

**DEPARTMENT OF TRANSPORTATION**

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January 12, 2004

04-SF-80-13.4,13.8  
04-0120E4  
ACBRIM-080-1(094)N

Addendum No. 6

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in THE CITY AND COUNTY OF SAN FRANCISCO AT YERBA BUENA ISLAND.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on January 21, 2004.

This addendum is being issued to revise the Project Plans, the Notice to Contractors and Special Provisions and the Proposal and Contract.

Project Plan Sheets 21, 34, 52, 54, 68, 70 and 71 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheet 5A is added. A half-sized copy of the added sheet is attached for addition to the project plans.

In the Special Provisions, "AMENDMENTS TO JULY 1999 STANDARD SPECIFICATIONS," Section 52, "REINFORCEMENT," is revised as attached.

In the Special Provisions, Section 5-1.0105, "INTERGRATED SHOP DRAWINGS," is revised as attached.

In the Special Provisions, Section 5-1.12, "PROJECT INFORMATION," subsection "INFORMATION HANDOUT," subsection "District Materials Information," Item "H" in the second paragraph is revised as follows:

"H. Underground Classification No. C151-075-04T, December 10, 2003, and No. C151-075-04T Amendment #1, December 18, 2003, by the Division of Occupational Safety and Health, Mining and Tunneling Unit."

In the Special Provisions, Section 5-1.19, "AREAS FOR CONTRACTOR'S USE," the following paragraph is added after the third paragraph:

"The Area CE as shown on the plans shall be available for the Contractor's use from January 1, 2005 to December 31, 2006. Access shall be made available to the Pier W2 area for work to be performed by the adjacent contract 04-0120F4."

In the Special Provisions, Section 5-1.25, "PAYMENTS," is revised as attached.

In the Special Provisions, Section 10-1.115, "WORKING DRAWING COORDINATION," replaced with Section 10-1.115, "WORKING DRAWING CAMPUS" as attached.

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In the Special Provisions, Section 10-1.24, "PILING," subsection "CAST-IN-DRILLED-HOLE CONCRETE PILES," the following paragraph is added after the fourth paragraph:

"Should the Contractor elect to use a temporary casing for constructing cast-in-drilled-hole concrete piling, driving of temporary casings will not be permitted. The Contractor may use an impact hammer to seat the temporary casing provided the impact hammer energy does not exceed 200 kJ. Use of a marine pile driving energy attenuator will not be required."

In the Special Provisions, Section 10-1.26, "CONCRETE STRUCTURES," subsection "MASS CONCRETE," subsection "Thermal Control Plan," the eleventh and twelfth paragraphs are revised as follows:

"After the completion of the mass concrete element, the Contractor shall remove all formwork, equipment and materials from the mass concrete element and clean the surface for the Engineer to measure the crack intensity. Surface crack intensity will be determined after monitoring shows the maximum internal temperature has dropped to within 5°C of the outer concrete temperature. Cracking shall be considered excessive if a surface crack intensity on any face of a concrete surface where cracks greater than 0.15 mm in width measure more than 1.0 m in cumulative length within any 2 m square area or where individual cracks greater than 0.15 mm in width measure more than 300 mm in length.

In case of excessive cracking, the Contractor shall suspend work on subsequent mass concrete placements, submit a written explanation of the thermal cracking and additional steps to be taken in the future to eliminate excessive cracking, and submit proposed modifications in writing to the Engineer for review. Concrete placement may not resume until the Engineer approves the proposed modifications."

In the Special Provisions, Section 10-1.29, "REINFORCEMENT," is revised as attached.

In the Special Provisions, Section 10-1.31, "STEEL STRUCTURES," subsection "TEMPLATE," the third paragraph is revised as follows:

"Twelve months prior to the completion of the number of days bid, the Contractor shall furnish to the Engineer a steel template with holes that correspond to the as-fabricated location of the tower anchorage anchor bolt pipe sleeves and dowels. The steel template shall be sufficiently rigid to locate holes for tower anchorage anchor bolt pipe sleeves and dowels within 5% of the tolerance required after shipping and erection. The steel template shall be comprised of four (4) match-marked quadrants or as otherwise approved by the Engineer. The Contractor shall submit steel template working drawings to the Engineer 30 working days prior to fabrication of the steel template. The Contractor shall allow the Engineer 10 working days to review and approve steel template working drawings."

In the Special Provisions, Section 10-3.05, "PILE CORROSION MONITORING SYSTEM," subsection "SUBMITTALS," subsection "Ultrasonic Thickness Probe," the first paragraph is revised as follows:

"The ultrasonic thickness transducers to be installed on the interior surface of the steel pile on Pier shall be an Accuscan, Lemo Connector Type, Transducer Part Number D790 manufactured by RT transducers distributed by Panametrics, or approved equal. Cable shall be as supplied by manufacturer for the intended use. The probes are to be installed permanently inside the pile shell and set in epoxy after the reinforcing cage is installed and before the tremie concrete is placed. Wiring shall be set in epoxy on the shell wall, or installed in a small conduit and sealed in silicone gel."

In the Proposal and Contract, the Engineer's Estimate, Alternate 1 and Alternate 2, Item 30 is revised, Item 40 and 41 are added and Item 39 is deleted as attached.

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Page 3  
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To Proposal and Contract book holders:

Replace the entire Engineer's Estimate in the Proposal with the attached revised Engineer's Estimate. The revised Engineer's Estimate is to be used in the bid.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the proposal.

Submit bids in the Proposal and Contract book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

This office is sending this addendum by UPS overnight mail to Proposal and Contract book holders to ensure that each receives it. A copy of this addendum and the modified wage rates are available for the contractor's use on the Internet Site:

**[http://www.dot.ca.gov/hq/esc/oe/weekly\\_ads/addendum\\_page.html](http://www.dot.ca.gov/hq/esc/oe/weekly_ads/addendum_page.html)**

If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY

REBECCA D. HARNAGEL, Chief  
Office of Plans, Specifications & Estimates  
Office Engineer

Attachments

## SECTION 52: REINFORCEMENT

Issue Date: November 06, 2003

The third paragraph in Section 52-1.04, "Inspection," of the Standard Specifications is amended to read:

- A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall also be furnished for each shipment of epoxy-coated bar reinforcement or wire reinforcement certifying that the coated reinforcement conforms to the requirements in ASTM Designation: A 775/A 775M or A 884/A 884M, respectively, and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement." The Certificate of Compliance shall include all of the certifications specified in ASTM Designation: A 775/A 775M or A 884/A 884M respectively, and a statement that the coating material has been prequalified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

Section 52-1.07 "Placing," of the Standard Specifications is amended to read by deleting item C of the third paragraph.

Section 52-1.08 "Splicing," of the Standard Specifications is amended to read:

### 52-1.08 SPLICING

- Splices of reinforcing bars shall consist of lap splices, service splices, or ultimate butt splices.
- Splicing of reinforcing bars will not be permitted at a location designated on the plans as a "No-Splice Zone." At the option of the Contractor, reinforcing bars may be continuous at locations where splices are shown on the plans. The location of splices, except where shown on the plans, shall be determined by the Contractor using available commercial lengths where practicable.
- Unless otherwise shown on the plans, splices in adjacent reinforcing bars at any particular section shall be staggered. The minimum distance between staggered lap splices or mechanical lap splices shall be the same as the length required for a lap splice in the largest bar. The minimum distance between staggered butt splices shall be 600 mm, measured between the midpoints of the splices along a line which is centered between the axes of the adjacent bars.

#### 52-1.08A Lap Splicing Requirements

- Splices made by lapping shall consist of placing reinforcing bars in contact and wiring them together, maintaining the alignment of the bars and the minimum clearances. Should the Contractor elect to use a butt welded or mechanical splice at a location not designated on the plans as requiring a service or ultimate butt splice, this splice shall conform to the testing requirements for service splice.
- Reinforcing bars shall not be spliced by lapping at locations where the concrete section is not sufficient to provide a minimum clear distance of 50 mm between the splice and the nearest adjacent bar. The clearance to the surface of the concrete specified in Section 52-1.07, "Placing," shall not be reduced.
- Reinforcing bars Nos. 43 and 57 shall not be spliced by lapping.
- Where ASTM Designations: A 615/A 615M, Grade 420 or A 706/A 706M reinforcing bars are required, the length of lap splices shall be as follows: Reinforcing bars No. 25 or smaller shall be lapped at least 45 diameters of the smaller bar joined; and reinforcing bars Nos. 29, 32, and 36 shall be lapped at least 60 diameters of the smaller bar joined, except when otherwise shown on the plans.
- Where ASTM Designation: A 615/A 615M, Grade 280 reinforcing bars are permitted, the length of lap splices shall be as follows: Reinforcing bars No. 25 or smaller shall be lapped at least 30 diameters of the smaller bar joined; and reinforcing bars Nos. 29, 32, and 36 shall be lapped at least 45 diameters of the smaller bar joined, except when otherwise shown on the plans.
- Splices in bundled bars shall conform to the following:
  - A In bundles of 2 bars, the length of the lap splice shall be the same as the length of a single bar lap splice.
  - B In bundles of 3 bars, the length of the lap splice shall be 1.2 times the length of a single bar lap splice.

• Welded wire fabric shall be lapped such that the overlap between the outermost cross wires is not less than the larger of:

- A. 150 mm,
- B. The spacing of the cross wires plus 50 mm, or
- C. The numerical value of the longitudinal wire size (MW-Size Number) times 370 divided by the spacing of the longitudinal wires in millimeters.

**52-1.08B Service Splicing and Ultimate Butt Splicing Requirements**

• Service splices and ultimate butt splices shall be either butt welded or mechanical splices, shall be used at the locations shown on the plans, and shall conform to the requirements of these specifications and the special provisions.

**52-1.08B(1) Mechanical Splices**

• Mechanical splices to be used in the work shall be on the Department's current prequalified list before use. The prequalified list can be obtained from the Department's internet site listed in the special provisions or by contacting the Transportation Laboratory directly.

• When tested in conformance with the requirements in California Test 670, the total slip of the reinforcing bars within the splice device after loading in tension to 200 MPa and relaxing to 20 MPa shall not exceed the values listed in the following table. The slip shall be measured between gage points that are clear of the splice device.

Reinforcing Bar Number	Total Slip (µm)
13	250
16	250
19	250
22	350
25	350
29	350
32	450
36	450
43	600
57	750

• Slip requirements shall not apply to mechanical lap splices, splices that are welded, or splices that are used on hoops.

• Splicing procedures shall be in conformance with the manufacturer's recommendations, except as modified in this section. Splices shall be made using the manufacturer's standard equipment, jigs, clamps, and other required accessories.

• Splice devices shall have a clear coverage of not less than 40 mm measured from the surface of the concrete to the outside of the splice device. Stirrups, ties, and other reinforcement shall be adjusted or relocated, and additional reinforcement shall be placed, if necessary, to provide the specified clear coverage to reinforcement.

• The Contractor shall furnish the following information for each shipment of splice material in conformance with the provisions in Section 6-1.07, "Certificates of Compliance:"

- A. The type or series identification of the splice material including tracking information for traceability.
- B. The bar grade and size number to be spliced.
- C. A copy of the manufacturer's product literature giving complete data on the splice material and installation procedures.
- D. A statement that the splicing systems and materials used in conformance with the manufacturer's installation procedures will develop the required tensile strengths, based on the nominal bar area, and will conform to the total slip requirements and the other requirements in these specifications.
- E. A statement that the splice material conforms to the type of mechanical splice in the Department's current prequalified list.

### **52-1.08B(2) Butt Welded Splices**

- Except for resistance butt welds, butt welded splices of reinforcing bars shall be complete joint penetration butt welds conforming to the requirements in AWS D 1.4, and these specifications.
- Welders and welding procedures shall be qualified in conformance with the requirements in AWS D 1.4.
- Only the joint details and dimensions as shown in Figure 3.2, "Direct Butt Joints," of AWS D 1.4, shall be used for making complete joint penetration butt welds of bar reinforcement. Split pipe backing shall not be used.
- Butt welds shall be made with multiple weld passes using a stringer bead without an appreciable weaving motion. The maximum stringer bead width shall be 2.5 times the diameter of the electrode and slagging shall be performed between each weld pass. Weld reinforcement shall not exceed 4 mm in convexity.
- Electrodes used for welding shall meet the minimum Charpy V-notch impact requirement of 27°J at -20°C.
- For welding of bars conforming to the requirements of ASTM Designation: A 615/A 615M, Grade 280 or Grade 420, the requirements of Table 5.2, "Minimum Preheat and Interpass Temperatures," of AWS D 1.4 are superseded by the following:

The minimum preheat and interpass temperatures shall be 200°C for Grade 280 bars and 300°C for Grade 420 bars. Immediately after completing the welding, at least 150 mm of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 90°C.

- When welding different grades of reinforcing bars, the electrode shall conform to Grade 280 bar requirements and the preheat shall conform to the Grade 420 bar requirements.
- In the event that any of the specified preheat, interpass, and post weld cooling temperatures are not met, all weld and heat affected zone metal shall be removed and the splice rewelded.
- Welding shall be protected from air currents, drafts, and precipitation to prevent loss of heat or loss of arc shielding. The method of protecting the welding area from loss of heat or loss of arc shielding shall be subject to approval by the Engineer.
- Reinforcing bars shall not be direct butt spliced by thermite welding.
- Procedures to be used in making welded splices in reinforcing bars, and welders employed to make splices in reinforcing bars, shall be qualified by tests performed by the Contractor on sample splices of the type to be used, before making splices to be used in the work.

### **52-1.08B(3) Resistance Butt Welds**

- Shop produced resistance butt welds shall be produced by a fabricator who is approved by the Transportation Laboratory. The list of approved fabricators can be obtained from the Department's internet site or by contacting the Transportation Laboratory directly.
- Before manufacturing hoops using resistance butt welding, the Contractor shall submit to the Engineer the manufacturer's Quality Control (QC) manual for the fabrication of hoops. As a minimum, the QC manual shall include the following:

- A. The pre-production procedures for the qualification of material and equipment.
- B. The methods and frequencies for performing QC procedures during production.
- C. The calibration procedures and calibration frequency for all equipment.
- D. The welding procedure specification (WPS) for resistance welding.
- E. The method for identifying and tracking lots.

### **52-1.08C Service Splice and Ultimate Butt Splice Testing Requirements**

- The Contractor shall designate in writing a splicing Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for 1) the quality of all service and ultimate butt splicing including the inspection of materials and workmanship performed by the Contractor and all subcontractors; and 2) submitting, receiving, and approving all correspondence, required submittals, and reports regarding service and ultimate splicing to and from the Engineer.
- The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

- Testing on prequalification and production sample splices shall be performed at the Contractor's expense, at an independent qualified testing laboratory. The laboratory shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors who will provide other services or materials for the project, and shall have the following:

- A. Proper facilities, including a tensile testing machine capable of breaking the largest size of reinforcing bar to be tested with minimum lengths as shown in this section.
- B. A device for measuring the total slip of the reinforcing bars across the splice to the nearest 25  $\mu\text{m}$ , that, when placed parallel to the longitudinal axis of the bar is able to simultaneously measure movement across the splice, at 2 locations, 180 degrees apart.
- C. Operators who have received formal training for performing the testing requirements of ASTM Designation: A 370 and California Test 670.
- D. A record of annual calibration of testing equipment performed by an independent third party that has 1) standards that are traceable to the National Institute of Standards and Technology, and 2) a formal reporting procedure, including published test forms.

- The Contractor shall provide samples for quality assurance testing in conformance with the provisions in these specifications and the special provisions.

- Prequalification and production sample splices shall be 1) a minimum length of 1.5 meters for reinforcing bars No. 25 or smaller, and 2 meters for reinforcing bars No. 29 or larger, with the splice located at mid-point; and 2) suitably identified before shipment with weatherproof markings that do not interfere with the Engineer's tamper-proof markings or seals. Splices that shows signs of tampering will be rejected.

- Each set or sample splice, as defined herein, shall be identified as representing either a prequalification or production test sample splice.

- For the purpose of production testing, a lot of either service splices or ultimate butt splices is defined as 1) 150, or fraction thereof, of the same type of mechanical splices used for each bar size and each bar deformation pattern that is used in the work, or 2) 150, or fraction thereof, of complete joint penetration butt welded splices, or resistance butt welded splices for each bar size used in the work. If different diameters of hoop reinforcement are shown on the plans, separate lots shall be used for each different hoop diameter.

- Whenever a lot of splices is rejected, the rejected lot and subsequent lots of splices shall not be used in the work until 1) the QCM performs a complete review of the Contractor's quality control process for these splices, 2) a written report is submitted to the Engineer describing the cause of failure for the splices in this lot and provisions for preventing similar failures in future lots, and 3) the Engineer has provided the Contractor with written notification that the report is acceptable. The Engineer shall have 3 working days after receipt of the report to provide notification to the Contractor. In the event the Engineer fails to provide notification within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in providing notification, the Contractor will be compensated for any resulting loss, and an extension of time will be granted in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

#### **52-1.08C(1) Splice Prequalification Report**

- Before using any service splices or ultimate butt splices in the work, the Contractor shall submit a Splice Prequalification Report. The report shall include splice material information, names of the operators who will be performing the splicing, and descriptions of the positions, locations, equipment, and procedures that will be used in the work.

- The Splice Prequalification Report shall also include certifications from the fabricator for prequalifications of operators and procedures based on sample tests performed no more than 2 years before submitting the report. Each operator shall be certified by performing 2 sample splices for each bar size of each splice type that the operator will be performing in the work. For deformation-dependent types of splice devices, each operator shall be certified by performing 2 additional samples for each bar size and deformation pattern that will be used in the work.

- Prequalification sample splices shall be tested by an independent qualified testing laboratory and shall conform to the appropriate production test criteria and slip requirements specified herein. When epoxy-coated reinforcement is required, resistance butt welded sample splices shall have the weld flash removed by the same procedure as will be used in the work, before coating and testing. The Splice Prequalification Report shall include the certified test results for all prequalification sample splices.

- The QCM shall review and approve the Splice Prequalification Report before submitting it to the Engineer for approval. The Contractor shall allow 2 weeks for the review and approval of a complete report before performing any service splicing or ultimate butt splicing in the work. In the event the Engineer fails to complete the review within the time allowed, and in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

#### **52-1.08C(2) Service Splice Test Criteria**

- Service production and quality assurance sample splices shall be tensile tested in conformance with the requirements in ASTM Designation: A 370 and California Test 670 and shall develop a minimum tensile strength of not less than 550 MPa.

#### **52-1.08C(2)(a) Production Test Requirements for Service Splices**

- Production tests shall be performed by the Contractor's independent laboratory for all service splices used in the work. A production test shall consist of testing 4 sample splices prepared for each lot of completed splices. The samples shall be prepared by the Contractor using the same splice material, position, operators, location, and equipment, and following the same procedure as used in the work.

- At least one week before testing, the Contractor shall notify the Engineer in writing of the date when and the location where the testing of the samples will be performed.

- The 4 samples from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the independent laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 samples of splices shall not be tested.

- Before performing any tensile tests on production test sample splices, one of the 4 samples shall be tested for, and shall conform to, the requirements for total slip. Should this sample not meet the total slip requirements, one retest, in which the 3 remaining samples are tested for total slip, will be allowed. Should any of the 3 remaining samples not conform to the total slip requirements, all splices in the lot represented by this production test will be rejected.

- If 3 or more sample splices from a production test conform to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," all splices in the lot represented by this production test will be considered acceptable, provided each of the 4 samples develop a minimum tensile strength of not less than 420 MPa.

- Should only 2 sample splices from a production test conform to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," one additional production test shall be performed on the same lot of splices. This additional production test shall consist of testing 4 sample splices that have been randomly selected by the Engineer and removed by the Contractor from the actual completed lot of splices. Should any of the 4 splices from this additional test fail to conform to these provisions, all splices in the lot represented by these production tests will be rejected.

- If only one sample splice from a production test conforms to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," all splices in the lot represented by this production test will be rejected.

- If a production test for a lot fails, the Contractor shall repair or replace all reinforcing bars from which sample splices were removed before the Engineer selects additional splices from this lot for further testing.

#### **52-1.08C(2)(b) Quality Assurance Test Requirements for Service Splices**

- For the first production test performed, and for at least one, randomly selected by the Engineer, of every 5 subsequent production tests, or portion thereof, the Contractor shall concurrently prepare 4 additional service quality assurance sample splices. These service quality assurance sample splices shall be prepared in the same manner as specified herein for service production sample splices.

- These 4 additional quality assurance sample splices shall be shipped to the Transportation Laboratory for quality assurance testing. The 4 sample splices shall be securely bundled together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 samples of splices will not be tested. Sample splices not accompanied by the supporting documentation required in Section 52-1.08B(1), for mechanical splices, or in Section 52-1.08B(3), for resistance butt welds, will not be tested.

- Quality assurance testing will be performed in conformance with the requirements for service production sample splices in Section 52-1.08C(2)(a), "Production Test Requirements for Service Splices."

### **52-1.08C(3) Ultimate Butt Splice Test Criteria**

- Ultimate production and quality assurance sample splices shall be tensile tested in conformance with the requirements described in ASTM Designation: A 370 and California Test 670.
- A minimum of one control bar shall be removed from the same bar as, and adjacent to, all ultimate production, and quality assurance sample splices. Control bars shall be 1) a minimum length of one meter for reinforcing bars No. 25 or smaller and 1.5 meters for reinforcing bars No. 29 or larger, and 2) suitably identified before shipment with weatherproof markings that do not interfere with the Engineer's tamper-proof markings or seals. The portion of adjacent bar remaining in the work shall also be identified with weatherproof markings that correspond to its adjacent control bar.
  - Each sample splice and its associated control bar shall be identified and marked as a set. Each set shall be identified as representing a prequalification, production, or quality assurance sample splice.
  - The portion of hoop reinforcing bar, removed to obtain a sample splice and control bar, shall be replaced using a prequalified ultimate mechanical butt splice, or the hoop shall be replaced in kind.
  - Reinforcing bars, other than hoops, from which sample splices are removed, shall be repaired using ultimate mechanical butt splices conforming to the provisions in Section 52-1.08C(1), "Splice Prequalification Report," or the bars shall be replaced in kind. These bars shall be repaired or replaced such that no splices are located in any "No Splice Zone" shown on the plans.
  - Ultimate production and quality assurance sample splices shall rupture in the reinforcing bar either: 1) outside of the affected zone or 2) within the affected zone, provided that the sample splice has achieved at least 95 percent of the ultimate tensile strength of the control bar associated with the sample splice. In addition, necking of the bar shall be visibly evident at rupture regardless of whether the bar breaks inside or outside the affected zone.
    - The affected zone is the portion of the reinforcing bar where any properties of the bar, including the physical, metallurgical, or material characteristics, have been altered by fabrication or installation of the splice.
    - The ultimate tensile strength shall be determined for all control bars by tensile testing the bars to rupture, regardless of where each sample splice ruptures. If 2 control bars are tested for one sample splice, the bar with the lower ultimate tensile strength shall be considered the control bar.

### **52-1.08C(3)(a) Production Test Requirements for Ultimate Butt Splices**

- Production tests shall be performed for all ultimate butt splices used in the work. A production test shall consist of testing 4 sets of sample splices and control bars removed from each lot of completed splices, except when quality assurance tests are performed.
  - After the splices in a lot have been completed, and the bars have been epoxy-coated when required, the QCM shall notify the Engineer in writing that the splices in this lot conform to the specifications and are ready for testing. Except for hoops, sample splices will be selected by the Engineer at the job site. Sample splices for hoops will be selected by the Engineer either at the job site or a fabrication facility.
  - After notification has been received, the Engineer will randomly select the 4 sample splices to be removed from the lot and place tamper-proof markings or seals on them. The Contractor shall select the adjacent control bar for each sample splice bar, and the Engineer will place tamper-proof markings or seals on them. These ultimate production sample splices and control bars shall be removed by the Contractor, and tested by an independent qualified testing laboratory.
  - At least one week before testing, the Contractor shall notify the Engineer in writing of the date when and the location where the testing of the samples will be performed.
  - A sample splice or control bar from any set will be rejected if a tamper-proof marking or seal is disturbed before testing.
  - The 4 sets from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the independent laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 sets of splices shall not be tested.
  - Before performing any tensile tests on production test sample splices, one of the 4 sample splices shall be tested for, and shall conform to, the requirements for total slip. Should this sample splice not meet these requirements, one retest, in which the 3 remaining sample splices are tested for total slip, will be allowed. Should any of the 3 remaining sample splices not conform to these requirements, all splices in the lot represented by this production test will be rejected.
  - If 3 or more sample splices from a production test conform to the provisions in Section 52-1.08C(3), "Ultimate Butt Splice Test Criteria," all splices in the lot represented by this production test will be considered acceptable.

- Should only 2 sample splices from a production test conform to the provisions in Section 52-1.08C(3), "Ultimate Butt Splice Test Criteria," one additional production test shall be performed on the same lot of splices. Should any of the 4 sample splices from this additional test fail to conform to these provisions, all splices in the lot represented by these production tests will be rejected.

- If only one sample splice from a production test conforms to the provisions in Section 52-1.08C(3), "Ultimate Butt Splice Test Criteria," all splices in the lot represented by this production test will be rejected.

- If a production test for a lot fails, the Contractor shall repair or replace all reinforcing bars from which sample splices were removed, complete in place, before the Engineer selects additional splices from this lot for further testing.

- Production tests will not be required on repaired splices from a lot, regardless of the type of prequalified ultimate mechanical butt splice used to make the repair. However, should an additional production test be required, the Engineer may select any repaired splice for the additional production test.

#### **52-1.08C(3)(b) Quality Assurance Test Requirements for Ultimate Butt Splices**

- For the first production test performed, and for at least one, randomly selected by the Engineer, of every 5 subsequent production tests, or portion thereof, the Contractor shall concurrently prepare 4 additional ultimate quality assurance sample splices along with associated control bars.

- Each time 4 additional ultimate quality assurance sample splices are prepared, 2 of these quality assurance sample splice and associated control bar sets and 2 of the production sample splice and associated control bar sets, together, shall conform to the requirements for ultimate production sample splices in Section 52-1.08C(3)(a), "Production Test Requirements for Ultimate Butt Splices."

- The 2 remaining quality assurance sample splice and associated control bar sets, along with the 2 remaining production sample splice and associated control bar sets shall be shipped to the Transportation Laboratory for quality assurance testing. The 4 sets shall be securely bundled together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 sets will not be tested.

- Quality assurance testing will be performed in conformance with the requirements for ultimate production sample splices in Section 52-1.08C(3)(a), "Production Test Requirements for Ultimate Butt Splices."

#### **52-1.08C(3)(c) Nondestructive Splice Tests**

- When the specifications allow for welded sample splices to be taken from other than the completed lot of splices, the Contractor shall meet the following additional requirements.

- Except for resistance butt welded splices, radiographic examinations shall be performed on 25 percent of all complete joint penetration butt welded splices from a production lot. The size of a production lot will be a maximum of 150 splices. The Engineer will select the splices which will compose the production lot and also the splices within each production lot to be radiographically examined.

- All required radiographic examinations of complete joint penetration butt welded splices shall be performed by the Contractor in conformance with the requirements in AWS D 1.4 and these specifications.

- Before radiographic examination, welds shall conform to the requirements in Section 4.4, "Quality of Welds," of AWS D 1.4.

- Should more than 12 percent of the splices which have been radiographically examined in any production lot be defective, an additional 25 percent of the splices, selected by the Engineer from the same production lot, shall be radiographically examined. Should more than 12 percent of the cumulative total of splices tested from the same production lot be defective, all remaining splices in the lot shall be radiographically examined.

- Additional radiographic examinations performed due to the identification of defective splices shall be at the Contractor's expense.

- All defects shall be repaired in conformance with the requirements in AWS D 1.4.

- The Contractor shall notify the Engineer in writing 48 hours before performing any radiographic examinations.

- The radiographic procedure used shall conform to the requirements in AWS D1.1, AWS D1.4, and the following:

Two exposures shall be made for each complete joint penetration butt welded splice. For each of the 2 exposures, the radiation source shall be centered on each bar to be radiographed. The first exposure shall be made with the radiation source placed at zero degrees from the top of the weld and perpendicular to the weld root and identified with a station mark of "0." The second exposure shall be at 90 degrees to the "0" station mark and shall be identified with a station mark of "90." When obstructions prevent a 90 degree placement of the radiation source for the second exposure, and when approved in writing by the Engineer, the source may be rotated, around the centerline of the reinforcing bar, a maximum of 25 degrees.

For field produced complete joint penetration butt welds, no more than one weld shall be radiographed during one exposure. For shop produced complete joint penetration butt welds, if more than one weld is to be radiographed during one exposure, the angle between the root line of each weld and the direction to the radiation source shall be not less than 65 degrees.

Radiographs shall be made by either X-ray or gamma ray. Radiographs made by X-ray or gamma rays shall have densities of not less than 2.3 nor more than 3.5 in the area of interest. A tolerance of 0.05 in density is allowed for densitometer variations. Gamma rays shall be from the iridium 192 isotope and the emitting specimen shall not exceed 4.45 mm in the greatest diagonal dimension.

The radiographic film shall be placed perpendicular to the radiation source at all times; parallel to the root line of the weld unless source placement determines that the film must be turned; and as close to the root of the weld as possible.

The minimum source to film distance shall be maintained so as to ensure that all radiographs maintain a maximum geometric unsharpness of 0.020 at all times, regardless of the size of the reinforcing bars.

Penetrators shall be placed on the source side of the bar and perpendicular to the radiation source at all times. One penetrator shall be placed in the center of each bar to be radiographed, perpendicular to the weld root, and adjacent to the weld. Penetrator images shall not appear in the weld area.

When radiography of more than one weld is being performed per exposure, each exposure shall have a minimum of one penetrator per bar, or 3 penetrators per exposure. When 3 penetrators per exposure are used, one penetrator shall be placed on each of the 2 outermost bars of the exposure, and the remaining penetrator shall be placed on a centrally located bar.

An allowable weld buildup of 4 mm may be added to the total material thickness when determining the proper penetrator selection. No image quality indicator equivalency will be accepted. Wire penetrators or penetrator blocks shall not be used.

Penetrators shall be sufficiently shimmed using a radiographically identical material. Penetrator image densities shall be a minimum of 2.0 and a maximum of 3.6.

Radiographic film shall be Class 1, regardless of the size of reinforcing bars.

Radiographs shall be free of film artifacts and processing defects, including, but not limited to, streaks, scratches, pressure marks or marks made for the purpose of identifying film or welding indications.

Each splice shall be clearly identified on each radiograph and the radiograph identification and marking system shall be established between the Contractor and the Engineer before radiographic inspection begins. Film shall be identified by lead numbers only; etching, flashing or writing in identifications of any type will not be permitted. Each piece of film identification information shall be legible and shall include, as a minimum, the following information: Contractor's name, date, name of nondestructive testing firm, initials of radiographer, contract number, part number and weld number. The letter "R" and repair number shall be placed directly after the weld number to designate a radiograph of a repaired weld.

Radiographic film shall be developed within a time range of one minute less to one minute more than the film manufacturer's recommended maximum development time. Sight development will not be allowed.

Processing chemistry shall be done with a consistent mixture and quality, and processing rinses and tanks shall be clean to ensure proper results. Records of all developing processes and any chemical changes to the developing processes shall be kept and furnished to the Engineer upon request. The Engineer may request, at any time, that a sheet of unexposed film be processed in the presence of the Engineer to verify processing chemical and rinse quality.

The results of all radiographic interpretations shall be recorded on a signed certification and a copy kept with the film packet.

Technique sheets prepared in conformance with the requirements in ASME Boiler and Pressure Vessels Code, Section V, Article 2 Section T-291 shall also contain the developer temperature, developing time, fixing duration and all rinse times.

#### **52-1.08D Reporting Test Results**

- A Production Test Report for all testing performed on each lot shall be prepared by the independent testing laboratory performing the testing and submitted to the QCM for review and approval. The report shall be signed by an engineer who represents the laboratory and is registered as a Civil Engineer in the State of California. The report shall include, as a minimum, the following information for each test: contract number, bridge number, lot number and location, bar size, type of splice, length of mechanical splice, length of test specimen, physical condition of test sample splice and any associated control bar, any notable defects, total measured slip, ultimate tensile strength of each splice, and for ultimate butt splices, limits of affected zone, location of visible necking area, ultimate tensile strength and 95 percent of this ultimate tensile strength for each control bar, and a comparison between 95 percent of the ultimate tensile strength of each control bar and the ultimate tensile strength of its associated splice.

- The QCM must review, approve, and forward each Production Test Report to the Engineer for review before the splices represented by the report are encased in concrete. The Engineer will have 3 working days to review each Production Test Report and respond in writing after a complete report has been received. Should the Contractor elect to encase any splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase splices pending notification by the Engineer, and in the event the Engineer fails to complete the review and provide notification within the time allowed, and if, in the opinion of the Engineer, the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

- Quality assurance test results for each bundle of 4 sets or 4 samples of splices will be reported in writing to the Contractor within 3 working days after receipt of the bundle by the Transportation Laboratory. In the event that more than one bundle is received on the same day, 2 additional working days shall be allowed for providing test results for each additional bundle received. A test report will be made for each bundle received. Should the Contractor elect to encase splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase splices pending notification by the Engineer, and in the event the Engineer fails to complete the review within the time allowed, and in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

Section 52-1.08F, "Nondestructive Splice Tests," of the Standard Specifications is amended by deleting the seventh paragraph.

### **5-1.0105 INTEGRATED SHOP DRAWINGS**

Difficult construction is anticipated at the Tower footing, and the Pier E2 footing and columns that are highly congested with steel plates, stiffeners, studs, dowels, pile sleeves, reinforcing steel, headed reinforcing steel, anchor bolts, pipe sleeves, drain pipes, and other concrete embedded items as shown on the plans. The Contractor shall develop three-dimensional integrated shop drawings (ISD) for the Tower and Pier E2 including columns and footings, in accordance with the details shown on the plans and the requirements of this section. The ISD shall conform to Section "Working Drawings," of these special provisions. The ISD shall be of sufficient detail to demonstrate compatibility of the embedded items within the concrete.

Prior to commencing work on the ISD, the Contractor (including any subconsultants hired to work on the ISD) shall attend a meeting with the Engineer to discuss the ISD work.

The Contractor shall utilize commercially available software that checks for interference in three dimensions. Prior to acquiring the software, the Contractor shall submit to the Engineer the product name and application features of the software for review and approval. The software shall be compatible with the computer-aided drafting (CAD) software used to develop the ISD. Bar reinforcement shall be shown with deformed diameters. The Contractor shall develop CAD files using different layers for each type of embedded item such that the sequence of construction of the member or area being detailed can be shown. Attention is directed to "Working Drawing Campus" elsewhere in these special provisions for other equipment and software requirements.

Embedded items that are to be shown on the ISD shall include, but are not limited to, the following:

- A. Bar reinforcing steel and splices including lap, welded, and mechanical splices
- B. Casings and pipes
- C. Anchor bolts
- D. Drainage pipes
- E. Corrosion protection system items
- F. Inserts, bolt sleeves, dowels and studs
- G. Other items, as shown on the plans

The Contractor shall use the ISD to identify and eliminate interference between the planned positions of embedded items and to satisfy the concrete cover shown on the plans.

If a conflict is identified, the Contractor shall document the conflict and propose changes to the embedded items in the ISD to resolve the conflict. Proposed changes to the embedded items shall be made by a licensed engineer practicing civil engineering with extensive previous experience developing ISD.

The Contractor's proposed changes in the ISD shall comply with the following sequence of item adjustments:

- A. Non structural embedded items.
- B. Bar reinforcing steel.

The Contractor shall use the following measures in the order prescribed to resolve interference issues during the preparation of the ISD:

- A. Adjust reinforcement spacing.
- B. Bundle bars.
- C. Relocate splices.
- D. Change reinforcement size and number. Reduction of the total reinforcement area will not be permitted, unless otherwise approved by the Engineer.
- E. Change reinforcement shape.
- F. Move embedded inserts.

The ISD to be submitted to the Engineer shall include the following:

- A. Three sets of the ISD corresponding to the details as shown on the plans without any modifications. These ISD shall indicate all conflicts including locations of the conflicts and items involved in the conflicts.
- B. Three complete lists of conflicts with descriptions and the Contractor's proposed modifications for each conflict.

- C. Three sets of the ISD corresponding to the details as shown on the plans with incorporation of the Contractor's proposed modifications. These ISD shall indicate that all previous identified conflicts have been resolved and concrete cover requirements as shown on the plans are met.
- D. ISD shall be 559 mm x 864 mm in size and shall use colored ink to differentiate each type of embedded items. For each portion of the structure, ISD shall include a minimum of six isometric views. Any two isometric views shall be 90 degrees apart.
- E. Three copies of the ISD in electronic form on compact discs or tape for use by the Engineer.

An ISD submittal that complies with all of the above requirements, in the opinion of the Engineer, will be defined as a complete ISD submittal. Submittal of isometric drawings made from ISD shall in no way relieve the Contractor from any other working drawing submittal required by these special provisions or the Standard Specifications.

CAD files of the contract drawings will not be made available to the Contractor.

After an ISD submittal is received by the Engineer, the Contractor shall allow the Engineer 7 days to review the ISD submittal for completeness. If determined to be complete, the Engineer shall have 28 working days from the day of receipt to review and approve the ISD submittal. For proposed modifications that are not approved by the Engineer, the Engineer will propose alternative modifications to the Contractor. The Contractor shall submit revised ISD incorporating the Engineer's alternative modifications as specified in this section.

Assembly of the mock-up represented by the ISD and construction of the Tower footing and the Pier E2 footings and columns shall not begin until the Engineer reviews and approves the complete ISD submittal with all conflicts resolved.

No extension of time will be permitted for the Contractor's failure to complete the ISD as required by these special provisions.

Full compensation for preparing ISD, including all revisions necessary due to conflict resolution measures taken by the Contractor, shall be considered as included in the contract prices paid for the various items of work and no additional compensation will be allowed therefore.

### 5-1.25 PAYMENTS

Attention is directed to Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

Partial Payments shall conform to Section 9-1.06, "Partial Payments," of the Standard Specifications and these special provisions.

In conformance with 49 CFR, Part 26, Subpart A, Section 26.29 (b)(1), the retention of proceeds required by Public Contract Code Section 10261 shall not apply. In conformance with Public Contract Code 7200 (b), in subcontracts between the Contractor and a subcontractor and in subcontracts between a subcontractor and any subcontractor thereunder, retention proceeds shall not be withheld, and the exceptions provided in Public Contract Code 7200 (c) shall not apply. At the option of the Contractor, subcontractors shall be required to furnish payment and performance bonds issued by an admitted surety insurer.

The third and fourth paragraphs of Section 9-1.06, "Partial Payments," of the Standard Specifications, and Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications shall not apply.

The Department shall pay monthly to the Contractor, while carrying on the work, the balance, after deducting therefrom all previous payments and all sums to be kept or withheld under the provisions of the contract. No monthly estimate or payment shall be required to be made when, in the judgement of the Engineer, the work is not proceeding in accordance with the provisions of the contract.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes:

A. Electronic Mobile Daily Diary Computer System Data Delivery	\$ 7,500
B. Progress Schedule (critical Path)	\$40,000
C. Establish Marine Access	\$5,000,000
D. Working Drawing Campus	\$4,000,000

After acceptance of the contract pursuant to the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes hereinabove listed for the item, will be included for payment in the first estimate made after acceptance of the contract.

In determining the partial payments to be made to the Contractor, only the following listed materials will be considered for inclusion in the payment as materials furnished but not incorporated in the work:

- A. Steel shells for cast-in-steel shell piling
- B. Permanent steel casings
- C. Bar reinforcing steel
- D. Bar reinforcing steel (epoxy coated)
- E. Headed bar reinforcement
- F. Structural steel
- G. Miscellaneous metal

Plate steel for fabrication of structural steel and fabricated elements for structural steel, fabricated and stored in fenced areas with locked gates or in locked warehouses stored within will be eligible for partial payment if the Contractor furnishes evidence satisfactory to the Engineer that its storage is subject to or under the control of the Department and that it has been designated or fabricated specifically for this project and is of such character that is not adaptable to any other use.

Attention is directed to Section 2-1.104, "Alternative Bids," and Section 3, "Award and Execution of the Contract," of these special provisions. If the contract is awarded based upon a bid pursuant to "Engineer's Estimate, Alternative 1, Foreign Steel and Iron Alternative," the following shall apply: For the purpose of making partial payments for plate steel and fabricated elements for structural steel fabricated and stored outside the United States pursuant to these special provisions and Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount of \$30,000,000 for each monthly pay estimate shall be deemed to be the maximum value which will be recognized for progress payment purposes, until such material is brought into the United States.

If the contract is awarded based upon a bid pursuant to "Engineer's Estimate, Alternative 1, Foreign Steel and Iron Alternative," the successful bidder shall furnish a bond or first demand bank guarantee to secure the value of potential partial payments for plate steel and fabricated elements for structural steel fabricated and stored outside the United States pursuant to these special provisions and Section 9-1.06, "Partial Payments," of the Standard Specifications." The bond form will be furnished to the successful bidder by the Department. The bond shall be in a sum equal to at least \$30,000,000. All alterations, extensions of time, extra and additional work, and other changes authorized by these special provisions or any part of the contract may be made without securing the consent of the surety of the bond.

### **10-1.115 WORKING DRAWING CAMPUS**

The objective of the working drawing campus is to prepare, submit, review and process working drawings in the shortest and most efficient manner possible. After the bid, the Department will make its Design engineers available for consultation on site with the contractor's engineers and detailers who are preparing working drawings. The effort will focus on the most critical and time dependent working drawings first to prevent delay to the project schedule. It is the Contractor's responsibility to submit working drawings sufficiently in advance of the start of the affected work, in accordance with "Working Drawings" of these special provisions.

The Contractor shall provide the following within 60 days of contract award to facilitate early resolution of construction working drawings:

1. Suitable office facilities within 10 km of the San Francisco-Oakland Bay Bridge Toll Plaza for a minimum of one year. The facilities shall include workspace for the Contractor's staff as determined by the Contractor plus a minimum of 4 vacant, separate office cubicles or rooms intended for the use by the Department or its representatives, and a common meeting room with meeting table to seat a minimum of 6 people. The facilities shall also include access to a copier, and a fax machine. Each workspace shall include a minimum of a desk, office chair, bookshelf, phone, and T1 computer cabling. The Contractor is responsible for providing local phone service, internet access and building utility services.
2. On-site Coordination Engineer. The Coordination Engineer shall be a full time, on-site, registered Civil Engineer in the State of California, and available to coordinate, manage, and process shop/working drawings for the project.
3. Full time, on-site staff authorized by the Contractor to be capable of producing and revising working drawings, and in conjunction with such work generating and assisting in resolution of requests for information and potentially resultant change orders. It is not required that all the Contractor's design staff be located on-site.
4. Regularly scheduled submittal status meetings (daily if required) to discuss the status and resolve shop/working drawing issues, attended by representatives of the Engineer and the Contractor's coordinator and staff as appropriate.
5. Regular updates of the working drawing submittal schedule specified in "Working Drawing Submittal Schedule," of these special provisions.

The Contractor shall provide a submittal for the Working Drawing Campus within the first 10 calendar days of award of contract. The submittal shall show the location of the office, layout of the office space and meeting room, and list of the furnishing, including office computer, telephone, desk and chairs to be supplied. The Department will review within 10 working days.

Conformance with these special provisions does not relieve the Contractor of the responsibility for furnishing complete shop/working drawings or producing finished work of the quality specified in the Standard Specifications, these special provisions and as shown on the plans.

The Contractor shall submit, for approval by the Engineer, a schedule of costs detailing the breakdown of the contract lump sum item. The schedule of costs shall be proportionate to the work involved and shall detail the costs and payment schedule for each cost item associated with the process entailed in obtaining approval on all approved working drawing as specified hereunder. When requested by the Engineer, the Contractor shall furnish any cost data, which might assist the Engineer in verifying one-time partial payments and establishing a suitable schedule of costs. The schedule of costs will be used to determine progress payments for "Working Drawing Campus" during the progress of the work. The schedule of costs shall be submitted to the Engineer for approval within 10 days of contract award. The Engineer shall be allowed 10 days for approval or return for correction of the submittal.

### **EQUIPMENT AND SOFTWARE**

Attention is directed to "Integrated Shop Drawings" elsewhere in these special provisions.

The Contractor shall provide for the State's exclusive possession and use a complete computer system specifically capable of creating, storing, and updating ISD utilizing the latest hardware and software technology. Before delivery and setup of the computer system, the Contractor shall submit to the Engineer for approval a detailed list of all computer hardware and software the Contractor proposes to furnish. The minimum computer system to be furnished shall include the following:

- A. Complete computer system, including keyboard, mouse with scroll, video card with one hundred twenty eight (128) megabyte onboard memory and dual ports, two 530-mm color SVGA monitors (1,024x768 pixels), current Intel Pentium IV micro processor chip, or equivalent or later;

- B. Computer operating system software, compatible with the selected processing unit and CADD software, for Windows 2000, equivalent;
- C. Minimum one (1) gigabytes of random access memory (RAM);
- D. A 100 gigabyte minimum hard disk drive, a 1.44 megabyte 90-mm floppy disk drive, 32x speed minimum CD-RW drive, 10/100 Ethernet card, two UBCUSB ports;
- E. CADD software identical to the CADD software used by the Contractor to generate ISD;
- F. Microsoft Office software, the latest version for Windows NT/Windows 2000, or later, and McAfee Virus software or equivalent.
- G. A color laser-jet printer with a minimum of eight (8) megabytes of RAM, capable of 600 dots per inch color, 600 dots per inch monochrome or equivalent. Capable of printing fully legible plots in color with a minimum size of 279-mm by 432-mm. LaserJet toner and paper to be provided throughout the contract. HP LaserJet 5500, equivalent or later.

The computer hardware and software furnished shall be compatible with that used by the Contractor for the production of the ISD by the Contract, and shall include original instruction manuals and other documentation normally provided with the software.

The Contractor shall furnish, install, set up, maintain and repair the computer hardware and software ready for use at a location determined by the Engineer. The hardware and software shall be installed and ready for use at least 30 days prior to submittal of the first ISD. The Contractor shall provide 16 hours of formal training for the Engineer, and three other agents of the department designated by the Engineer, in the use of the hardware and software to include generating 3-D drawings, merging files, and manipulating drawing elements. An authorized vendor of CADD software shall perform the training.

All computer hardware and software furnished shall remain the property of the Contractor and shall be removed by the Contractor upon acceptance of the contract.

#### **MEASUREMENT AND PAYMENT**

Attention is directed to "Payments," of these special provisions.

The contract lump sum price paid for working drawing campus shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in facilitating early resolution of construction working drawings, including but not limited to utility connection costs, maintenance costs, purchasing of office equipment and furniture, and set up and removal of the office facility.

### **10-1.29 REINFORCEMENT**

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

Attention is directed to the section "Headed Bar Reinforcement," of these special provisions.

Exposed portion of reinforcement at the top of columns shall be cleaned and painted. Dirt, loose rust and mill scale shall be removed in conformance with the requirements in Surface Preparation Specification No. 2, "Hand Tool Cleaning," of the "SSPC: The Society for Protective Coatings." One application of a zinc-rich primer shall be applied to the exposed surface of the reinforcement in conformance with the provisions in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications.

The Department's mechanical splices prequalified list can be found at the following internet site:

[http://www.dot.ca.gov/hq/esc/approved\\_products\\_list/](http://www.dot.ca.gov/hq/esc/approved_products_list/)

The provisions of "Welding Quality Control" of these special provisions shall not apply to resistance butt welding.

At the option of the Contractor, sample splices shall be either 1) removed from the completed lot, or 2) prepared in the same manner as specified in Section 52-1.08 "Splicing," of the Standard Specifications for ultimate prequalification sample splices and control bars.

### **EPOXY-COATED PREFABRICATED REINFORCEMENT**

Bar reinforcement to be epoxy-coated shall conform to the ASTM Designation and grade required or permitted by Section 52-1.02A, "Bar Reinforcement," of the Standard Specifications, for the location or type of structure involved. The coated bar reinforcement shall conform to the requirements in ASTM Designation: A 934/A 934M except as provided herein.

Welded wire fabric and wire reinforcement to be epoxy-coated shall conform to the ASTM Designation and grade required or permitted by Section 52-1.02C, "Welded Wire Fabric," and Section 52-1.02D, "Reinforcing Wire," of the Standard Specifications, respectively, for the location or type of structure involved. The coated wire reinforcement shall conform to the requirements for Class A, Type 2 coating of ASTM Designation: A 884/A 884M except as provided herein.

Appendices X1 and X2, "Guidelines For Job-Site Practices," of ASTM Designation: A 884/A 884M and A 934/A 934M, respectively, shall apply except as provided herein. The term "shall" shall replace the term "should" in these appendices. Section X1.2 of Appendix X1 and Section X2.2 of Appendix X2 shall not apply.

All coatings shall be purple or gray in color.

Except for field welding of butt splices, all welding of reinforcement shall be complete prior to epoxy coating the reinforcement.

Prior to epoxy coating, all resistance butt welds shall have the weld flash removed to produce a smooth profile free of any sharp edges that would prevent proper coating of the bar. The flash shall be removed such that the ultimate tensile strength and elongation properties of the bar are not reduced, and the outside radius of the flash, at any point along the circumference of the bar, is 1) not less than the nominal radius of the bar, nor 2) greater than 5 mm beyond the nominal radius of the bar.

Mechanical couplers used in fenders shall be epoxy-coated to the requirements of this section. Prior to epoxy coating, surfaces of couplers shall be prepared to produce a smooth profile free of any sharp edges that would prevent proper coating. Surface preparation shall be such that the mechanical properties of the coupler are not reduced.

Couplers shall be properly connected to bar reinforcement and the entire unit epoxy-coated in accordance with this section. The Contractor shall provide a temporary plug or other means to protect the exposed end of the coupler threads during the epoxy coating process. After the epoxy coating process, the exposed threads of finished units shall be filled with a commercial quality corrosion inhibiting grease. Finish units shall be covered with plastic caps, as shown on the plans.

A proposed weld flash removal process shall be submitted to and approved by the Engineer in writing, prior to performing any removal work. The submittal shall demonstrate that the proposed flash removal process produces a smooth profile that can be successfully epoxy-coated in conformance with the requirements specified herein.

Bending of epoxy-coated reinforcement after the coating has been applied will not be allowed.

When any portion of a reinforcing bar or wire requires epoxy coating, the entire bar or wire shall be coated, except, when the bar or wire is spliced outside of the limits of epoxy coating shown on the plans, epoxy coating will not be required on the portion of bar or wire beyond the splice.

Within areas where epoxy-coated reinforcement is required, tie wire and bar chairs or other metallic devices used to secure or support the reinforcement shall be plastic-coated or epoxy-coated to prevent corrosion of the devices or damage to the coated reinforcement.

Prior to coating, the Contractor shall furnish to the Transportation Laboratory a representative 110 g sample from each batch of epoxy coating material to be used. Each sample shall be packaged in an airtight container identified with the manufacturer's name and batch number.

Two 700-mm long samples of coated bar or wire reinforcement from each size and from each load shipped to the jobsite shall be furnished to the Transportation Laboratory for testing. These samples shall be representative of the material furnished. These samples, as well as any additional random samples taken by the Engineer, may be tested for specification compliance. Additional sampling, and all tests performed by the Engineer, may be performed at any location deemed appropriate by the Engineer. Failure of any sample to meet the requirements of the specifications will be cause for rejection.

If any bar tested for coating thickness or for adhesion of coating fails to meet the requirements for coated bars in Section 9 of ASTM Designation: A 934/A 934M, 2 retests on random samples taken from bars represented by the failed test will be conducted for each failed test. If the results of both retests meet the specified requirements, the coated bars represented by the samples may be certified as meeting the test requirements.

If any wire reinforcement tested for coating thickness or for flexibility fails to meet the requirements for coated wire in Section 8 of ASTM Designation: A 884/A 884M, 2 retests on random samples taken from wire represented by the failed test will be conducted for each failed test. If the results of both retests meet the specified requirements, the coated wire represented by the samples may be certified as meeting the test requirements.

Epoxy-coated reinforcement shall be covered with an opaque polyethylene sheeting or other suitable protective material to protect the reinforcement from exposure to sunlight, salt spray, and weather. For stacked bundles, the protective covering shall be draped around the perimeter of the stack. The covering shall be adequately secured; however, it should allow for air circulation around the reinforcement to prevent condensation under the covering. Epoxy-coated reinforcement shall not be stored within 300 m of ocean or tidal water for more than 2 months.

All visible damage to coatings caused by shipping, handling, or installation shall be repaired as required for repairing coating damaged prior to shipment conforming to the requirements in ASTM Designation: A 934/A 934M for bar reinforcement or ASTM Designation: A 884/A 884M for wire reinforcement. When the extent of coating damage prior to repair exceeds 2 percent of the bar or wire surface area in any 300-mm length, repair of the bar or wire will not be allowed, and the coated bar or wire will be rejected.

The patching material and process shall be suitable for field application. The patching material shall be prequalified as required for the coating material and shall be either identified on the container as a material compatible with the reinforcement coating, or shall be accompanied by a Certificate of Compliance certifying that the material is compatible with the reinforcement coating. Damaged areas shall be patched in conformance with the patching material manufacturer's recommendations.

Except for lap splices, all splices for epoxy-coated reinforcement shall be coated with a corrosion protection covering that is on the Department's list of approved products. The covering shall be installed in conformance with the manufacturer's recommendations and as directed by the Engineer. The list is available from the Transportation Laboratory.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, shall be furnished for each shipment of epoxy-coated bar, welded wire fabric, or wire reinforcement certifying that the coated bars, fabric, or wire conform to the requirements in ASTM Designation: A 934/A 934M for bars or A 884/A 884M for welded wire fabric and wire and Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications. This Certificate of Compliance shall include all the certifications specified in ASTM Designation: A 934/A 934M for bars or ASTM Designation: A 884/A 884M for welded wire fabric and wire and a statement that the coating material has been prequalified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

Any portion of bar or wire reinforcement extending beyond the limits for epoxy-coated reinforcement shown on the plans will be measured and paid for as bar reinforcing steel (bridge) of the types listed in the Engineer's Estimate.

#### **MEASUREMENT AND PAYMENT**

Measurement and payment for reinforcement in structures shall conform to the provisions in Section 52-1.10, "Measurement," and Section 52-1.11, "Payment," of the Standard Specifications and these special provisions.

Full compensation for preparing and epoxy-coating mechanical couplers, filling mechanical couplers with corrosion inhibiting grease, and furnishing and placing plastic caps and plugs shall be considered as included in the contract prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

**ENGINEER'S ESTIMATE  
04-0120E4  
ALTERNATIVE 1 FOREIGN STEEL AND IRON ALTERNATIVE**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	030627	ELECTRONIC MOBILE DAILY DIARY COMPUTER SYSTEM DATA DELIVERY	LS	LUMP SUM	LUMP SUM	
2	030628	TRANSPORTATION FOR THE ENGINEER	LS	LUMP SUM	LUMP SUM	
3	030629	CONSTRUCTION SURVEYING	LS	LUMP SUM	LUMP SUM	
4	030630	PILE CORROSION MONITORING SYSTEM	LS	LUMP SUM	LUMP SUM	
5	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM	LUMP SUM	
6	070018	TIME-RELATED OVERHEAD	WDAY	1130		
7	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM	LUMP SUM	
8	074020	WATER POLLUTION CONTROL	LS	LUMP SUM	LUMP SUM	
9	030631	NON-STORM WATER DISCHARGES	LS	LUMP SUM	LUMP SUM	
10	030632	TURBIDITY CONTROL	LS	LUMP SUM	LUMP SUM	
11	074032	TEMPORARY CONCRETE WASHOUT FACILITY	LS	LUMP SUM	LUMP SUM	
12 (S)	490672	2.5 M CAST-IN-DRILLED-HOLE CONCRETE PILING	M	423		
13 (S)	049245	2.2 M CAST-IN-DRILLED-HOLE CONCRETE PILING (ROCK SOCKET)	M	390		
14 (S)	049246	FURNISH 2.5 M CAST-IN-STEEL SHELL CONCRETE PILING	M	1694		
15 (S)	049247	DRIVE 2.5 M CAST-IN-STEEL SHELL CONCRETE PILE	EA	16		
16 (S)	049248	2.5 M PERMANENT STEEL CASING	M	423		
17 (S-F)	049249	MARINE PILE DRIVING ENERGY ATTENUATOR	LS	LUMP SUM	LUMP SUM	
18 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	M3	7030		
19 (F)	049250	STRUCTURAL CONCRETE, BRIDGE FOOTING (LIGHTWEIGHT)	M3	2300		
20 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	M3	1640		

**ENGINEER'S ESTIMATE  
04-0120E4  
ALTERNATIVE 1**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	049251	NONSHRINK GROUT	LS	LUMP SUM	LUMP SUM	
22	049252	NONSHRINK FIBER-REINFORCED GROUT	LS	LUMP SUM	LUMP SUM	
23 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	KG	2 495 000		
24 (S-F)	520110	BAR REINFORCING STEEL (EPOXY COATED) (BRIDGE)	KG	801 000		
25 (S-F)	520120	HEADED BAR REINFORCEMENT	EA	3020		
26 (F)	550203	FURNISH STRUCTURAL STEEL (BRIDGE)	KG	3 960 000		
27 (F)	550204	ERECT STRUCTURAL STEEL (BRIDGE)	KG	3 960 000		
28 (S)	590115	CLEAN AND PAINT STRUCTURAL STEEL	LS	LUMP SUM	LUMP SUM	
29 (S)	049253	FURNISH AND INSTALL STEEL DOWNHOLE CASING E	LS	LUMP SUM	LUMP SUM	
30 (S-F)	750501	MISCELLANEOUS METAL (BRIDGE)	KG	420		
31	800391	CHAIN LINK FENCE (TYPE CL-1.8)	M	150		
32	833080	CONCRETE BARRIER (TYPE K)	M	72		
33	030633	GROUNDING FOR PIERS E2 AND T1 FOUNDATIONS	LS	LUMP SUM	LUMP SUM	
34	030634	NAVIGATION LIGHTING SYSTEM	LS	LUMP SUM	LUMP SUM	
35	030635	STRONG MOTION DETECTION DOWNHOLE	LS	LUMP SUM	LUMP SUM	
36 (S-F)	030965	PLASTIC LUMBER	M3	145		
37 (S-F)	030966	UHMW POLYETHYLENE PANEL (50 MM)	M2	930		
38	049400	ESTABLISH MARINE ACCESS	LS	LUMP SUM	LUMP SUM	
39	BLANK					
40	032252	WORKING DRAWING CAMPUS	LS	LUMP SUM	LUMP SUM	

**ENGINEER'S ESTIMATE  
04-0120E4  
ALTERNATIVE 1**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

**TOTAL BID (ALTERNATIVE 1):** \_\_\_\_\_

**ENGINEER'S ESTIMATE  
04-0120E4**

**Alternative 2 DOMESTIC Steel and Iron Alternative**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	030627	ELECTRONIC MOBILE DAILY DIARY COMPUTER SYSTEM DATA DELIVERY	LS	LUMP SUM	LUMP SUM	
2	030628	TRANSPORTATION FOR THE ENGINEER	LS	LUMP SUM	LUMP SUM	
3	030629	CONSTRUCTION SURVEYING	LS	LUMP SUM	LUMP SUM	
4	030630	PILE CORROSION MONITORING SYSTEM	LS	LUMP SUM	LUMP SUM	
5	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM	LUMP SUM	
6	070018	TIME-RELATED OVERHEAD	WDAY	1130		
7	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM	LUMP SUM	
8	074020	WATER POLLUTION CONTROL	LS	LUMP SUM	LUMP SUM	
9	030631	NON-STORM WATER DISCHARGES	LS	LUMP SUM	LUMP SUM	
10	030632	TURBIDITY CONTROL	LS	LUMP SUM	LUMP SUM	
11	074032	TEMPORARY CONCRETE WASHOUT FACILITY	LS	LUMP SUM	LUMP SUM	
12 (S)	490672	2.5 M CAST-IN-DRILLED-HOLE CONCRETE PILING	M	423		
13 (S)	049245	2.2 M CAST-IN-DRILLED-HOLE CONCRETE PILING (ROCK SOCKET)	M	390		
14 (S)	049246	FURNISH 2.5 M CAST-IN-STEEL SHELL CONCRETE PILING	M	1694		
15 (S)	049247	DRIVE 2.5 M CAST-IN-STEEL SHELL CONCRETE PILE	EA	16		
16 (S)	049248	2.5 M PERMANENT STEEL CASING	M	423		
17 (S-F)	049249	MARINE PILE DRIVING ENERGY ATTENUATOR	LS	LUMP SUM	LUMP SUM	
18 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	M3	7030		
19 (F)	049250	STRUCTURAL CONCRETE, BRIDGE FOOTING (LIGHTWEIGHT)	M3	2300		
20 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	M3	1640		

**ENGINEER'S ESTIMATE**  
**04-0120E4**  
**ALTERNATIVE 2**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	049251	NONSHRINK GROUT	LS	LUMP SUM	LUMP SUM	
22	049252	NONSHRINK FIBER-REINFORCED GROUT	LS	LUMP SUM	LUMP SUM	
23 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	KG	2 495 000		
24 (S-F)	520110	BAR REINFORCING STEEL (EPOXY COATED) (BRIDGE)	KG	801 000		
25 (S-F)	520120	HEADED BAR REINFORCEMENT	EA	3020		
26 (F)	550203	FURNISH STRUCTURAL STEEL (BRIDGE)	KG	3 960 000		
27 (F)	550204	ERECT STRUCTURAL STEEL (BRIDGE)	KG	3 960 000		
28 (S)	590115	CLEAN AND PAINT STRUCTURAL STEEL	LS	LUMP SUM	LUMP SUM	
29 (S)	049253	FURNISH AND INSTALL STEEL DOWNHOLE CASING E	LS	LUMP SUM	LUMP SUM	
30 (S-F)	750501	MISCELLANEOUS METAL (BRIDGE)	KG	420		
31	800391	CHAIN LINK FENCE (TYPE CL-1.8)	M	150		
32	833080	CONCRETE BARRIER (TYPE K)	M	72		
33	030633	GROUNDING FOR PIERS E2 AND T1 FOUNDATIONS	LS	LUMP SUM	LUMP SUM	
34	030634	NAVIGATION LIGHTING SYSTEM	LS	LUMP SUM	LUMP SUM	
35	030635	STRONG MOTION DETECTION DOWNHOLE	LS	LUMP SUM	LUMP SUM	
36 (S-F)	030965	PLASTIC LUMBER	M3	145		
37 (S-F)	030966	UHMW POLYETHYLENE PANEL (50 MM)	M2	930		
38	049400	ESTABLISH MARINE ACCESS	LS	LUMP SUM	LUMP SUM	
39	BLANK					
40	032252	WORKING DRAWING CAMPUS	LS	LUMP SUM	LUMP SUM	

**ENGINEER'S ESTIMATE  
04-0120E4  
ALTERNATIVE 2**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

**TOTAL BID (ALTERNATIVE 2):** \_\_\_\_\_