DEPARTMENT OF TRANSPORTATION
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October 30, 2001

04-SF,Ala-80-13.9/14.3,0.0/1.6
04-012024
ACIM-080-1(085)8N

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 AND ALAMEDA COUNTY IN SAN FRANCISCO AND OAKLAND FROM 1.3 km TO 3.3 km EAST OF THE YERBA BUENA ISLAND TUNNEL EAST PORTAL.

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 November 14, 2001.

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 24, 25, 81, 86, 125, 130, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 176, 181, 185, 186, 196, 201, 205, 206, 308, 341, 342, 343, 344, 345, 346, 347, 351, 355, 438, 483, 484, 485, 486, 488, 490, 491, 492, 493, 494, 496, 879, 880, 881, 882, 883, 884, and 886 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheet 340A, 340B, 340C, 340D, 340E and 902A are added. Half-sized copies of the added sheets are attached for addition to the project plans.

On Project Plan Sheet 137, under Notes, in 1. References, the fifth reference is revised as follows:

"For details of Hinge AW, see Sheet EE-295."

On Project Plan Sheet 142, under Notes, in 1. References, the fifth reference is revised as follows:

"For details of Hinge BW, see Sheet EE-296."

On Project Plan Sheet 147, under Notes, in 1. References, the fifth reference is revised as follows:

"For details of Hinge CW, see Sheet EE-297."

On Project Plan Sheet 151, under Notes, in 1. References, the fifth reference is added as follows:

"For details of Hinge DW, see Sheet EE-298."

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On Project Plan Sheet 152, under Notes, in 1. References, the fifth reference is deleted.

On Project Plan Sheet 153, under Notes, in 1. References, the fifth reference is revised as follows:

"For details of Hinge EW, see Sheet EE-299."

On Project Plan Sheet 171, under Sheet Notes, the seventh note is revised as follows:

"For continuation of cable trays at Hinge AW and cable tray arrangement at the transition section, see Sheets EE-295 and EE-264 respectively."

On Project Plan Sheet 187, under Sheet Notes, the eighth note is revised as follows:

"For continuation of cable trays at Hinge EW, see Sheets EE-299."

On Project Plan Sheet 188, under Sheet Notes, the first note is revised as follows:

"Install one separate 500 kcmil bare copper system grounding conductor in westbound girder, spanning the entire Skyway Structure. The system grounding conductor shall be physically attached to the 15 kV cable tray and 15 kV conduits (flexible and rigid) routed through the pipe beams in hinges."

On Project Plan Sheet 208, under Sheet Notes, the first note is revised as follows:

"Install one separate 500 kcmil bare copper system grounding conductor in westbound girder, spanning the entire Skyway Structure. The system grounding conductor shall be physically attached to the 15 kV cable tray and 15 kV conduits (flexible and rigid) routed through the pipe beams in hinges."

On Project Plan Sheet 313, under Sheet Notes, the fifth note is revised as follows:

"Continued to Hinge A, for details see Sheet EE-295 for Westbound and EE-300 for Eastbound."

On Project Plan Sheets, "SUPPLEMENT TO THE SPECIAL PROVISIONS AND PLANS, Binder 1 of 2 - Westbound," "CIRCUIT SCHEDULE WESTBOUND, EE-324", the following circuits are revised as attached:

"1321 through 1323, 1327 through 1329, 1330 through 1332, 1335, 1391, 1392, 1412, 1416, 1419, 1422, 1466-1, 1467-2, 1468-3, 1473-14, 1473-18, 1473-22, 1474-14, 1474-18, 1474-22, 1475-4, 1477-3, A-1351 through A-1354, A-1358 through A-1362, S-1301A, S-1302A, S-1305A, S-1306A, S-1307A, UP138-2A, UP138-2A, UP138-4A, UP138-4A, UP142-2A, UP142-2A, UP142-4A, UP142-4A."

On Project Plan Sheets, "SUPPLEMENT TO THE SPECIAL PROVISIONS AND PLANS, Binder 1 of 2 - Westbound," the attached "CONDUIT AND TRAY SCHEDULE WESTBOUND, EE-325A," is added after "CONDUIT AND TRAY SCHEDULE WESTBOUND, EE-325".

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On Project Plan Sheets, "SUPPLEMENT TO THE SPECIAL PROVISIONS AND PLANS, Binder 2 of 2 - Eastbound," "CIRCUIT SCHEDULE EASTBOUND, EE-327", the following circuits are revised as attached:

"2321 through 2323, 2327 through 2331, 2336 through 2339, 2342 through 2347, 2391, 2392, 2413, 2417, 2421, 2425, 2428, 2431, 2434, 2466-1, 2466-7 2467-2, 2468-3, 2473-14, 2473-18, 2473-22, 2474-14, 2474-18, 2474-22, 2475-4, 2506-1, 2506-121A, 2506-121B, 2506-121C, 2506-131A, 2506-131B, 2506-131C, 2506-2, 2506-241A, 2506-241B, 2506-251A, 2506-251B, 2506-251C, 2506-4, 2507-1, 2507-262A, 2507-262B, 2507-262C, 2507-282A, 2507-282B, 2507-292A, 2507-292B, 2507-292C, 2507-292D, A-2351 through A-2354, A-2358 through A-2362, S-2301A, S-2302A, S-2305A, S-2306A, S-2307A, UP233-6A, UP233-6A, UP238-2A, UP238-2A, UP238-4A, UP238-4A, UP238-6A, UP238-6A, UP238-6A, UP242-2A, UP242-2A, UP242-4A, UP242-4A, UP242-6A, UP242-6A, UP242-9."

On Project Plan Sheets, "SUPPLEMENT TO THE SPECIAL PROVISIONS AND PLANS, Binder 2 of 2 - Westbound," the attached "CONDUIT AND TRAY SCHEDULE EASTBOUND, EE-328A," is added after "CONDUIT AND TRAY SCHEDULE EASTBOUND, EE-328".

In the Special Provisions, Section 5-1.14, "COST REDUCTION INCENTIVE PROPOSALS," the following paragraph is added after the third pargraph:

"Attention is directed to "Cost Reduction Incentive Proposals For Pile Driving Template," of these special provisions regarding additional CRIP requirements."

In the Special Provisions, Section 5-1.25, "ENVIRONMENTAL WORK RESTRICTIONS," the following paragraphs are added after the first paragraph:

"The following documents are now available for review at the office of the Toll Bridge Duty Senior:

A. Final Environmental Impact Statement
B. Bay Conservation and Development District permit Application
C. San Francisco Bay Regional Water Quality Control Board Application for Water Quality Certification.
D. San Francisco Bay Regional Water Quality Control Board 401 Certification
E. Army Corps of Engineers 404 Permit Application
F. United States Coast Guard Permit Application
G. Caltrans letters to the Dredged Material Management Office with draft disposal plan.

Interested parties should contact the Toll Bridge Duty Senior by email at duty_senior_tollbridge_district04@dot.ca.gov or by phone at (510) 286-5549 at least 24 hours in advance to schedule an appointment to view these documents."

In the Special Provisions, Section 10-1.18, "MAINTAINING TRAFFIC," is deleted.

In the Special Provisions, Section 10-1.19, "CLOSURE REQUIREMENTS AND CONDITIONS," is deleted.

In the Special Provisions, Section 10-1.20, "TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE," is deleted.

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In the Special Provisions, Section 10-1.24, "PILING," subsection, "GENERAL," the following paragraphs are added after the fifth paragraph:

"Attention is directed to "Sound Control Requirements," and "Cost Reduction Incentive Proposals For Pile Driving Template," of these special provisions regarding pile driving.

Attention is directed to "Strong Motion Detection System," and "Pile Corrosion Monitoring System," of these special provisions regarding equipment to be installed in piling."

In the Special Provisions, Section 10-1.24, "PILING," subsection "GENERAL," the sixth and eighth paragraphs are deleted.

In the Special Provisions, Section 10-1.27, "CONCRETE STRUCTURES," the following paragraphs are added after the seventh paragraph:

"The Contractor shall prevent cracking of precast concrete elements. If cracks do occur and the crack widths of precast concrete elements are larger than 0.3 mm but less than 0.5 mm, cracks shall be repaired by the Contractor. The Contractor shall submit a repair plan for approval by the Engineer. No repairs shall be made until the repair procedure has been approved by the Engineer. No extension of time will be made for the submittal, review and construction of repairs. Precast elements with crack widths of 0.5 mm or larger will be rejected. No extension of time will be made for replacement of rejected precast elements. No compensation will be made for any costs incurred or for delay in completing the work resulting from repairing cracks or replacement of rejected precast elements.

The Contractor shall place the footing concrete and pier access casing concrete in a dewatered condition. Prior to placement of concrete for a footing or pier access casing, the Contractor shall wash (with fresh water) the previously placed concrete and steel. The wash water shall be disposed of in conformance with the requirements in “Non-Storm Water Discharges” of these special provisions.

At the Contractor's option, precast concrete footing walls may be cast-in-place. If said walls are cast-in-place, the Contractor shall provide dry access so that the Engineer can inspect the footing walls."

In the Special Provisions, Section 10-1.27, "CONCRETE STRUCTURES," subsection "MEASUREMENT AND PAYMENT," the seventh and eighth paragraphs are revised as follows:

"The contract price paid per cubic meter for precast concrete wall (bridge footing) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including reinforcing steel as required, and for doing all the work involved in constructing, furnishing and erecting precast concrete walls complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

If the cast-in-place alternative is used, cast-in-place concrete footing walls shall be measured and paid for as precast concrete wall (bridge footing). Full compensation for any additional cost involved in cast-in-place concrete footing walls shall be considered as included in the contract price paid for precast concrete wall (bridge footing) and no additional compensation will be allowed therefor. No extension of time and no delay will be granted for the cast-in-place alternative."

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In the Special Provisions, Section 10-1.34, "CIRCULAR SEGMENTED BEARING," is revised as attached.

In the Special Provisions, Section 10-1.40, "FOOTING CONSTRUCTION," subsection "GENERAL," the second paragraph is revised as follows:

"The steel footing frame shall not be used as a pile driving template unless approved as a cost reduction incentive proposal in conformance with "Cost Reduction Incentive Proposals For Pile Driving Template," of these special provisions."

In the Special Provisions, Section 10-1.40A, "COST REDUCTION INCENTIVE PROPOSALS FOR PILE DRIVING TEMPLATE," is added as attached.

In the Special Provisions, Section 10-1.44, "STEEL STRUCTURES," subsection, "SHOP WELDING," the provisions for "INSPECTION AND TESTING," are revised as follows:

"Inspection and Testing

The Contractor shall provide the Engineer with work schedules, and expected readiness of work for quality assurance (QA) inspection by the Engineer.

Full access for the State's QA personnel shall be provided to conduct VT for not less than 60 hours from the time the weld is completed.

The Contractor shall MT 15% of each of the following type of welds at locations selected by the Engineer:

A. Fillet; and
B. PJP (including weld restarts).

In addition to MT requirements, all rib to wing plate and rib to web plate welds shall be 15% UT inspected by the Contractor.

In addition to MT requiements, all rib to soffit plate and rib to deck plate welds shall also be 15% UT inspected by the Contractor in lieu of FCM requirements.

In addition to MT requirements, PJP butt welds in the footing steel shall be 100% UT inspected by the Contractor.

All CJP welds shall be 100% UT inspected by the Contractor.

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In addition to the MT requirements for PJP welds, and the UT requirement for CJP welds, all butt welds (PJP and CJP) shall be RT inspected by the Contractor as follows:

LOCATION	FREQUENCY OF TESTING
Orthotropic box section butt joints: deck and soffit plates and ribs	Transverse Plate Seams: 10% in lieu of FCM requirements Longitudinal Plate Seams: Minimum of 10% at locations selected by the Engineer Transverse Rib Seams: Minimum of 10% at locations selected by the Engineer
Orthotropic box section: One-sixth of web and wing plate depth starting from the deck and soffit plates	Minimum of 10%, at locations selected by the Engineer
Orthotropic box section: Central 2/3 of web and wing plate depth transverse seam	Minimum of 5%, at locations selected by the Engineer
For FCMs butt joint, except as noted above, and repairs to butt joints	100%

In the Special Provisions, Section 10-1.44A, "CORMORANT NESTING HABITAT," is added as attached.

In the Special Provisions, Section 10-1.56, "BRIDGE DECK DRAINAGE SYSTEM," the seventh paragraph is revised as follows:

"Pipe and pipe fittings, such as elbows and tees, shall be ductile iron and shall conform to the requirements of ASTM Designation: A 377M (ANSI 21.51). All pipe and pipe fittings shall be groove cut around the full pipe circumference at both ends. The grooves shall be radius cut in accordance with AWWA C606. The grooves shall be such that a keyed housing clamp coupling shall fit into them. All joints in the pipe shall be made with groove type couplings. All pipe bends (elbows) shall be of the minimum radius as shown on the plans."

In the Special Provisions, Section 10-1.56, "BRIDGE DECK DRAINAGE SYSTEM," the tenth paragraph is revised as follows:

"Pipe brackets and supports shall conform to the requirements of ASTM Designation: A 575, Grade 1015 and 1020. Supports for horizontal and vertical piping shall be spaced as shown on the plans. Anchors shall meet or exceed the requirement of US government, GSA Specification No. FS-S-325 Group I, Type I, Class I. Nuts and bolts shall conform to the requirements of ASTM Designation: A 307."

In the Proposal and Contract, the Engineer's Estimate Items 43, 54, 67, 68 are revised, Items 133, 134, 135, 136 and 137 are added and Items 44, 53 and 132 are deleted as attached.

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To Proposal and Contract book holders:

Replace pages 5, 6, and 9 of the Engineer's Estimate in the Proposal with the attached revised pages 5, 6, and 9 of the 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.

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

10-1.34 CIRCULAR SEGMENTED BEARING

This work shall consist of fabricating, testing, storing, as required, and installing circular segmented bearings in conformance with details shown on the plans and the requirements of these special provisions.

Each circular segmented bearing consists of several individually fabricated bearing segments, which are assembled to form a cylindrical surface. Bearing segments consist of anchor plates, masonry plates, keyed bottom plates, keyed top edge plates, bearing plates, steel anchor bolts, studs, elastomer, and woven polytetrafluoro-ethylene (PTFE) fabric. Bearings shall be anchored in place with bearing grout.

Circular segmented bearings shall be of 2 types:

A. Fixed type (Type III and Type IV as shown on the plans), a curved steel laminated elastomeric unit with concentric curved steel anchor plate.
B. Sliding type (Type I and Type II as shown on the plans), a curved steel laminated elastomeric unit with concentric curved steel anchor plate and an inner woven PTFE fabric on the sliding surface.

Circular segmented bearings of the types listed shall be furnished and installed at the following hinge locations:

Hinge Location	Sliding Type Bearings	Fixed Type Bearings
Hinge BW, BE	Type I and Type II	Type III and Type IV
Hinge CW, CE	Type I and Type II	Type III and Type IV
Hinge DW, DE	Type I and Type II	Type III and Type IV

Circular segmented bearings of the types listed shall be furnished and placed in the temporary recessed position as shown on the plans and shall not be grouted at the following hinge locations:

Hinge Location	Fixed Type Bearings
Hinge AW, AE	Type I and Type II
Hinge EW, EE	Type I and Type II

Circular segmented bearings of the types listed shall be furnished and stored for future installation at the following hinge locations:

Hinge Location	Sliding Type Bearings
Hinge AW, AE	Type III and Type IV
Hinge EW, EE	Type III and Type IV

GENERAL

The Contractor's attention is directed to the Section "Steel Structures," of these special provisions for hinge pipe beam requirements.

The design load including design service load and design ultimate load shall be the vector sum of the vertical and horizontal components of the load and shall conform to the values as shown on the plans. The design service load applied on one bearing segment shall be obtained by dividing the total design service load shown on the plans by the number of segments in an arc subtended by a 90° angle. The design ultimate load applied on one bearing segment shall be obtained by dividing the total design ultimate load shown on the plans by the number of segments in an arc subtended by a 90° angle.

WORKING DRAWINGS

The Contractor shall submit working drawings in conformance with the provisions in Section, "Working Drawings," elsewhere in these special provisions and these special provisions, except that the requirements for engineer registration shall be as specified herein.

Working drawings shall include complete details, information, drawings, and substantiating calculations of the circular segmented bearing and its components and the method, materials, equipment, and procedures of fabrication and installation that the Contractor proposes to use including the placement of bearing grout.

Working drawing submittals shall include the following:

A. Bearing fabrication plans for all bearings including complete details for each component of every bearing segment. Each segment shall have a unique number. The segment number shall be identified on the working drawings and shall be permanently marked on each component of the segment. The segment number shall be visible in the final installed position of the bearing. The segment number shall contain the following information:

   1. Hinge location
   2. Diaphragm location
   3. Bearing number
   4. Segment number

B. All ASTM, AASHTO, or other material designations.
C. Description and details of the method of mechanical interlocking of the woven PTFE fabric to the metallic substrate.
D. Storage and shipping plans including details of handling and supporting of the circular segmented bearings. Each shipment of the circular segmented bearings shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-l.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall state that the materials and fabrication involved comply in all respects to the specifications and data submitted in obtaining approval.
E. Installation plans including the following:

   1. Method, materials, equipment, sequence, procedures, and temporary support details that the Contractor proposes to use for installation of the circular segmented bearings.
   2. Measures that will protect the stainless steel surface of the pipe beam from damage during installation.
   3. Grout mix design and method of placement and curing.

F. Details of lifting locations and mechanisms.

A supplement to the working drawings shall include the following:

A. The Contractor shall furnish to the Engineer the woven PTFE fabric performance reports. Reports shall include documentation from at least 2 separate projects where the woven PTFE fabric successfully performed under condition and for applications similar to these shown on the plans for a performance life of at least 3 years.
B. Details, procedures, and schedules of prototype testing for bearing segments conforming to the section, “Prototype Testing,” of these special provisions. The Contractor shall submit the verification that the testing laboratory is available to perform the prototype tests within the specified schedules. The prototype testing plan shall include design and drawings of the test fixtures, and details of the test apparatus and equipment included in the testing program. The prototype testing plan shall also include certifications that all testing equipment has been calibrated no longer than 12 months prior to start of any test.
C. Details, procedures, and schedules of proof testing for bearing segments conforming to the section, “Proof Testing,” of these special provisions. The proof testing plan shall include design and drawings of the test fixtures, and details of the test apparatus and equipment included in the testing program. The proof testing plan shall also include certifications that all testing equipment has been calibrated no longer than 12 months prior to start of any test.
D. The quality control plan (QCP). The QCP of the circular segmented bearings shall conform to the requirements in "Quality Control” of these special provisions and shall include descriptions, details, and procedures for the fabrication and installation of the circular segmented bearings, except that the portion of the QCP for welding shall be submitted separately in conformance with "Welding" elsewhere in these special provisions.

E. The manufacturer of the circular segmented bearing shall submit to the Engineer a manual for the bearing inspection, maintenance, and replacement. This manual shall include:

1. A record of bearing segment number for each component of every bearing segment including the tracing of all components during the fabrication and installation of circular segmented bearings.
2. Recommended life expectancy for each bearing segment component.
3. Recommended frequency for bearing inspection and maintenance schedule.
4. Procedures and details to perform the bearing inspection and maintenance.
5. List of indication of bearing segment defects and the associated repair methods, if applicable.
6. Procedures and sequences for bearing segment replacement including locations of temporary support and estimate of jacking load for each temporary support location.

Each working drawing and calculation sheet shall be signed by an engineer who is registered as either a Civil Engineer or Mechanical Engineer in the State of California.

Complete working drawings and supplement shall be submitted to the Engineer within 80 working days after the contract is awarded. After complete working drawings and supplement are received by the Engineer, the Contractor shall allow the Engineer 40 working days to review the submittal. No fabrication of test specimen and test fixtures of the circular segmented bearing shall begin until complete working drawings and supplement are reviewed and a preliminary approval is given, in writing, by the Engineer.

After the Engineer issues a preliminary approval in writing to the Contractor for the submitted working drawings and supplement, the Contractor shall begin conducting the prototype tests for the circular segmented bearings.

Within 10 working days after the prototype tests have been successfully completed, the Contractor shall submit to the Engineer 4 copies of the following documents for review and final approval:

A. Test records, results, certified test reports, and all other relevant test information; and
B. Revised plans, procedures, or any other modifications.

The Contractor shall allow the Engineer 30 working days to review each of the certified test reports for the prototype tests and any Contractor proposed modifications to previously submitted working drawings and supplement. If the Engineer requests additional information or calculations, the Contractor shall allow the Engineer additional 10 working days to review. Fabrication of bearings shall be subject to successful completion of the relevant prototype tests as specified in section “Prototype Tests” of these special provisions.

After completion of proof testing, the Contractor shall submit the proof test reports as specified in Section “Proof Testing” of these special provisions.

Upon completion of installation, the Contractor shall submit to the Engineer certification stating that each circular segmented bearing has been installed in accordance with the approved working drawings and supplements installation procedure.

MATERIALS

Attention is directed to "Welding" and "Steel Audits" in these special provisions.

Steel components including plates, anchor bolts, and studs shall conform to the details shown on the plans, the provisions in “Steel Structures,” of the Standard Specifications, and these special provisions.

Except studs, welding of bearing segment components shall not be permitted after molding the elastomer. Welding quality control of studs shall conform to the requirements specified in “Welding,” of these special provisions.

The elastomeric elements shall have shear modulus of 1.2 MPa conforming to ASTM Designation, D 4014. The elastomer shall be fully vulcanize-bonded to the carbon steel plates under factory controlled conditions

PTFE surfaces of sliding type bearings shall be unfilled PTFE fabric made from virgin PTFE oriented multifilament and other fibers. The resin in the filaments shall be virgin (not reprocessed) PTFE material in conformance with the requirements of ASTM Designation: D 4441.

The bearing grout shall be high strength, non-shrink grout and shall be a nonmetallic and non-gas-forming flowable fluid containing natural aggregate, Portland Cement and additives and requiring only the addition of water. Grout shall contain a minimum of 390 kg of cement per cubic meter. Grout shall be premeasured and prepackaged by the manufacturer, and shall be suitable for baseplate and foundation grouting. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures. One hour after mixing, the grout shall pass through a flow cone with continuous flow. Grout shall conform to the requirements of ASTM Designation: C1107, and the following additional requirements:

Property	Requirement	Test
Shrinkage	0.0%	ASTM C827
Expansion	0.0%min.,	ASTM C827
	4.0% max.	
Fluid Consistency	20-30 seconds at 5 oC to 38 oC	CORPS-CRD-611-81
1 day compressive strength	24 MPa	ASTM C109
3 day compressive strength	35 MPa	ASTM C109
28 day compressive strength	52 MPa	ASTM C109

Bearing grout shall be formulated for minimum initial set time of 4 hours and minimum final set time of 6 hours at 21°C. Prior to use, the materials shall be stored in a cool, dry environment. Grout shall be free from chlorides and other corrosion-causing chemicals. Grout shall be designed for an air content of 4 to 6 percent.

Mix water shall conform to the requirements of Section 90-2.03, "Water," of the Standard Specifications. Cold water shall be used in hot weather conditions to maintain the mixed grout temperature from 7°C to 32°C.

Bearing grout shall be mixed and placed in accordance with the requirements of the manufacturer and these special provisions.

The quantity of water to be blended with the dry component shall be within the limits recommended by the manufacturer. The quantity of water shall be the least amount required to produce a flowable fluid that can be pumped.

Prior to placing bearing grout, the Contractor shall demonstrate to the Engineer that the placement method results in full, void free, contact between the grout and the masonry plate. The size of the demonstration sample shall match the largest grout placement shown on the plans. The Contractor shall revise the placement method, as required, and shall not place bearing grout in the work until the placement method has been approved by the Engineer.

Before using grout material, a minimum of 20 kilograms shall be submitted to the Engineer for testing. The Contractor shall allow the Engineer 45 days for the testing. Additionally, the Contractor shall submit for approval, specific printed manufacturer’s product data, curing methods and proposed methods for keeping the surface wet prior to grout application for each grout location. Bearing grout properties shall not be based on gas or gypsum expansion.

QUALITY CONTROL

Quality Control (QC) shall be the responsibility of the Contractor. Quality Control shall be performed by an entity having a line of responsibility distinctly different from that of the manufacturer's fabrication department. As a minimum, the Contractor shall perform inspection and testing prior to fabrication, during fabrication, and after fabrication as specified in this section and additionally as necessary to ensure that materials and workmanship conform to the requirements of the contract documents. Quality Control shall apply to each component of the circular segmented bearing in addition to the assembly, shipping and installation of the bearing.

The QC Inspector shall be the duly designated person who acts for and on behalf of the Contractor for inspection, testing, and quality related matters for all fabrication.

Quality Assurance (QA) is the prerogative of the Engineer. The QA Inspector is the duly designated person who acts for and on behalf of the Engineer.

Each QC Inspector shall be responsible for quality control acceptance or rejection of materials and workmanship

The Contractor shall provide sufficient number of QC Inspectors to ensure continuous inspection.

The Contractor shall designate in writing a Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of the fabrication, including materials and workmanship, performed by the Contractor and subcontractors.

The QCM shall be the sole individual responsible to the Contractor for submitting and receiving all correspondences, required submittals, and reports to and from the Engineer.

The Contractor shall submit to the Engineer 3 copies of Quality Control Plan (QCP), in conformance with the requirements in "Working Drawings," of these special provisions. As a minimum, each QCP shall include the following:

A. A manual including equipment, testing procedures, and code of safe practices;
B. The names, qualifications, and documentation of certifications for the QCM and all QC Inspectors;
C. An organizational chart showing all QC personnel and their assigned QC responsibilities;
D. The methods and frequencies for performing all required quality control procedures, including QC inspection forms to be used, as required by the specifications including:

    1. All visual inspections;
    2. Tests;
    3. Calibration procedures and calibration frequency for all equipment;

E. Forms to be used for Certificates of Compliance, weekly production logs, and weekly reports;
F. Mill certificates and material certificates;
G. Shipping plan; and
H. Installation plan.

Prior to submitting the QCP, a pre-fabrication meeting between the Engineer, Contractor, and Fabricator, any entity performing circular segmented bearing component fabrication or subcontractor to the Fabricator, shall be held to discuss the requirements for the QCP. The pre-fabrication meeting shall be held in San Francisco Bay Area.

After a complete QCP is submitted, the Contractor shall allow the Engineer 10 working days to review the submittal. An amended QCP or addendum shall be submitted to, and approved in writing by the Engineer, for proposed revisions to the approved QCP. The Contractor shall allow the Engineer 10 working days to complete the review of the amended QCP or addendum.

After final approval of the QCP, amended QCP, or addendum, the Contractor shall submit 7 copies to the Engineer of each of these approved documents.

It is expressly understood that the Engineer's approval of the Contractor's QCP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications. The Engineer's approval shall not constitute a waiver of any requirement of the plans and specifications nor relieve the Contractor of any obligation thereunder, and defective work, materials, and equipment may be rejected notwithstanding approval of the QCP.

A weekly production log for fabrication shall be kept by the QCM for each day that fabrication if performed. The weekly report from each QC Inspector shall be included in the log.

The QCM shall sign and furnish to the Engineer, a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each circular segmented bearing. The certificate shall state that all of the materials and workmanship incorporated in the work, and all required tests and inspections of this work have been performed in conformance with the details shown on the plans and approved working drawings and the provisions of the Standard Specifications and these special provisions.

FABRICATION AND INSTALLATION

Concave plate radius dimension tolerances shall be 1 mm to -1 mm.

The woven PTFE fabric on sliding bearing surfaces shall be epoxy bonded and mechanically interlocked to the steel substrate. All bonding shall be done under controlled factory conditions. The mechanical interlock on the cylindrical surface must be integrally machined into the steel substrate. Welded retention grids will not be allowed on the cylindrical surface. Any edges, other than the selvage, shall be oversown or recessed so that no cut fabric edges are exposed.

After completion of the bonding operation the PTFE surface shall be smooth and free from bubbles and in full contact with its concentric substrate.

Metal surfaces of bearings exposed to the atmosphere in the completed work and the inner surfaces of the fixed type bearings shall be cleaned and painted in conformance with the provisions in Sections 59-2, "Painting Structural Steel," and 91, "Paint" of the Standard Specifications, and "Clean and Paint Structural Steel" of these special provisions.

Conformance with the requirements in SSPC-QP 1, SSPC-QP 2, and SSPC-QP 3 of the "SSPC: The Society for Protective Coatings" will not be required for circular segmented bearings.

Finish coats will not be required on the bearings.

Each segment shall be marked for location and orientation in conformance with the approved working drawing and supplement. Segments shall be secured to shipping skids in a manner that assures protection during transportation and off-loading. Each skid shall be wrapped in moisture proof and dust proof covers and in addition the woven PTFE surface shall be fully covered with opaque material at all times until immediately before placement.

During fabrication, the maximum temperature of bonded PTFE surfaces shall be 150°C.

Damaged bearings shall be replaced.

A qualified representative of the manufacturer shall be present during installation of all circular segmented bearings.

The Contractor shall protect the pipe beam stainless steel surface during the installation of the circular segmented bearings. No damage to the stainless steel surface shall be permitted.

Circular segmented bearing steel anchor plates shall be temporarily supported during grout operations. Temporary supports shall be designed to ensure a gap between the bearing and the pipe beam as shown on the plans. Temporary supports shall prevent the rotation or displacement of the bearing during grout operation. Temporary supports shall not inhibit the functioning of the circular segmented bearing after grout has set. Temporary supports shall not restrict the movement at bridge joints due to temperature changes and shortening from prestressing forces. Materials for temporary supports within the limits for placing concrete shall conform to the requirements for form fasteners.

Prior to the bearing grout is placed, the contact surfaces of previously cast concrete shall be cleaned by abrasive blast to clean the concrete and any exposed reinforcing steel, as necessary, and to remove all rust, paint, grease, asphalt or other foreign materials. A minimum of 3 mm of concrete shall be removed. Steel contact surfaces shall be cleaned by methods approved by the Engineer to remove all rust, paint, grease, or other foreign materials. Immediately prior to placing the grout, the surfaces shall be recleaned by air blasting, or by other approved means, as necessary to remove any debris that has accumulated during construction or after abrasive blast cleaning. Prior to grouting, all concrete contact surfaces shall be kept constantly wet for a period of 24-hours. The surface temperature of the areas to be covered shall be between 7°Cand 32°Cwhen the grout is placed. Methods proposed to heat said surfaces are subject to approval by the Engineer. The condition of the concrete contact surface shall be saturated surface-dry when the grout is placed.

Forms shall be nonabsorbent and watertight, and shall conform to the requirements of Section 51-1.05, "Forms," of the Standard Specifications. Forms shall extend 50 mm higher than the top surface of the grout to be placed.

The grout shall be pumped continuously and shall fill the entire space provided for grouting. Grout shall be continuously agitated until pumped. The Contractor shall provide injection and ejection vents with positive shut-offs. Grout shall be allowed to flow from the ejection vent until all entrapped air has been removed, at which time the vent shall be capped or otherwise closed.

Bearing grout shall be cured in accordance with the method specified in the approved working drawing and supplement. Immediately after placed, grout shall be wet cured by covering all the exposed grout with wet rags. Burlap shall not be used to cover the exposed grout surface. The grout surface shall be kept moist until final set. Following removal of damp rags, the grout shall be sprayed with two coats of curing compound (1) of Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

The Contractor shall provide a flow cone and cube molds with restraining plates onsite for field evaluation of bearing grout. Three 50 mm by 50 mm cubes shall be made by the Contractor for each 0.5 cubic meter of grout used. Restraining caps shall be provided for the cube molds in accordance with CRD-C-621-83. Store cubes at 21°C. Test reports for cubes shall be submitted to the Engineer for approval.

TESTING

The Contractor shall perform a series of tests on full-scale bearing segment specimens at the laboratory designated in the approved working drawings and supplement. This laboratory shall be an independent laboratory in the United States. The tests shall verify the performance of the circular segmented bearings for the design loads as shown on the plans. Testing of circular segmented bearings shall consist of prototype tests and proof tests.

The fabrication of all components of the test specimens including material specifications, fabrication procedures, workmanship, and quality control program shall be the same as that used in the production of circular segmented bearings. Bearing segments that are subject to prototype tested shall not be installed in the bridge and shall become the property of the State.

The Contractor shall notify the Engineer, in writing, at least 10 working days prior to the start of each test.

The Contractor shall provide the necessary access and assistance to the Engineer to observe the tests, monitor the process, and take measurements. The Contractor shall also provide space in the testing room to accommodate the Engineer's monitoring equipment.

After completion of each test, the Contractor shall inspect the test specimen, in the presence of the Engineer, to identify any damage that may have occurred to the test specimen components.

Test Fixtures

The test fixture elements including the mating surfaces shall be fabricated to match the curved surface of the tested segments as shown on the plans and as specified elsewhere in these special provisions. The materials and tolerances of the fixture mating surfaces shall be the same as those specified for the pipe beam in section "Steel Structures," of these special provisions.

The surface of the test fixture elements in contact with the bearing segment shall match that of the bearings as installed, for each of the fixed and sliding bearing segments without causing the bearing segments to flex or marring their surfaces.

The test fixtures shall be designed to transfer loading uniformly to the curved surfaces throughout the range of test loads with deflection equal to or less than the actual hinge pipe beams as shown on the plans.

The test fixture elements shall be subject to the same quality control and inspection requirements as bearing segments, and pipe beams as specified in Section, "Steel Structures," elsewhere in these special provisions.

The slider shall be constructed so that the geometry and surface finish are identical to those of the pipe beam. The same finishing process shall be used as is used for the pipe beam. The direction of the PTFE sliding, relative to the direction of the surface machining on the stainless steel surface, shall be the same as in the production bearings. The length of the slider shall be such that the slider overhangs the PTFE during all testing conditions including maximum displacement.

Prototype Tests

The Contractor shall fabricate 6 test specimens to perform prototype tests of the types and at hinge locations as follows:

Test Specimen No.	Fabricate for Hinge Location	Bearing Type	Set of Bearings Represented by Test Specimen
1	AW, AE	Type II	AW, AE, BW, BE, CW, CE (Type I and Type II)
2	AW, AE	Type III	AW, AE, BW, BE, CW, CE (Type III and Type IV)
3	DW, DE	Type II	DW, DE (Type I and Type II)
4	DW, DE	Type III	DW, DE (Type III and Type IV)
5	EW, EE	Type II	EW, EE (Type I and Type II)
6	EW, EE	Type III	EW, EE (Type III and Type IV)

For each of the Type II specimens, the following series of tests shall be performed in the order prescribed:

A. Compression test at design service load condition;
B. Friction test at design service load condition;
C. Combined friction and elastomer shear test at design service load condition;
D. Compression test at design ultimate load condition;
E. Friction test at design ultimate load condition;
F. Combined friction and elastomer shear test at design ultimate load condition; and
G. Keyed plate test at design ultimate load condition.

For each of the Type III specimens, the following series of tests shall be performed in the order prescribed:

A. Compression test at design service load condition;
B. Elastomer shear test at design service load condition; and
C. Compression test at design ultimate load condition.

Prototype test results shall be certified correct and signed by the testing laboratory personnel who conducted the test and interpreted the results. Prototype test results shall include the identification number of the bearing segment tested.

If a test specimen fails to meet any of the acceptance criteria, as determined by the Engineer, the specimen will be rejected and the Contractor shall fabricate additional specimen and conduct prototype tests as specified herein. No extension of time or compensation will be made for manufacturing, furnishing, and testing additional bearing segment specimens.

After series of tests for a test specimen have been successfully completed, all certified test reports are reviewed, and the final approval is given, in writing, by the Engineer, the Contractor may start the fabrication of production bearings for the set of bearings represented by that test specimen.

Proof Tests

The Contractor shall perform a series of proof testing under design service loads as shown on the plans. For each circular segmented bearing, one bearing segment shall be selected by the Engineer for proof testing. The tests shall verify the performance of the circular segmented bearings for the design service load conditions.

For each sliding type bearing segment, following tests shall be performed in the order prescribed:

A. Compression test at design service load condition; and
B. Friction test at design service load condition.

For each fixed type bearing segment, following tests shall be performed in the order prescribed:

A. Compression test at design service load condition; and
B. Elastomer shear test at design service load condition.

Proof test results shall be certified correct and signed by the testing laboratory personnel who conducted the test and interpreted the results. Proof test results shall include the identification number of the bearing segment tested.

If a bearing segment fails to meet any of the acceptance criteria, as determined by the Engineer, the bearing segment will be rejected and all remaining bearing segments of that bearing shall be individually proof tested. No extension of time or compensation will be made for manufacturing, furnishing, and testing additional bearing segments.

At the completion of successful proof testing for each bearing segment, within 10 working days, the Contractor shall submit to the Engineer 4 copies of the complete test results in conformance with the requirements for the specific test as specified in these special provisions.

Bearings will not be accepted and released for installation until the Engineer has reviewed and approved, in writing, the proof testing.

Testing Requirements

Prior to the start of the first test of each specimen all steel sliding surfaces shall be cleaned using alcohol. No greasing or lubricating agents shall be applied to any part of the sliding interfaces.

The bearing segment and its load transfer plates shall be centered in a press capable of loads in excess of the design load as shown on the plans.

For each test specimen, the first test shall be completed after conditioning specimens for 12 hours at 20°±8°C. All tests shall be conducted at an ambient temperature of 20°±8°C.

The axis of the slider shall be aligned with the axis of the PTFE element.

The Contractor shall record the compressive force, shear force, shear displacement, and time for every test. Readings shall be taken at sufficiently close intervals to detect the force peak that may occur at the reversal of direction but not less than 200 readings per cycle. The zero for force shall be taken as the mid-point between the forces at zero displacement during sliding in the two different directions. Friction forces shall be measured from this zero value.

A new stainless steel sliding surface shall be used for each PTFE specimen tested.

Compression Test

The compression tests at the design load shall conform to the following procedures and requirements:

A. The test loading shall include both compression and rotation. The rotation shall be imposed by the use of a tapered plate or other device that causes a relative rotation of the two faces of the bearing equal to the design rotation as shown on the plans; and
B. The loading shall be applied at a rate between 10 and 20 MPa per minute. Hold the design load. Check for uneven bulges that suggest misplaced steel plate laminates or bond failure. Release at a rate not exceeding 20 MPa per minute.

The acceptance criteria for compression tests at the design service load shall be the following:

A. There shall be no bond failure of two adjacent steel plate laminates at any location around the edge of the bearing;
B. There shall be no sign of bond failure between the outer steel plates and the elastomer;
C. There shall be no sign of bond failure between the woven PTFE fabric and the steel bearing plate; and
D. There shall be no damage to the PTFE.

The acceptance criteria for compression tests at the design ultimate load shall be the following:

A. Debonding of any steel-elastomer interface shall not exceed 25% of the plan area of the layer;
B. The external steel plates shall not be permanently distorted from their unloaded shap;
C. Debonding of the PTFE from its substrate shall not exceed 10% of the plan area of the PTFE;
D. The stainless steel element shall not come into contact with the steel components of the elastomeric bearing assembly; and
E. At the highest point of substrate and after compression under the design ultimate load, the woven PTFE fabric shall have a minimum thickness of 1.6 mm and a maximum thickness of 3.2 mm.

Friction Test

The friction tests at the design load shall be performed to verify that the coefficient of friction between the PTFE and the mating surface lies within acceptable limits at design load conditions, and shall conform to the following procedures and requirements:

A. The friction test shall be conducted in such a way that all of the shear movement of the bearing occurs at the sliding interface;
B. The design load shall be applied without any relative movement of the sliding surfaces for a minimum of 1 hour prior to the application of relative displacements;
C. The design load shall be maintained throughout the test;

D. At the design service load, the test bearing segment shall be subject to a minimum of 100 fully reversed cycles of longitudinal displacement, with zero-to-peak amplitude of 25 mm at a speed of 125 mm/min. Then 3 fully reversed cycles shall be applied at a speed of 25 mm/min. These last three cycles shall be used to measure the coefficient of friction. A record of readings shall be kept for all cycles; and
E. At the design ultimate load, the test bearing segment shall be subject to 3 fully reversed cycles of longitudinal displacement, with zero-to-peak amplitude of 100 mm at a speed of 150 mm/sec.

The acceptance criteria for friction tests shall be the following:

A. These tests shall also satisfy the acceptance criteria for compression tests as specified elsewhere in these special provisions;
B. Friction value shall be computed by dividing the instantaneous shear force with the instantaneous compressive force;
C. The coefficient of friction under design service load shall be less than 7%; and
D. The coefficient of friction under design ultimate load shall be less than 15%.

Combined Friction and Elastomer Shear Test

The combined friction and elastomer shear tests shall be conducted on sliding bearings to verify the bearing friction and elastomer performance and shall conform to the following procedures and requirements:

A. The test shall consist of loading the bearing in shear parallel to its longitudinal axis. The shear loading shall be applied at the location as shown on the approved working drawing and supplement. The elastomer shall be allowed to deform freely and may engage the keyed edge plates as shown on plans. Compressive load, equal to the design load shall be applied simultaneously and maintained throughout the test.
B. At the design service load, the test bearing segment shall be subject to 3 fully reversed cycles of longitudinal displacement, with zero-to-peak amplitude of 25 mm at a speed of 25 mm/min.
C. At the design ultimate load, the test bearing segment shall be subject to 3 fully reversed cycles of longitudinal displacement, with zero-to-peak amplitude of 100 mm at a speed of 150 mm/sec.

The acceptance criteria for combined friction and elastomer shear tests shall be the following:

A. These tests shall also satisfy the acceptance criteria for compression and friction tests as specified elsewhere in these special provisions.
B. There shall be no cracking, distortion, or tearing of the steel plates or the welds of the keyed top and bottom plates. In the test at the design ultimate load, local yielding at the bearing surfaces of the keys is permissible.

Shear Test

The shear test for the elastomer at the design service load shall be performed to verify the material properties and consistency of fabrication of the elastomer compound in nominally similar bearings, and shall conform to the following procedures and requirements:

A. Longitudinal movement shall take place only at the elastomer.
B. The shear loading may be applied simultaneously with a compressive load that is no greater than the service compressive load on the bearing.
C. The test specimen shall be subjected to 7 fully reversed cycles of shear displacements, with zero-to-peak amplitude equal to 0.5 times the elastomer thickness, and at a speed of 25 mm/min. On the fourth, fifth and sixth cycles record compressive and shear loads, shear displacement and time. Reading frequency shall not be less than 200 readings per cycle.

The acceptance criteria for shear test shall be the following:

A. These tests shall also satisfy the acceptance criteria for compression tests as specified elsewhere in these special provisions.

B. The bearing segment stiffness shall be obtained as follows: For each of the loading and unloading halves of cycles 4, 5, and 6, a best fit line shall be drawn between $-0.75\Delta s$ and $+0.75\ \Delta s$ where Δs is the target peak shear displacement during the test. The slope of each line gives the stiffness of that half cycle. The stiffness of the test bearing segment shall be taken as the arithmetic average of these six stiffness values.
C. The stiffness of any individual test bearing shall not differ from the design stiffness by more than 20%. The design stiffness, kshear, shall be obtained from the equation kshear=GA/T, where G is the elastomer shear modulus (G=1.2 MPa), A is the average plan area of the elastomer, computed along the curved surface and T is the total elastomer thickness normal to the surface.
D. Allowance may be made for the effect of compressive load on the shear stiffness, if a compressive load is used in the test. The method of adjusting the stiffness to account for the effects of compressive load shall be submitted to the engineer for approval at least 7 days prior to the start of testing.

Keyed Top Edge Plate Shear Test

The keyed top edge plate shear test at design ultimate load conditions shall be conducted to verify the performance of the side plates and shall conform to the following procedures and requirements:

A. The test shall consist of loading the bearing in shear parallel to its longitudinal axis. Compressive load, not exceeding the design ultimate load shall be applied simultaneously. Longitudinal movements shall be limited to the elastomer.
B. The loads and the shear displacement shall be measured during the test.
C. The shear load shall be equal to 15% of the design ultimate load.
D. The shear load shall be applied and held for one minute, then released.

The acceptance criteria for the keyed top edge plate shear test at design ultimate conditions shall be the following:

A. There shall be no cracking or tearing of the steel plates or the welds.
B. There shall be no overall distortion of the keyed plates or other components. Local yielding at the bearing surfaces of the keys is permissible.

BEARING STORAGE

Circular segmented bearings of Types III and IV on Hinges AE, AW, EE, and EW shall be transported to and stored at the bearing storage facility as designated by the Engineer. Said location will be within 25 km of the San Francisco-Oakland Bay Bridge Toll Plaza. The Contractor shall notify the Engineer at least two months prior to delivery of the circular segmented bearings.

Circular segmented bearings of Types III and IV on Hinges AE, AW, EE, and EW shall be packaged for the protection of the steel against physical damage and corrosion during shipping and storage. The shipping package shall be clearly marked with a statement that the package contains bearing segments for the San Francisco-Oakland Bay Bridge and show the hinge location and the date packaged.

MEASUREMENT AND PAYMENT

No payment will be made for circular segmented bearings that do not pass the specified testing requirements.

Furnish and install circular segmented bearing will be measured and paid for by the unit and the number of bearings for payment will be determined by the actual count in the completed work.

The contract unit price paid for furnish and install circular segmented bearing of Types I, II, III, and IV at Hinges BE, BW, CE, CW, DE, and DW shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the bearing, testing including fixtures, temporary supports, installing in final position, including bearing grout, and cleaning and painting of circular segmented bearing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Furnish and place circular segemented bearing will be measured and paid for by the unit and the number of bearings for payment will be determined by the actual count placed in the temporary recessed position.

The contract unit price paid for furnish and place circular segmented bearing of Types I and II at Hinges AE, AW, EE, and EW shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the bearing, testing including fixtures, temporary supports, cleaning and painting, and installation of the circular segmented bearing in temporary recessed position, excluding bearing grout, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Furnish and store circular segemented bearing will be measured and paid for by the unit and the number of bearings for payment will be determined by the actual count placed in the storage.

The contract unit price paid for furnish and store circular segmented bearing of Types III and IV at Hinges AE, AW, EE, and EW shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the bearing, testing including fixtures, cleaning and painting, and storing of the circular segmented bearing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for bearing test specimens for prototype tests shall be considered as included in the contract unit prices paid for furnish and install circular segmented bearing, furnish and place circular segmented bearing, and furnish and store circular segmented bearing and no separate payments will be made therefor.

Full compensation for demonstrating bearing grout methods to the Engineer shall be considered as included in the contract unit price paid for furnish and install circular segmented bearing and no additional compensation will be allowed therefor.

If a portion or all of circular segmented bearings are either fabricated or tested at a site more than 480 air line kilometers from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Payment to the Contractor for furnishing circular segmented bearings will be reduced $10,000 for any fabrication and testing site located more than 480 air line kilometers from both Sacramento and Los Angeles, or in the case where a fabrication or testing site is located more than 4800 air line kilometers from both Sacramento and Los Angeles, payment will be reduced $20,000.

10-1.40A COST REDUCTION INCENTIVE PROPOSALS FOR PILE DRIVING TEMPLATE

Except as provided herein, piles shall be installed in conformance with the details shown on the plans and the provisions in Sections “Piling,” and “Steel Structures,” of these special provisions.

If the Contractor submits cost reduction incentive proposals for pile driving installation, the proposals shall be in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications, and in “Cost Reduction Incentive Proposal,” of these special provisions, and these special provisions.

The Engineer may reject any proposal which, in the Engineer's judgment, may not produce a structure which is at least equivalent to the planned structure.

CRIP submittals shall conform to “Working Drawings,” elsewhere in these special provisions. The CRIP submittal shall include proposed revisions to the contract plans and design calculations. Calculations shall be independently checked, and these check calculation shall be included in the submittal.

Each CRIP shall be submitted prior to completion of 25 percent of the contract working days and sufficiently in advance of the start of the work that is proposed to be revised by the CRIP to allow time for review by the Engineer and correction by the Contractor of the CRIP plans and calculations without delaying the work. The Contractor shall allow a minimum of 50 working days for the review of a CRIP. In the event that several CRIPs are submitted simultaneously, or an additional CRIP is submitted for review before the review of a previously submitted CRIP has been completed, the Contractor shall designate the sequence in which the CRIPs are to be reviewed. In this event, the time to be provided for the review of any proposal in the sequence shall be not less than the review time specified herein for that proposal, plus 2 weeks for each CRIP of higher priority which is still under review.

No extension of time nor delay will be granted for a CRIP.

Permits and approvals required of the State have been obtained for the structures shown on the plans. Proposals which result in a deviation in configuration may require new permits or approvals. The Contractor shall be responsible for obtaining the new permits and approvals before the Engineer will reach a decision on the proposal. Delays in obtaining permits and approvals will not be reason for granting an extension of contract time.

The Contractor shall determine the means and methods for the following:

A. Type of cofferdam;
B. Method of dewatering the footing; and
C. Sequence of pile cap construction.

Modifications may be proposed in the following:

A. Use of pile cap as a driving template;
B. Watertight seals; and
C. Pile head collar assembly

A modification differing in any respect from the structure as designed and detailed on the plans shall comply with the following:

A. Welds for temporary attachments shall conform to the requirements for field welding in the Section “Steel Structures,” of these special provisions;
B. No permanent stresses or deflections shall be imposed on the pile cap elements due to pile driving operations;
C. Temporary stresses and deflections imposed on the permanent steel pile cap elements shall not exceed the maximum allowable limits specified in the current edition of the AISC Manual of Steel Construction, Allowable Stress Design;
D. Temporary stresses and deflections imposed on the concrete pile cap perimeter wall shall not exceed the maximum limits specified in the current edition of the AASHTO Standard Specifications for Highway Bridges;
E. Horizontal loads from pile driving shall be resisted at the pile cap top and bottom plates;

F. Pile centralizer shall be provided between the pile and pile sleeve to prevent contact between pile and permanent pile cap elements;
G. The pile centralizer shall be designed as a load fuse, thereby limiting stresses imposed on the permanent pile cap elements to the limits specified herein;
H. The Contractor shall provide the Engineer dry access to inspect and test the pile sleeve, top and bottom plates near the pile sleeve annulus, pile sleeve welded connections, and concrete pile cap perimeter wall; and
I. Testing and repair of steel plates and welds shall be in accordance with AISC Manual of Steel Construction and AWS D1.5, respectively. Crack width limits and crack repair on the precast footing concrete walls shall conform to the requirements as specified in "Concrete Structures," of these specail provisions..

No modifications will be permitted in the following:

A. Confinement of concrete in the pile sleeve annulus; and
B. Holes for temporary attachments will not be allowed on the pile cap elements, unless shown on the contract plans or approved by the Engineer.

10-1.44A CORMORANT NESTING HABITAT

This work shall consist of constructing stainless steel cormorant nesting platforms in conformance with the details shown on the plans and as specified in these special provisions.

Attention is directed to “WELDING,” of these special provisions.

Welding shall conform to the requirements in AWS D1.6.

MATERIALS

All parts shall be fabricated from stainless steel Type 316L.

Pipe shall be fabricated in conformance with the requirements of ASTM Designation: A 269.

Pipe fittings shall be fabricated in conformance with the requirements of ASTM Designation: A 182.

Bolts and nuts shall be fabricated in conformance with the requirements of ASTM Designation: F 593.

Base plates shall be fabricated in conformance with the requirements of ASTM Designation: A 240.

Welded wire mesh and pipe straps shall be of commercial quality.

Elastomeric bearing pads shall conform to the provisions in Section 51-1.12H, “Elastomeric Bearing Pads,” of the Standard Specifications.

WORKING DRAWINGS

The Contractor shall submit working drawings with supplement for cormorant nesting habitat to the Engineer for approval in conformance with the provisions in “WORKING DRAWINGS," of these special provisions.

The Contractor shall provide suitable means to prevent bird access to the platforms until completion of the project.

Working drawings shall include the following:

A. Complete details and description of materials and hardware; and
B. Complete details and description of methods to prevent bird access to the platforms prior to completion of the project.

The Contractor shall allow the Engineer 20 working days to review the working drawings.

MEASUREMENT AND PAYMENT

Cormorant nesting habitat will be paid for on a lump sum basis.

The contract lump sum price paid for cormorant nesting habitat shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the cormorant nesting habitat, complete in place, including elastomeric bearing pads, as specified in these special provisions, and as directed by the Engineer.

ENGINEER'S ESTIMATE
04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41 (F)	048561	FURNISH PRECAST CONCRETE PANEL (PIER TABLE, LIGHTWEIGHT)	M3	2350		
42 (S-F)	048562	ERECT PRECAST CONCRETE PANEL (PIER TABLE, LIGHTWEIGHT)	M3	2350		
43 (F)	048563	PRECAST CONCRETE WALL (BRIDGE FOOTING)	M3	3510		
44	BLANK					
45 (F)	048565	FURNISH PRECAST CONCRETE FENDER MODULES	M3	1820		
46 (S-F)	048566	ERECT PRECAST CONCRETE FENDER MODULES	M3	1820		
47 (F)	048567	FURNISH PRECAST CONCRETE SEGMENT	M3	85 000		
48 (S-F)	048568	ERECT PRECAST CONCRETE SEGMENT	M3	98 900		
49 (S-F)	048569	FURNISH POLYESTER CONCRETE OVERLAY (20 MM)	M3	1950		
50 (S-F)	048570	PLACE POLYESTER CONCRETE OVERLAY (20 MM)	M2	97 600		
51 (S-F)	048571	FURNISH POLYESTER CONCRETE OVERLAY (13 MM)	M3	138		
52 (S-F)	048572	PLACE POLYESTER CONCRETE OVERLAY (13 MM)	M2	10 580		
53	BLANK					
54 (S-F)	048574	NEOPRENE BUMPER	EA	40		
55 (S)	519121	JOINT SEAL (TYPE B - MR 30 MM)	M	790		
56 (S)	048575	MODULAR JOINT SEAL ASSEMBLY (HINGE BW)	M	25		
57 (S)	048576	MODULAR JOINT SEAL ASSEMBLY (HINGE BE)	M	25		
58 (S)	048577	MODULAR JOINT SEAL ASSEMBLY (HINGE CW)	M	25		
59 (S)	048578	MODULAR JOINT SEAL ASSEMBLY (HINGE CE)	M	25		
60 (S)	048579	MODULAR JOINT SEAL ASSEMBLY (HINGE DW)	M	25		

REVISED PER ADDENDUM NO. 6 DATED OCTOBER 30, 2001

ENGINEER'S ESTIMATE
04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61 (S)	048580	MODULAR JOINT SEAL ASSEMBLY (HINGE DE)	M	25		
62 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	KG	16 490 000		
63 (S-F)	520110	BAR REINFORCING STEEL (EPOXY COATED) (BRIDGE)	KG	9 110 000		
64 (S-F)	048581	HEADED BAR REINFORCEMENT	EA	140 500		
65 (F)	048582	FURNISH STRUCTURAL STEEL (ORTHOTROPIC BOX GIRDER)	KG	2 600 000		
66 (S-F)	048583	ERECT STRUCTURAL STEEL (ORTHOTROPIC BOX GIRDER)	KG	2 600 000		
67 (F)	048584	FURNISH STRUCTURAL STEEL (BRIDGE FOOTING)	KG	21 600 000		
68 (S-F)	048585	ERECT STRUCTURAL STEEL (BRIDGE FOOTING)	KG	21 600 000		
69 (F)	048586	FURNISH STRUCTURAL STEEL (PIPE BEAM)	KG	1 347 000		
70 (S-F)	048587	ERECT STRUCTURAL STEEL (PIPE BEAM)	KG	1 347 000		
71 (S-F)	048588	FURNISH STRUCTURAL STEEL (PIPE BEAM FUSE)	EA	40		
72 (F)	048589	FURNISH STRUCTURAL STEEL (BRIDGE BIKEPATH)	KG	3 290 000		
73 (S-F)	048590	ERECT STRUCTURAL STEEL (BRIDGE BIKEPATH)	KG	3 290 000		
74 (S-F)	048591	TRAVELER SUPPORT RAILS	KG	192 000		
75 (S)	048592	TRAVELER SCAFFOLD	LS	LUMP SUM	LUMP SUM	
76 (S)	048593	TRAVELER SCAFFOLD MECHANICAL	LS	LUMP SUM	LUMP SUM	
77	021685	SERVICE PLATFORMS	EA	26		
78	560218	FURNISH SIGN STRUCTURE (TRUSS)	KG	29 000		
79	560219	INSTALL SIGN STRUCTURE (TRUSS)	KG	29 000		
80	562004	METAL (RAIL MOUNTED SIGN)	KG	1900		

ENGINEER'S ESTIMATE
04-012024

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
121	021711	CCSF SEWER FORCE MAIN (10 NPS)	M	2130		
122	021712	CCSF SEWER CASING PIPE (18 NPS)	M	2040		
123	021713	CCSF WATER CASING PIPE (20 NPS)	M	12		
124	021714	DOMESTIC WATER (2 1/2 NPS)	M	2110		
125	021715	COMPRESSED AIR (4 NPS)	M	2110		
126	021716	CCSF RECLAIMED WATER (6 NPS)	M	2130		
127	021717	CCSF RECLAIMED WATER CASING PIPE (10 NPS)	M	12		
128	021718	SUBSTATION ARCHITECTURAL EASTBOUND	LS	LUMP SUM	LUMP SUM	
129	021719	SUBSTATION ARCHITECTURAL WESTBOUND	LS	LUMP SUM	LUMP SUM	
130	BLANK					
131 (S-F)	048834	MARINE PILE DRIVING ENERGY ATTENUATOR	LS	LUMP SUM	LUMP SUM	
132	BLANK					
133	048844	FURNISH AND INSTALL CIRCULAR SEGMENTED BEARING	EA	48		
134	048845	FURNISH AND PLACE CIRCULAR SEGMENTED BEARING	EA	16		
135	048846	FURNISH AND STORE CIRCULAR SEGMENTED BEARING	EA	16		
136	048847	CORMORANT NESTING HABITAT	LS	LUMP SUM	LUMP SUM	
137	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID: _____