

DEPARTMENT OF TRANSPORTATION

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March 15, 2002

07-Ven-101-35.4/38.6
07-0607U4
ACNH-Q101(005)E

Addendum No. 2

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in VENTURA COUNTY IN OXNARD AND SAN BUENAVENTURA FROM ROUTE 232 TO MONTALVO SPUR OVERHEAD.

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 March 21, 2002.

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

In the Special Provisions, Section 8-1.03, "STATE-FURNISHED MATERIALS," the seventh item of the fifth paragraph is revised as follows:

"5 Steel pipe pile 1.860 m I.D. x 38.1 m thick x 23.0 m"

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the third paragraph is revised as follows:

"The Contractor will be permitted to work within the active riverbed between April 1 and October 30. The active riverbed is defined as the area between Piers 8 through 12 of the new bridge. The Contractor shall notify the Engineer at least 24 hours in advance of any work performed within the riverbed. The Engineer will approve or deny the Contractor's request to enter the riverbed within 24 hours of the request. Bridge deck work and leaving falsework in place is excluded from this provision."

In the Special Provisions, Section 10-1.44, "PILING," subsection "GENERAL," subsection "Load Test Piles," the following table is added after the third paragraph:

Bridge	Load Test Pile Location	Control Locations
Santa Clara River Bridge Br. No. 52-0449	Pier 7, Stage 1	Pier 2-Pier 8 Stage 1
Santa Clara River Bridge Br. No. 52-0449	Pier 13, Stage 1	Pier 9-Pier 14 Stage 1
Oxnard Blvd. O.C. Br. No. 52-0454		Bent 2

In the Special Provisions, Section 10-1.44, "PILING," subsection "GENERAL," subsection "Load Test Piles," the seventh paragraph is deleted.

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In the Special Provisions, Section 10-1.44, "PILING," subsection "GENERAL," subsection "Dynamic Monitoring," the following paragraph is added after the fifth paragraph:

"The 21 working days required for the Engineer to perform the load test, to complete dynamic monitoring, revise specified tip elevations, and to provide the bearing acceptance criteria curves are not applicable to the first section of pile load tested. For the first section of pile to be load tested, the Engineer shall be allowed 3 days to perform pile load testing. Day one of 3 shall be the first day after the load test and anchor piles have been installed at that same control location."

In the Special Provisions, Section 10-1.44, "PILING," subsection "GENERAL," subsection "Dynamic Monitoring," the eighth paragraph is revised as follows:

"Production piles, other than load test and anchor piles, shall not be driven to tip until the bearing acceptance criteria curves for piles within the corresponding control location have been provided by the Engineer."

In the Special Provisions, Section 10-1.46, "CONCRETE STRUCTURES," subsection "FALSEWORK," the second paragraph is revised as follows:

"Santa Clara River Bridge falsework supports shall be aligned with the existing bents and maintain the existing clear opening with the exception of spans with hinges. The falsework girders shall not be lower in elevation than the existing southbound bridge soffit elevation."

In the Special Provisions, Section 10-4.01, "SEISMIC MONITORING ELECTRICAL SYSTEM," is added as attached.

In the Special Provisions, Section 10-4.02, "INSTALLATION OF SEISMIC MONITORING CASING," is added as attached.

In the Proposal and Contract, the Engineer's Estimate Items 238 is revised as attached.

To Proposal and Contract book holders:

Replace page 14 of the Engineer's Estimate in the Proposal with the attached revised page 14 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.

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This office is sending this addendum by confirmed facsimile to all 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

10-4.01 SEISMIC MONITORING ELECTRICAL SYSTEM

This work shall consist of installing the seismic monitoring system in accordance with the details shown on the plans, these special provisions, the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications, and the Standard Plans, and the provisions in Chapter 6, "Specifications for Cabinet Models 332,334, and 336", of the Traffic Signal Control Equipment Specifications.

Electrical work shall include furnishing all labor, materials, equipment and services required to construct and install the complete seismic monitoring electrical system shown on the plans.

System layouts are generally diagrammatic and location of equipment is approximate. Exact routing of conduits and other facilities and location of equipment is to be governed by structural conditions and other obstructions, and shall be coordinated with the work of other trades. Equipment requiring maintenance and inspection shall be located where it is readily accessible for the performance of such maintenance and inspection.

Related work

Earthwork, foundations, sheet metal, painting and such other work incidental to and necessary for the proper installation and operation of the seismic monitoring system shall be done in accordance with the requirements specified for similar work in the Standard Specifications.

Order of work,--

The Contractor shall first drill the down holes, construct the free field, mount the seismic sensor enclosures, install the recorder cabinets and the complete conduit system. Next, the Contractor shall pull all the seismic cables (without any splices) from each seismic sensor enclosure to the respective seismic recorder location as shown on the plans. Next, the Contractor shall insure that electrical power and ISDN telephone service is present at each of the recorder locations where applicable. The Contractor shall notify the Engineer in writing at least 20 working days in advance when the Contractor wants The California Division of Mines and Geology (CDMG) to install and test their equipment as specified elsewhere in these special provisions.

COST BREAK-DOWN

The Contractor shall furnish to the Engineer a cost breakdown for each contract lump sum item of work described in this Section 10-4.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and values shall be included in the cost breakdown submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost breakdown submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for the various electrical work items due to any differences between the quantities shown in the cost break-down furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in the cost breakdown for electrical work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in the cost breakdown, however, costs for traffic control system shall not be included. Bond premium, temporary construction facilities, plant and other items will not be paid for under the various electrical work items and shall be included in the mobilization bid item for the entire project.

The cost breakdown shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The cost breakdown shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

At the Engineer's discretion the approved cost break-down may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer.

When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

The cost breakdown shall, as a minimum, include the following items:

- Conduit - list by each size and installation method
- Pull boxes - each type
- Conductors - each size and type
- Seismic sensor recorder disconnect switch
- Seismic sensor enclosures-each type
- Free field manhole

STATE-FURNISHED MATERIALS

Attention is directed to Section 8-1.01, "State-Furnished Materials", of these special provisions. The following materials will be furnished to the Contractor:

- Force balance accelerometer (FBA) pigtails.

The Contractor shall notify the Engineer in writing not less than 20 working days in advance when the Contractor wants The California Division of Mines and Geology (CDMG) to deliver the State-furnished material to the Contractor.

State furnished and installed material.---

The following materials will be furnished and installed by State forces:

- The seismic sensor mounting plates
- Down hole seismic sensors and cable to surface
- Seismic sensors on bridge and at free field
- Seismic recorders

Freefield and downhole installations at the Southwest end of the bridge.

The final location shall be selected by CDMG and the Engineer. With 2 weeks advance notice, CDMG will be on-site to witness the installation and grouting of the two 103 mm PVC downhole casings. CDMG will provide the specially formed sealed cap assemblies (Bishops Hat) for the bottom of the casings. The approximate depth of the two casings are 18 and 36 meter. See Freefield and Downhole details and Junction Box specification. Appropriate paddle markers are to be installed to identify the freefield, dowholes and associated pull-boxes.

State furnished and installed material installation.—

After all Contractor supplied equipment, conduit and cable has been installed, the CDMG shall be given access to the recorder cabinets, downholes and freefield sites near the southwest end of the bridge (off Johnson Drive) and to all seismic sensor enclosures on the bridge. Access is for CDMG to install and adjust the seismic sensors and recorders of the seismic monitoring system. Access shall include transportation of equipment on the job site, movement of stored materials or parked vehicles, traffic control, where necessary. Access is for the purpose of installation, operational testing and to perform any necessary system trouble shooting and repair. The estimates below are for the actual work at the locations and exclude transit time to the work locations. Some of the work can be accomplished simultaneously and the CDMG will meet with the Engineer and the Contractor at the job site to work out a mutually agreeable schedule.

1. Seismic recorder cabinets location:
 1. The CDMG will need convenient access to the recorder cabinets prior to their installation for the purpose of measuring and preparing to mount the recorders into the cabinet.
 2. The CDMG will need approximately 3 days access per recorder location to install and wire the recorders.
 3. The CDMG will also need access to each recorder cabinet during the installation and testing of the seismic sensors wired to that recorder.
 4. CDMG will need approximately 3 days access per recorder during the final system testing for any necessary troubleshooting and repairs.

1. Bridge seismic sensor enclosure locations (8 Total):
 1. The CDMG will require approximately 30 minutes work time, at each enclosure on a minimum of two occasions (installation and operational testing) to accomplish their work.
 2. Downhole and Freefield locations (2 downhole and 1 freefield):
 1. The CDMG will require approximately _ day access time for each downhole and freefield package. In addition, access will be required to the downhole locations during the 2 days needed for wiring and testing the recorder.

SUBMITTALS

Unless otherwise permitted in writing by the Engineer, the Contractor shall within 60 days after approval of the contract, submit a list of materials and equipment to be installed, manufacturer's descriptive data and such other data as may be requested by the Engineer for approval.

Each submission of data shall consist of at least 5 copies. Two copies will be returned to the Contractor either approved for use or returned for correction and resubmittal.

When the submitted data is approved, the Contractor shall furnish the Engineer with 6 additional copies for use during construction.

Data submitted shall bear a descriptive title, the name of the project, District, County, and Route and the contract number.

Installation of equipment will not be permitted until the material lists have been reviewed and approved by the Engineer. The State will not be responsible for any equipment purchased or labor performed prior to the review and will not be responsible for any delay to the Contractor pending review of submissions made after the 60 day period.

Product Data

A list of materials and equipment to be installed, manufacturer's descriptive data, and such other data as may be requested by the Engineer shall be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein.

Manufacturer's descriptive data shall be submitted for the following:

- Conduit - list by each size and installation method
- Pull boxes - each type
- ISDN Telephone cable
- Seismic sensor enclosures (at bridge railing)
- Downhole junction box
- Seismic sensor enclosure (freefield)
- Downhole box
- Seismic sensor cable junction boxes-each type
- Free field manhole

CLOSEOUT SUBMITTALS

Project Record Drawings

Project record drawings shall be submitted in accordance with the requirements listed elsewhere in these special provisions.

BASIC MATERIALS AND METHODS

GENERAL

This work shall consist of furnishing and installing conduits, conductors, fittings, and wiring devices in accordance with the details shown on the plans and these special provisions.

Conduits, conductors, fittings, and wiring devices shall include those accessories and appurtenances, not mentioned, that are required for the proper installation and operation of the electrical system.

PRODUCTS

Conduits and Fittings

Conduit shall conform to Section 86-2.05 "Conduit" in the Standard Specifications and these special provisions. The conduit material specified for Type 2 shall be hot-dip galvanized rigid steel conduit conforming to Type 1 above and coated with polyvinyl chloride or polyethylene. The exterior thermoplastic coating shall have a minimum thickness of 0.9 mm. The interior of the conduit and fittings shall be coated with a urethane lining. in Section 86-2.05A, "Material," of the Standard Specifications is amended to read:

Hot-dip galvanized rigid steel conduit conforming to Type 1 above and coated with polyvinyl chloride or polyethylene. The exterior thermoplastic coating shall have a minimum thickness of 0.9 mm. The interior of the conduit and fittings shall be coated with a urethane lining.

Rigid steel conduit shall be threaded, full weight rigid steel, hot-dip galvanized inside and outside with steel of malleable iron fitting.

Liquid-tight flexible metal conduit shall be used where flexible conduit is shown.

Conduit trade sizes are shown on the plans. No deviation from the conduit size shown on the plans will be permitted without written permission from the Engineer.

Conduit shall be tightly covered and well protected during construction using metallic bushings and bushings "pennies" to seal open ends.

A pull rope shall be installed in all empty conduits. At least 610 mm of pull rope shall be doubled back into the conduit at each termination.

Locations of conduit runs shall be planned in advance of the installation and coordinated with bridge construction work and shall not unnecessarily cross other conduits or pipe, nor block access to mechanical or electrical equipment.

Where practical, conduits shall be installed in groups in parallel, vertical or horizontal runs and at elevations that avoid unnecessary offsets.

All raceway systems shall be secured to the building or bridge structures using specified fasteners, clamps and hangers.

Single conduit runs shall be supported by using one hole pipe clamps. Where run horizontally on walls in damp or wet locations, conduit shall be installed with "clamp backs" to space conduit off the surface.

Multiple conduit runs shall be supported with construction channel secured to the building or bridge structure. Conduits shall be fastened to construction channel with channel compatible pipe clamps.

Raceways of different types shall be joined using approved couplings or transition fittings.

CABLES AND CONDUCTORS

Cables

Seismic sensor cable.

Seismic sensor cable shall be eight (8) tinned copper, insulated conductors (4 twisted shielded pairs with individual drain wires), AWG #22 (7 x 30stranded) with insulation 0.18 mm thick. Cable shall have an overall aluminum-polyester shield, AWG #22 stranded tinned copper drain wires, an outer jacket 0.23 mm min thick and an overall nominal outside diameter of 7.6 mm or less. Cable shall be instrument cable, NEC rated CL2P plenum cable rated for 105 degrees C. Cable shall have a color code as specified below:

Color Code: 1st pair – red, black; 2nd pair – white, brown; 3rd pair – blue, violet; 4th pair – yellow, orange.

Seismic cable shall be United Wire and Cable Co., Inc.; Consolidated Wire and Cable; or equal.

ISDN Telephone cable.

Telephone cable shall be Category 5 Telecommunications cable four (4) twisted conductor pairs, minimum AWG # 24 tinned copper, polyvinyl chloride insulated with a chrome PVC jacket rated for 150 Volts

Conductors

Conductors shall conform to Section 86-2.08, "Conductors," in the Standard Specifications and as specified in these special provisions.

- A. Conductors shall be Type XHHW-2 in wet and outdoor locations.
- B. Conductors shall be Type THHN in dry locations.

Wire connections and devices

Wire connections and devices shall be pressure or compression type, except that connectors for No. 10 AWG and smaller conductors in dry locations may be pre insulated spring-pressure type.

EXECUTION

Conduit Applications

Rigid steel conduit, rigid steel conduit coated with polyvinyl chloride and PVC rigid conduit shall be used unless otherwise shown on the plans or specified in these special provisions.

Liquid-tight flexible metal conduit shall be used where shown on the plans.

Conduit Installation

Conduit shall be installed in accordance with the requirements listed elsewhere in these special provisions.

Conduit Termination

Conduits entering seismic sensor enclosures shall be either from top or side. Conduit shall not enter from the backside of the seismic sensor enclosure.

Rigid steel conduits shall be securely fastened to cabinets, boxes and gutters using 2 locknuts and specified insulating metallic bushing. Conduit terminations at exposed weatherproof enclosures and cast outlet boxes shall be made watertight using specified hubs.

All future conduits terminated in underground pull boxes or exposed indoor and outdoor shall be provided with watertight conduit plugs.

Conductor and cable installation.

Conductors shall not be installed in conduit until all work of any nature that may cause injury is completed. Care shall be taken in pulling conductors that insulation is not damaged. An approved non-petroleum base and insulating type pulling compound shall be used as needed.

All cables shall be installed and tested in accordance with manufacturer's recommendations.

Splices and joints shall be insulated with insulation equivalent to that of the conductor.

Provide 914 mm of slack at each outlet and device connection. If the outlet or device is not at the end of a run of wire, connection shall be made with correctly colored pigtails tapped to the runs with splices as specified herein.

Branch circuit conductors in service cabinet shall be neatly trained along a path from the breaker terminals to their exit point. The conductors shall have ample length to transverse the path without strain, but shall not be so long as to require coiling, doubling back, or cramming. All pressure type connectors and lugs shall be retightened after the initial set.

Splices in underground pull boxes and similar locations shall be made watertight.

Seismic cable installation.

Seismic cables shall be installed continuous without any splices. One cable shall be installed for each sensor channel.

Conductor Identification

In addition to color-coding required by the National Electrical Code, all phase conductors shall be color coded by continuously colored insulation. Phase conductor color-coding shall be as follows:

SYSTEM	COLOR CODE
120/240V-Single Phase	Black, blue

The neutral and equipment-grounding conductors shall be identified as follows:

- A. Neutral conductor shall have a white or natural gray insulation.
- B. Equipment grounding conductor shall be insulated. Equipment grounding conductors shall have green insulation over its entire length.

Where a branch circuit enters or leaves a conduit, panel, gutter, or junction box, each conductor shall be identified by its panel board and circuit number. Identification shall be made with one of the following:

- 1. Adhesive backed paper or cloth wrap-around markers with clear, heat shrinkable tubing sealed over either type of marker.
- 2. Self-laminating wrap around type, printable, transparent, permanent heat bonding type thermoplastic film markers.
- 3. Pre-printed, white, heat-shrinkable tubing.

Seismic cable identification.

Each seismic cable shall be identified with the channel number as shown on the plans at each termination. Identification shall be made with pre-printed, white, heat-shrinkable tubing.

ELECTRICAL BOXES

Recorder cabinet.

Recorder cabinets 1 and 2 shall conform to Section 2 "Housing Requirements" in Chapter 6, "Specifications for Cabinet Models 332, 334 and 336", of the Traffic Signal Control Equipment Specifications with the following exceptions:

Paragraph 6.2.1 is amended to read:

The housing shall include, but not be limited to the following:

Enclosure	Hinges and Door catches
Doors	Gasketing
Latches/Locks	Cage supports and mounting
Ventilization	

Paragraph 6.2.4 is amended to read:

The housing ventilation including intake, exhaust and filtration are as follows:

Paragraphs 6.2.4.3 and 6.2.4.4 shall be deleted.

In addition, the police panel and cabinet cage are not required.

Cabinet shipping requirements – The cabinet shall be delivered mounted on a plywood shipping pallet. The pallet shall be bolted to the cabinet base. The cabinet shall be enclosed in a slipcover cardboard packing shell. The housing doors shall be locked to prevent movement during transportation.

All bolts, nuts, washers, screws (size 8 or larger), hinges and hinge pins shall be stainless steel unless otherwise specified.

Seismic sensor enclosure (on the bridge).

Seismic sensor enclosure on the bridge shall be made of stainless steel and shall conform to Caltrans Type 9A pull box shown on Caltrans Standard Plans July 1999, Plan No. ES-9C design. A nameplate with the inscription "SEISMIC" shall be installed on the cover.

Seismic sensor enclosure (freefield).

Seismic enclosure shall be submersible, 305 mm x 305 mm x 153 mm (H x W x D) cast iron box with cast iron cover. Box to withstand submersion in water up to six foot depth for extended periods. The word "SEISMIC" cast into the cover. Cast mounting lugs attached on two opposing sides, minimum of two lugs each side. One each bossed, drilled and tapped (NPT) hole to accept one inch conduit connector centered between mounting lugs on one side only. One each mounting button drilled and tapped for 6 mm x 20 located in the center (+ - 3 mm) of the inside bottom of the box. Finish to be hot dip galvanized.

The enclosure must be equivalent to one of the following:

O-Z Gedney P/N: YF-121206-SUB, with raised cast lettering "SEISMIC" in cover. One each mounting button P/N 1MBT installed in the center inside the bottom of the box. Mounting lugs P/N 4ML1816 attached. One each P/N BDT100 installed centered between mounting lugs on one side only.

Crouse Hinds P/N WCB121208-1-000G (except box shall be 153mm deep) with mounting straps and raise cast lettering "SEISMIC" in cover. One each mounting pad, blind tapped for 6 mm-20 installed in the center inside box. One each drilled and tapped (NPT) 25 mm hole centered between mounting straps on one side only.

Downhole junction box.

Down hole junction box shall be the same as seismic sensor enclosure (Cast iron box) except the box size shall be 356 mm x 203 mm x 152 mm D. Cast mounting lugs shall be attached on the two 203 mm opposing sides, minimum of two lugs each side. One each bossed, drilled and tapped (NPT) hole to accept a 53 mm conduit centered between mounting lugs on one side only. One each bossed, drilled and tapped (NPT) hole to accept a 27 mm Crouse Hinds water-tight strain relief connector or equal, per down hole cable as required. These holes are to be centered between the lid and the bottom along a 356 mm side of the box. Finish to be hot dip galvanized.

The enclosure must be equivalent to one of the following:

O-Z Gedney P/N: YF - 140806 -SUB, with mounting lugs P/N 4ML1816 attached to the 203 mm sides of the box. One each P/N BDT200 installed centered between mounting lugs on one side only. Appropriate number of P/N BDT100 installed centered between lid and bottom of the 356mm side.

Crouse Hinds P/N WCB120806 - 3 - 0000G0200 (except box shall be 356 mm long) with mounting straps. Two each mounting straps on each 203 mm side of box. One each bossed, drilled and tapped (NPT) hole to accept a 53 mm conduit connector centered between mounting pads on one side only. Each downhole cable requires a bossed, drilled and tapped (NPT) to accept a one inch Crouse Hinds water - tight connector. These holes to be entered between the lid and bottom along the 356 mm side of box.

The water tight connectors must be equivalent to Crouse Hinds P/N CGB397.

Seismic junction box.

Seismic junction box shall be Caltrans 9A pull box and shall conform to the Caltrans Standard Plans July 1999, plan No. ES-9C design. The inscription "SEISMIC JUNCTION BOX" shall be marked on the cover.

No unused openings shall be left in any box. Knockout seals shall be installed as required to close openings.

Junction boxes shall be installed at the locations and elevations shown on the plans or specified herein. Adjustments to locations may be made as required by structural conditions and to suit coordination requirements of other trades.

Pull boxes.

Pull boxes shall conform to Section 86-2.06 "Pull Boxes" in the Standard Specifications and as specified in these special provisions.

Freefield box shall be a 1220 mm x 1220 mm x 580 mm D electrical pull box with steel checker plate cover.

Pull box installation.

Electrical pull box covers shall be marked "ELECTRICAL". Telephone service pull box covers or lids shall have plain, unmarked covers.

Downhole box.

Downhole box shall be high density reinforced concrete box having an inside diameter of 356 mm minimum. The box shall be designed for installation in heavy traffic areas. Box cover shall be cast iron. Box cover shall be marked "SEISMIC".

Downhole box installation.

The top of the downhole shall be flush with the finished surface in paved areas and 51 mm above the finished grade in unpaved areas. Where conduits enter the down hole, the space around the conduits shall be grouted tightly or cast in the wall.

Free Field Manhole

Free field manhole shall be 1220 x 1220 (inside dimensions) x 610 mm deep with 102 mm thick walls, bottom and top. The manhole shall be precast or cast-in-place. The frame and cover shall be cast iron and cover shall have provisions for hold down bolts. Bolts shall be included. Conduits terminating inside the manhole shall end with bushings specified elsewhere in these special provisions. Manhole cover shall be marked "SEISMIC".

Manhole Installations

The top of the manhole shall be flush with the finished surface in paved areas and 50 mm above the finished grade in unpaved areas. Where conduits enter the manhole, the space around the conduit shall be grouted tightly or cast in the wall.

RECEPTACLES AND SWITCHES

Duplex receptacles.

Duplex receptacles shall be NEMA Type 5-20R, 3-wire, 20-ampere, 125-volt AC, safety grounding type, ivory color, specification grade receptacle suitable for wiring with stranded conductors.

Disconnect switch.

Disconnect switch shall be 20-amperes, 120/277-volt Ac, specification grade, ivory color toggle switch with silver cadmium alloy contacts. Switch shall be suitable for wiring with stranded conductors. Switch shall be mounted inside a NEMA 1 enclosure. A nameplate with the inscription "DISCONNECT SWITCH" shall be installed on the cover.

MISCELLANEOUS MATERIALS

Pull Ropes

Pull ropes shall be nylon or polypropylene with a minimum tensile strength of 225 kgf.

Watertight Conduit Plugs

Watertight conduit plugs shall be a hollow or solid stem expansion plugs complete with inner and outer white polypropylene compression plates and red thermoplastic rubber seal. Seal material shall be non-stick type rubber resistant to oils, salt, and alkaline substances normally available at the construction sites.

Anchorage Devices

Anchorage devices shall be corrosion resistant stainless steel toggle bolts, wood screws, bolts, machine screws, studs, expansion shields, and expansion anchors and inserts.

Anchorage

Hangers, brackets, conduit straps, supports, and electrical equipment shall be rigidly and securely fastened to surfaces by means of toggle bolts on hollow masonry; expansion shields and machine screws, or expansion anchors and studs or standard preset inserts on concrete or solid masonry; machine screws or bolts on metal surfaces; and wood or lag screws on wood construction.

Anchorage devices shall be installed in accordance with the anchorage manufacturer's recommendations.

Electrical Supporting Devices

Electrical supporting devices shall be one-hole conduit clamps with clamp backs, hot-dipped galvanized, malleable cast iron. Beam clamps supporting conduit in box girders shall be malleable iron.

Electrical supporting devices for PVC conduit shall be PVC coated steel two-hole conduit clamp.

Construction channel shall be galvanized steel channel. Galvanized steel channel shall be 41 mm x 41 mm x 2.66 mm (12-gage) galvanized steel channel with 13 mm diameter bolt holes, 40 mm on center in the base of the channel.

Ground rod (s).

Ground rod (s) shall be a 19 mm (minimum) galvanized or copper clad steel rod 3 meters long.

Ground rod(s) installation.

The ground rod(s) shall be driven vertically until the top is 150 mm above the surrounding surface. When vertical penetration of the ground rod cannot be obtained, an equivalent horizontal grounding system, approved by the Engineer, shall be installed.

Nameplates

Nameplates shall be laminated phenolic plastic with white core and black front and back. Nameplate inscription shall be in 6 mm high capitals letters etched through the outer layer of the nameplate material.

Equipment Identification

Equipment identified with nameplates shall be fastened with self-tapping, stainless steel screws.

TESTING

Functional testing.

After all the seismic sensors and recorders have been installed and connected by the CDMG, the seismic monitoring system shall be tested by the CDMG to insure that the system functions properly. The Contractor shall make necessary repairs and replacements at his expense if the source of the problem is determined to be part of the Contractor's scope of work.

After the seismic monitoring system installation work has been completed, the seismic monitoring system shall be tested in the presence of the Engineer to demonstrate that the seismic monitoring system functions properly. The Contractor shall make necessary repairs, replacements, adjustments and retest at his expense.

TELEPHONE SERVICE

Scope.-- The work shall consist of furnishing and installing service equipment in accordance with the requirements of the serving utilities, the details shown on the plans and these special provisions.

Utility connection.—The Contractor shall make all arrangements and obtain all permits and licenses required for the extension of and connection to each utility service applicable to this project, shall furnish all labor and materials necessary for such extensions which are not performed or provided by utility, and shall furnish and install any intermediate equipment required by the serving utilities.

Upon written request by the Contractor, the State will pay all utility permits, licenses, connection charges, and excess length charges directly to the utility. Such request shall be submitted not less than 15 days before service connections are required.

The cost incurred by the Contract for the extension of utilities beyond the limits shown on the plans, and in furnishing and installing any intermediate equipment required by the serving utilities, will be paid for as an ordered change as provided for elsewhere in these special provisions.

Full compensation for any costs incurred by the Contractor to obtain the permits and licenses shall be considered as included in the contract lump sum price paid for seismic monitoring system and no additional compensation will be allowed therefor.

SUBMITTALS

Installation details.

The Contractor shall submit complete service installation details to the serving utilities for approval. Prior to submitting installation details to the serving utility, the Contractor shall have submit said drawings as specified elsewhere in these special provisions to be reviewed and stamped "APPROVED" by the Engineer. Submittals shall be approved by the serving utility prior to commencing work.

PART 2. -- EXECUTION

Installation of service equipment shall be in accordance with the requirements of the serving utilities as shown on the approved installation details.

MEASUREMENT AND PAYMENT

The contract lump sum price paid for seismic monitoring electrical system shall include full compensation for furnishing all labor, materials (except State-furnished materials), tools, equipment, and incidentals, and for doing all the work (except State-furnished and installed materials) involved in seismic monitoring electrical system complete in place, including testing of the said system as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-01.—INSTALLATION OF SEISMIC MONITORING CASING

Installation of seismic monitoring casing shall consist of drilling into soil and rock, sampling soil and rock, providing a log of test borings and a boring report, and furnishing and installing casing for seismic monitoring equipment at the downhole locations shown on the plans. Seismic monitoring casing shall be in accordance with the details shown on the plans and these special provisions.

Installation of seismic monitoring casing includes the following operations in the following order:

1. Drill 115 mm diameter hole, perform Standard Penetration Test (SPT) and collect rock cores, and prepare a log of test borings and boring report.
2. Allow State forces to perform P-S suspension logging and provide assistance to lower instrument using in place drill rig.
3. Drill 205 mm diameter hole for installation of casing.
4. Furnish and install 103 mm diameter polyvinyl chloride (PVC) pipe casing, including equipment furnished and attached to the bottom of the casing by the State.
5. Grout the annulus between the 205 mm diameter hole and the 103 mm diameter casing and install pipe cap and enclosure.

MATERIALS.—The seismic monitoring casing shall consist of 103 mm diameter Schedule 80 screw joint (flush) polyvinyl chloride (PVC) pipe. Each screw joint shall include an O-ring and shall be sealed with an O-ring lubricant.

The casing will have a specially formed sealed cap (Bishops Hat) at the bottom with instrumentation cables extending up through the casing. The Bishops Hat and instrumentation cables will be furnished and installed by State forces. Casing shall be filled with clean water.

Grout for placement in the annular space between the casing and the hole shall be proportioned as follows:

Grout Type	Downhole	Grout
A	The shallow hole (18.3 meter)	2 sacks of cement (90 Ibs and 0.5 sack of bentonite (60 Ibs each) per 50 gallons of water
B	The deep hole (36.6 meter)	5 sacks of cement (90 Ibs each) and 0.25 sack of bentonite (60 Ibs each) per 50 gallons of water.

The Contractor shall furnish sufficient quantities of grout for filling the annular space between the casing and the hole.

BORINGS.—Borings shall consist of drilling holes, taking samples, logging borings and furnishing test boring submittals to the Engineer.

The “Soil and Rock Logging Classification Manual” is included in the “Materials Information” available to the Contractor as provided for in Section 2-1.03 “Examination of Plans, Specifications, Contract, and Site of Work,” of the Standard Specifications.

The Contractor shall drill borings at the center of each downhole location as shown on the plans and as directed by the Engineer. Boring shall be vertical.

The Contractor shall notify the Engineer in writing not less than 10 working days in advance of drilling borings.

All borings shall be made under site supervision of a Geologist provided by the contractor, The log of test borings shall be stamped by, and the boring submittal shall be signed by a geologist who is registered in the State of California and has at least five years of geotechnical engineering experience of deep foundations in both soil and rock.

Borings shall be made by rotary drill methods and shall be at least 76 mm in diameter.

One borings shall be drilled and logged to a depth equal to that of the deepest hole at the downhole location.

Standard Penetration Tests (SPT) shall be made in all soil types and performed in accordance with ASTM D1586 in each test boring at 765 mm maximum intervals and terminate when bedrock is encountered. Soil classification and description and descriptions shall conform to the requirements for visual-manual procedures in ASTM D 2488.

Bedrock shall be continuously cored with at least 90% core recovery. Rock shall not be logged from drill cuttings. Rock quality designation (RQD) shall be made taken at 1.5 meter maximum intervals. Rock shall be cored using an outer and inner core barrel drilling system. The outer core barrel shall be fitted with either a diamond impregnated or polycrystalline drill bit and have an outside diameter of at least 115 mm. The split inner tube core barrel shall have an inside diameter of at least 50 mm.

Prior to removal from the split inner tube barrels and placement into core boxes, rock cores shall be photographed. After core boxes are filled, and prior to removal from the drilling platform, rock cores shall be photographed. All rock core photographs shall be color, 127 mm x 177 mm, and labeled with the bore hole number, sample elevation, scale, and date and time photographed.

The rock cores shall be retained in rock core boxes that are labeled with the job contract number, the pile location, and the sample elevation. Rock core boxes shall become the property of the State and will be removed from the job site by the State. Prior to their removal from the job site, the Contractor shall preserve and secure the rock core samples in a weather protected facility until notified by the Engineer.

The log of test borings including the soil and rock classification shall conform to the document "Soil and Rock Logging Classification Manual: Field Manual," published by the Engineering Service Center, Caltrans, dated August 1995.

After completion of all borings, the Contractor shall furnish to the Engineer a test boring submittal that includes photographs of rock cores, a boring report and the log of test borings.

The log of test borings shall conform with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. All log of test borings shall be 560 mm x 864 mm in size. For initial review, 4 sets of drawings shall be submitted to the Engineer. Within 3 weeks after final approval of the test boring submittal, one set of the corrected prints on 27 kg (minimum) good quality bond paper, 560 mm x 864 mm in size, prepared by the Contractor shall be furnished to the Office of Structure Design, Documents P.O. Box 942874, MS #9, Sacramento, CA 94274-0001 (1801 30th Street, Sacramento, CA 95816) and 7 sets furnished to the Engineer.

Log of test borings shall show the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Post mile on each sheet. The test boring/geotechnical subcontractor name, address, and phone number shall be shown on the working drawings. Each sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for corner for future contract sheet numbers. The following shall be shown on the log of test borings:

1. Stationing and offset of boring.
2. Northing and easting coordinates.
3. Reference elevation and datum.
4. Boring start and completion date.
5. Geotechnical notes and miscellaneous explanations.
6. Drill bit and sampler types and diameters.
7. Percent of core recovery and RQD.
8. Sample numbers.
9. SPT data.
10. Depth increments of borings.
11. Graphic log.
12. Soil classifications and descriptions.
13. Rock classifications and descriptions.
14. Log symbol legend.
15. Signature and seal of the Geologist or Civil Engineer.

The boring report shall include the following:

1. Summary of drilling methods, drilling equipment, drill platforms, and any drilling difficulties encountered.
2. Location map of the surveyed position of the borings relative to the existing pier (in California Coordinate System and bridge stationing).
3. Bore hole surveying notes.
4. Photographs of rock cores.
5. Copies of original daily drilling notes.

The Engineer will notify the Contractor in writing when a boring submittal is complete and approved.

All materials utilized in making boring shall be disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, and to the requirements of the non-storm water discharges in the "Caltrans Storm Water Quality Handbook, Construction Contractor's Guide and Specifications" as specified in the Section entitled "Water Pollution Control" elsewhere in these special provisions.

P-S SUSPENSION LOGGING.—P-S suspension logging, consisting of P-wave and S-wave (dilatational wave and shear wave) velocity measurements, will be made by State forces. P-S suspension logging will be made after completion of the Contractor's boring, sampling, and logging operations. The Contractor shall notify the Engineer in writing not less than 10 working days prior to completing boring, sampling and logging operations in order for the State forces to be on site to perform P-S suspension logging. The Contractor shall allow 2 working days for the State forces to complete P-S suspension logging.

INSTALL CASING.—The seismic monitoring casing shall be installed into an 205 mm diameter hole. The shall be drilled by mud rotary methods and shall be centered over the 115 mm diameter hole described in the section "Borings" in these special provisions.

The 105 mm diameter pipe casing shall be installed from 200 mm above the ground surface to the depth as shown on the plans unless directed by the Engineer (using the P-S suspension logs). The Contractor shall notify the Engineer in writing not less than 15 working days prior to installing the casings in order for personnel from CDMG to attach the Bishops Hat to the casing. CDMG personnel shall be on site for the installation and grouting of the casings.

Grout shall be delivered at the low end of the void being filled by methods that prevent the mixing of grout with water during charging of the grout delivery tubes and placement of the grout. Until at least 3 meters of grout has been placed, the tips of grout delivery tubes shall be within 155 mm of the bottom of the void being filled. The grout delivery tubes may be raised during grouting, providing that the embedment of the tips are maintained at least 1.8 meter below the top surface of the grout.

Sufficient grout shall be injected to fill the annular space between the casing and the hole and be expelled at the top of the hole until there is no evidence of entrapped air or water. A minimum grout head of 610 mm shall be maintained above the of the hole until the grout has set.

All residue from the grouting operation shall be removed after completing the grouting operations and shall be disposed of in accordance with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, and to the requirements of Contractor's Guide and Specifications" as specified in the Section entitled "Water Pollution Control" elsewhere in these special provisions.

MEASUREMENT AND PAYMENT.—

Seismic monitoring casing shall be measured and paid for as install seismic monitoring casing. The length of seismic monitoring casing to be paid for shall be the total length in place in the completed work, measured from the bottom tip of the casing to the ground surface.

The contract price paid per meter for install seismic monitoring casing 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 casings, complete in place, including drilling into soil and rock, SPT sampling, collecting soil and rock cores, preparing a log of test borings and boring report, furnishing and installing casing, grouting, and disposing of material resulting from drilling holes and grouting, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

**ENGINEER'S ESTIMATE
07-0607U4**

Item	Item Code	Item	Unit of Measure	Estimated Quantity	Unit Price	Item Total
221 (S)	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	12 300		
222	023183	TWO 103 MM COMMUNICATION CONDUIT (TRENCH IN PAVEMENT)	M	460		
223 (S)	860252	SIGNAL AND LIGHTING (LOCATION 2)	LS	LUMP SUM	LUMP SUM	
224 (S)	860253	SIGNAL AND LIGHTING (LOCATION 3)	LS	LUMP SUM	LUMP SUM	
225 (S)	860400	LIGHTING (TEMPORARY)	LS	LUMP SUM	LUMP SUM	
226 (S)	860402	LIGHTING (CITY STREET)	LS	LUMP SUM	LUMP SUM	
227	023184	LIGHTING AND SIGN ILLUMINATION (REMOVAL)	LS	LUMP SUM	LUMP SUM	
228	023185	LIGHTING AND SIGN ILLUMINATION (BRIDGE)	LS	LUMP SUM	LUMP SUM	
229 (S)	023186	INTERCONNECTION SYSTEM	LS	LUMP SUM	LUMP SUM	
230	023817	4-103 MM COMMUNICATION CONDUIT (BRIDGE)	M	630		
231	860797	ELECTRIC SERVICE (IRRIGATION(LS	LUMP SUM	LUMP SUM	
232 (S)	861100	RAMP METERING SYSTEM	LS	LUMP SUM	LUMP SUM	
233	861497	MODIFY SIGNAL AND LIGHTING (LOCATION 1)	LS	LUMP SUM	LUMP SUM	
234 (S)	861504	MODIFY LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM	LUMP SUM	
235	023188	ADJUST POWER POLE TO GRADE	EA	1		
236	869039	COMMUNICATION PULL BOX	EA	8		
237	023189	SEISMIC MONITORING ELECTRICAL SYSTEM	LS	LUMP SUM	LUMP SUM	
238	023190	INSTALL SEISMIC MONITORING CASING	M	49		
239	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID: _____