DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
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Flex your power!
Be energy efficient!

January 4, 2013

04-Ala-80-2.2
04-014084
Project ID 0412000666

Addendum No. 3

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN ALAMEDA COUNTY AT THE SAN FRANCISCO - OAKLAND BAY BRIDGE MAINTENANCE YARD.

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 Wednesday, January 16, 2013.

This addendum is being issued to revise the Project Plans, the Notice to Bidders and Special Provisions, and the Bid book.

Project Plan Sheets 1, 2, 3, 4, 6, 7, 8, 9, 20, 21, 22, 23, 24, 27, 28, 29, 37, 38, 53, 101, 102, 103, 105, 106, 112, 113, 114, 115, 116, 118, 119, 120, 123, 127, 134, 135, 142, 144, 150, 156, 173, 174, 181, 207, 208, 209, 210, 211, 212, 241, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 307, 316, 328, 341, 342, 347, 349, 355, 368, 369, 370, 373, 375, 378, 379, 380, 383, 384, 389, 390, 393, 399, 400, 401, 402, 404, 405, 409, 411, 412, 417, 421, 424, 425, 428, 434, 438, 439, 443, 446, 453, 455, 457, 460, 478, 479, 480, 481, 482, 483, 485, 530, 533, 536, 537, 551, 563, 564, 566, 572, 573, 574, 575, 576, 577, 578, 583, 585, 586, 587, 588, 596, 597, 598, 599, 600, 611, 612, 613, 614, 615, 616, 617, 626, 627, 635, 638, 639, 641, 647, 648, 649, 669, 677, 683, 684, 685, 686, 697, 700, 707, 709, 711, 726, 730, 736, 737, 738, 740, 742, 746, 748, 762, 765, 771, 783, 784, 785, 789, 792, 794, and 795 are revised. Copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheets 252A, 252B, 254A, 254B, 483A, 483B, 483C, 610A, 610B, 782A, 782B, 782C, 783A, and 800A are added. Copies of the added sheets are attached for addition to the project plans.

In the Notice to Bidders, the eleventh paragraph is revised as follows:

"The estimated cost of the project is $40,000,000."

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In the Special Provisions, Section 4, "BEGINNING OF WORK, TIME OF COMPLETION, AND LIQUIDATED DAMAGES," the eighth paragraph is revised as follows:

"For this contract, a working day is defined as:

working day: Time measure unit for work progress. A working day is any day except when you cannot perform work on the controlling activity for at least 50 percent of the day with at least 50 percent of the normal labor and equipment due to any of the following:

1. Adverse weather-related conditions that cause you to dismiss the crew
2. Maintaining traffic under the contract
3. The Engineer's direction to suspend the controlling activities for reasons unrelated to your performance
4. An unanticipated event not caused by either party such as:

    4.1. Act of God (Pub Cont Code § 7105)
    4.2. Act of a public enemy
    4.3. Epidemic
    4.4. Fire
    4.5. Flood
    4.6. Governor-declared state of emergency
    4.7. Landslide
    4.8. Quarantine restriction

5. An issue involving a third-party, including:

    5.1. Industry or area-wide labor strike
    5.2. Material shortage
    5.3. Freight embargo
    5.4. Jurisdictional requirement of a law enforcement agency
    5.5. Workforce labor dispute of a utility or non-highway facility owner resulting in a utility or non-highway facility reconstruction not described and not solely for the Contractor's convenience"

In the Special Provisions, Section 10-1.24, "EXISTING HIGHWAY FACILITIES," subsection "REMOVE HIGH MAST LIGHT POLE FOUNDATION," is revised as follows:

"High mast light pole foundation including concrete pad, guard steel posts, electrical cabinets, hydrants, and water pipes, where shown on the plans to be removed, shall be removed.

The reinforced concrete foundation, and guard steel posts shall be removed to 5 feet below the finished grade if located within the building foundation limits, and shall be removed to 3 feet below the finished grade if located outside the building foundation limits.

Concrete removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

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MEASUREMENT AND PAYMENT

The contract unit price paid for remove high mast light pole foundation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in the removal of reinforced concrete foundation and concrete pad, guard steel posts, electrical cabinets, hydrants, and water pipes, complete in place, including structural backfilling and compacting the resulting holes, and depressions caused by the removal of the high mast pole foundation and guard steel posts, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer."

In the Special Provisions, Section 12-1.01, "SCOPE," the first and second paragraphs are revised as follows:

"Building work includes the construction of the Maintenance Complex which will include the Maintenance Building, Wash Rack and canopy, Fuel Island and canopy, and Wash-Fuel Building.

The Maintenance Building consists in general of offices, locker and gear rooms, restrooms, crew/break rooms, kitchens, equipment storage rooms, workshops, paint mixing room, vehicle repair area, vehicle storage areas, vehicle parts and tire storage, electrical and communication rooms, utilities- including gas, water, and sewer line systems, sewage lift station, and connections, and any other items or details required by the plans, Standard Specifications, or these special provisions."

In the Special Provisions, Section 12-2.20, "SEWAGE LIFT STATION BASIN," is added as attached.

In the Special Provisions, Section 12-8.09, "DOOR HARDWARE," subsection "PART 3 – EXECUTION, " sub-subsection "DOOR HARDWARE SCHEDULE," Door Hardware Set 5, Door Hardware Set 6, Door Hardware Set 7, Door Hardware Set 8, Door Hardware Set 12, Door Hardware Set 19 and Door Hardware Set 21 of the first paragraph are revised as follows:

"DOOR HARDWARE SET 5: (Pair exterior door. Doors 56, 58, and 136. Wash-Fuel Building Door 2)

No.	Item	Description	Quantity
1	Hinges	Heavy weight type 5111 with non removable pen.	3 pair
2	Cylindrical lockset and latch	Lever operated classroom lockset	1
3	Flush bolts	Manual, flush mounted on inoperable side	1
4	Lock guard	---	1
5	Accessories for pairs of doors	Astragal	1
6	Surface closer	Door closer	2
7	Mechanical stops and holders	Wall bumper	2
8	Gasketing	Weatherstrip	2 sets
9	Threshold	---	1 each
10	Protective trim unit	Door shoe with raindrip	2
11	Protective trim unit	Kickplate (no kickplate at Wash/Fuel Building Door 2)	1 ea side

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DOOR HARDWARE SET 6: (Single exterior door with security access. Door 21, 60, 78, 87, 113, 127, 134, 148, 153, and 154)

No.	Item	Description	Quantity
1	Hinges	Heavy weight type 5111 with non removable pen.	Minimum 2
2	Energy transfer hinge (electrified door hinge)	---	1
3	Electromechanical lock	Electrically unlocked, exit function (fail secure)	1
4	Lock guard	---	1
5	Surface closer	Door closer	1
6	Mechanical stops and holders	Wall bumper	1
7	Gasketing	Weatherstrip	1 set
8	Threshold	---	1
9	Protective trim unit	Door shoe with raindrip	1
10	Protective trim unit	Kickplate	1 ea side

DOOR HARDWARE SET 7: (Single exterior door. Doors 9, 22, 30, 57, 59, 62, 67, 74, 90, 92, 100, 157, 162 and 166. Wash-Fuel Building Door 1)

No.	Item	Description	Quantity
1	Hinges	Heavy weight type 5111 with non removable pen.	1 1/2 pair
2	Cylindrical lockset and latch	Lever operated storeroom lockset	1
3	Lock guard	---	1
4	Surface closer	Door closer	1
5	Mechanical stops and holders	Wall bumper	1
6	Gasketing	Weatherstrip	1 set
7	Threshold	---	1
8	Protective trim unit	Door shoe with raindrip	1
9	Protective trim unit	Kickplate (no kickplate at Wash/Fuel Building Door 1)	1 ea side

DOOR HARDWARE SET 8: (Single exterior fire rated, smoke seal door. Door 31)

No.	Item	Description	Quantity
1	Hinges	Heavy weight type 5111 with non removable pen.	Minimum 1-1/2 pair
2	Cylindrical lockset and latch	Lever operated storeroom lockset	1
3	Lock guard	---	1
4	Surface closer	Door closer	1
5	Mechanical stops and holders	Wall bumper	1
6	Gasketing	Weatherstrip and smoke gasketing	1
7	Threshold	---	1
8	Protective trim unit	Door shoe with raindrip	1
9	Protective trim unit	Kickplate	1 ea side

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DOOR HARDWARE SET 12: Single interior door with passage hardware. Door 5, 29, 42, 46, and 66)

No.	Item	Description	Quantity
1	Hinges	Heavy weight type 8111.	1-1/2 pairs
2		Lever operated, passage latch set	1
3	Surface closer	---	1
4	Mechanical stops and holders	Wall bumper	1

DOOR HARDWARE SET 19: Single interior door, locking. Door 41, 43, 51, 52, 53, 54, and 55)

No.	Item	Description	Quantity
1	Hinges	Heavy weight type 8111.	1-1/2 pair
2	Cylindrical lockset and latch	Lever operated classroom lockset	1
3	Surface closer	Door closer	1
4	Mechanical stops and holders	Wall bumper	1
5	Gasketing	Acoustic gasketing	1
6	Threshold	---	1
7	Trim unit	Acoustic door bottom seal	1

DOOR HARDWARE SET 21: (Pair exterior door w/ panic. Door 97)

No.	Item	Description	Quantity
1	Hinges	Heavy weight type 5111 with non removable pen.	3 pairs
2	Exit device	Panic device	2
3	Lock guard	---	2
4	Accessories for pairs of doors	Astragal	1
5	Surface closer	Door closer	2
6	Mechanical stops and holders	Wall bumper	2
7	Gasketing	Weatherstrip	2 sets
8	Threshold	---	1
9	Protective trim unit	Door shoe with raindrip	2
10	Protective trim unit	Kickplate	1 ea side

"

In the Special Provisions, Section 12-11.02, "FUEL STORAGE AND DISPENSING EQUIPMENT," subsection "PART 1 – GENERAL, " the following sub-subsection "DEFINITIONS," is added after sub-subsection "SUMMARY,":

"**DEFINITIONS**

Bio Diesel 5 - a blend of 5% biodiesel and 95% petrodiesel.

E-85 - an ethanol fuel blend of up to 85% denatured ethanol fuel and gasoline or other hydrocarbon by volume"

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In the Special Provisions, Section 12-11.02, "FUEL STORAGE AND DISPENSING EQUIPMENT," subsection "PART 2 – PRODUCTS, " sub-heading "Fuel Dispensers," is revised as follows:

"Fuel Dispensers:

Fuel dispensers shall be equipped to communicate with and be controlled by a fuel control terminal. Fuel dispensers shall have dual front mount nozzle and hose, listed shear/fire safety shut off valve with stabilizer bar assembly, listed shear/fire vapor safety shutoff valve (for dispensers with vapor recovery), automatic shut-off nozzles, automatic nozzle activation, ground supported overhead hose masts, registers displaying 99.9 gallons minimum per filling, 100,000-gallon electronic totalizers, and shall be supplied with brand panels factory labeled "BIO DIESEL 5", "E-85" or "GASOLINE," as applicable.

Dispenser hoses shall be provided with an electrically operated solenoid valve for controlling the dispensing of fuel from a remote location. The solenoid valve shall be rated for 120 volts operation and be installed in series with the fuel dispensing hose. In addition, each dispenser unit shall have a pulser unit for communicating with the fuel control terminal, as shown on the electrical plans. The pulser unit shall comply with the following:

Gallon to pulse ratio	1:10
Input frequency	0-1500 Hz
Supply voltage	12-12.5 Volts DC at no load
Supply current	1000 Ma DC maximum
Pulser voltage	0.5-12 Volts DC
Pulser current	20 Ma DC maximum
Contact rating	20 Ma minimum @ 12 Volts DC

Gasoline nozzles and hoses shall be vapor recovery type unless not required by the local air pollution control district. For the E-85 nozzle and hose (and vapor recovery system), a "Request for Research and Development Status for an E-85 Compatible Vapor Recovery System" shall be sent to the California Air Resources Board, Monitoring and Laboratory Division, Engineering and Certification Branch, for obtaining a 2 year Research and Development Permit. The request shall include a complete equipment list for all new and existing equipment, components and appurtenances associated with the E-85 fuel storage and dispensing system. Documentation shall be provided if vapor recovery nozzles are not required. Gasoline dispensers shall be single product, dual hose type. Each outlet shall have 12 feet of ¾-inch hose.

Diesel dispensers shall be single product, dual hose units with 15 feet of one-inch hose.

Fuel dispensers shall be freestanding type; Wayne, Tokheim, Gasboy, or equal. Safety shut off valve shall be Emco Wheaton, OPW, or equal."

In the Special Provisions, Section 12-11.02, "FUEL STORAGE AND DISPENSING EQUIPMENT," subsection "PART 2 – PRODUCTS, " sub-heading "Pipe and Fittings," the first paragraph is revised as follows:

"All double wall fuel piping and fittings shall be reinforced thermosetting resin pipe (RTRP) machine made with glass fiber reinforced epoxy resin. RTRP shall conform to NFPA Standard No. 58-2001 for underground piping for petroleum products and shall be listed and labeled for said use. Pipe and fittings shall be marked with manufacturer's name, nominal size and RTRP classification type, grade and class. Tracer tape shall be installed with all RTRP piping."

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In the Special Provisions, Section 12-11.02, "FUEL STORAGE AND DISPENSING EQUIPMENT," subsection "PART 2 – PRODUCTS, " the seventh paragraph is revised as follows:

> "Submersible Pumps: Submersible pumps shall be suitable for the fuel being pumped and be furnished with continuous duty motors, centrifugal type pumping unit with screen, extractable manifold and controller with built-in check valve, relief valve, leak detector, air eliminator, built-in thermal overload and safety disconnect switch. Pumps and solenoid valves supplying dispensers shall be controlled by the dispenser and the fuel control terminal. The pump and solenoid valve supplying the standby generator fuel tank shall be controlled by a control box, upon demand by the standby generator (fuel tank float switch). Control box shall be California State Fire Marshal approved and shall be furnished as a packaged unit with the submersible pump. Submersible pump shall be sized and rated as shown on the plans. Submersible pumps shall be FE Petrol, Veeder-Root or equal."

In the Special Provisions, Section 12-11.02, "FUEL STORAGE AND DISPENSING EQUIPMENT," subsection "PART 3 – EXECUTION, " sub-subsection "INSTALLATION," sub-heading "Pipe Installation," the first paragraph is revised as follows:

> "Double wall fuel piping for supplying the standby generator and fuel dispensers shall be graded slightly toward the fuel island without loops or traps. Double wall piping shall be installed where shown on the plans, and shall include the installation of tracer tape."

In the Special Provisions, Section 12-11.03, "LUBRICATION AND COMPRESSED AIR SYSTEMS," subsection "PART 2 - PRODUCTS," sub-subsection "MISCELLANEOUS COMPONENTS," the first and second paragraphs are revised as follows:

> "Recyclable Oil Storage Tank: Recyclable oil storage tank shall be rectangular, double walled steel type, UL-142 listed, and shall meet NFPA 30 standards. Tank shall be skid mounted, and shall have a corrosion resistant exterior coating. Recyclable oil transfer tank shall be sized according to the plans, and shall be equipped with NPT fittings, emergency vent and inspection opening, and all accessories as shown on the plans.
>
> Waste Coolant Storage Tank: Waste coolant storage tank shall be rectangular, double walled steel type, UL-142 listed, and shall meet NFPA 30 standards. Tank shall be skid mounted, and shall have a corrosion resistant exterior coating. Waste coolant storage tank shall be sized according to the plans, and shall be equipped with NPT fittings, emergency vent and inspection opening, and all accessories as shown on the plans."

In the Special Provisions, Section 12-11.03, "LUBRICATION AND COMPRESSED AIR SYSTEMS," subsection "PART 2 - PRODUCTS," sub-subsection "MISCELLANEOUS COMPONENTS," the tenth paragraph is deleted.

In the Special Provisions, Section 12-11.08, "SEWAGE LIFT STATION EQUIPMENT," is added as attached.

In the Special Provisions, Section 12-15.01, "MECHANICAL WORK," subsection "PART 1 – GENERAL, " sub-subsection "SUBMITTALS," sub-heading "Product Data," the following is added to the end of the list in the third paragraph:

> "Sewage Lift Station Basin
> Sewage Lift Station Equipment."

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In the Special Provisions, Section 12-15.01, "MECHANICAL WORK," subsection "PART 1 – GENERAL, " sub-subsection "CLOSEOUT SUBMITTALS," sub-heading "Operation and Maintenance Manuals," the following is added to the end of the list in the second paragraph:

"Sewage Lift Station Basin
Sewage Lift Station Equipment."

In the Special Provisions, Section 12-15.02, "PIPE, FITTINGS AND VALVES," subsection "PART 2 – PRODUCTS," sub-subsection "MATERIALS," sub-sub-subsection "PIPE AND FITTINGS (Class and Description)," the eighteenth paragraph is revised as follows:

"P3: Polyvinyl chloride (PVC) standard weight pipe and fittings, Schedule 40 and 80, conforming to ASTM Designation: D 1785. Pipe shall meet or exceed requirements of NSF Standard No. 14. Pipe shall have bell ends conforming to ASTM Designation: D 2672. For pipe sizes 3 inches and smaller, plain end pipe with solvent welded fittings conforming to ASTM Designation: D 2241, may be used."

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In the Special Provisions, Section 12-15.02, "PIPE, FITTINGS AND VALVES," subsection "PART 3 – EXECUTION," sub-subsection "INSTALLATION," sub-sub-subsection "INSTALLATION OF PIPES AND FITTINGS," the first paragraph is revised as follows:

"Pipe and Fittings: Pipe and fittings shall be installed in accordance with the following designated uses:

Designated Use	Pipe and Fitting Class
Domestic water (CW and HW) in buildings	H3
Domestic water underground within 5 feet of the building	H2
Domestic water underground 5 feet beyond the building	P2, P3, P4
Recycled water (CW) in buildings	P7
Recycled water underground within 5 feet of the building	P7, P8
Recycled water underground 5 feet beyond the building	P2, P3, P4, P8
Fire protection water, underground	B1,D1 or P4
Fire protection water riser	B1, D1 or H3
Fire protection sprinkler piping in building	A1, A3, A4 or B1
Sanitary drain piping above ground in building	H1, C1, or C2
Sanitary drain and vent piping underground within 5 feet of the building	C1 or C2
Sanitary vent piping above ground in building	A2, H1, C1, or C2
Sanitary drain pipe, 5 feet beyond the building (gravity flow)	C1 or P1
Sanitary sewer pipe, sewage lift station discharge (force flow)	P2 or P3 (schedule 80)
Natural gas, above ground	B2
Natural gas, underground	B2 (plastic coated), P5 or P6
Lubrication piping, less than 100 feet in length	LP1 (5/8" outside diameter)
Lubrication piping, over 100 feet in length	LP1 (7/8" outside diameter)
Gear oil, motor oil, and automatic transmission fluid (ATF) piping; less than 25 feet in length	LP2 or H3 (5/8" outside diameter)
Gear oil, motor oil, and ATF piping; over 25 feet in length	LP2 or H3 (7/8" outside diameter)
Compressed air	A1
Rainwater leaders	A2
Equipment drains and relief valve discharge	H3 or A1

"

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In the Special Provisions, Section 12-15.02, "PIPE, FITTINGS AND VALVES," subsection "PART 3 – EXECUTION," sub-subsection "FIELD QUALITY CONTROL," sub-heading "General Tests," the second paragraph is revised as follows:

"The Contractor shall test systems according to the following schedule for a period of not less than 4 hours:

Test Schedule		
Piping System	Test Pressure	Test Media
Sanitary sewer and vent (gravity flow system)	10-foot head	Water
Sanitary sewer (force flow system)	125 psig	Water
Water	125 psig	Water
Gas (except P6)	100 psig	Air
Gas (P6)	50 psig	Air
Air	125 psig	Air
Lubrication piping	125 psig	Air and Product

In the Special Provisions, Section 12-16.08, "STANDBY GENERATOR," subsection "PART 1 - GENERAL," the following subsection "DEFINITIONS," is added after subsection "PERMIT REQUIREMENTS,":

DEFINITIONS

Bio Diesel 5 - a blend of 5% biodiesel and 95% petrodiesel.

In the Special Provisions, Section 12-16.11, "INTRUSION ALARM SYSTEM AND ACCESS CONTROL SYSTEM," subsection "PART 1 – GENERAL," sub-subsection "SYSTEM DESCRIPTION," sub-heading "Design Requirements," the eighth paragraph is revised as follows:

"The intrusion alarm, access control, and telephone entry system shall not be integrated in any way. The intrusion alarm, access control, and telephone entry system shall be interconnected with each other for communication and for automatic operation of all three systems. All systems shall be wired, connected and left in first class operating condition. All systems shall be electrically supervised, 4-wire, Class A system and shall use closed loop initiating device circuits with individual zone supervision, individual indicating appliance circuit supervision, incoming and standby power supervision. All systems shall be an addressable system complete with built-in or portable reprogramming capabilities so that all reprogramming and reconfiguration of the system can be accomplished without removal of any solid state devices. Hardware, software and password used in programming the system and the I/O map shall be submitted to the Engineer."

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In the Special Provisions, Section 12-16.11, "INTRUSION ALARM SYSTEM AND ACCESS CONTROL SYSTEM," subsection "PART 2 – PRODUCTS," sub-heading "Telephone Entry Control Panel," the first paragraph is revised as follows:

> "The telephone entry control system shall be as shown on the plans and shall be inclusive of all power supplies and related hardware and software required for the automatic functioning and interconnection of the telephone entry system with the intrusion and access control system."

In the Special Provisions, Section 12-16.11, "INTRUSION ALARM SYSTEM AND ACCESS CONTROL SYSTEM," subsection "PART 3 – EXECUTION," sub-subsection "TELEPHONE ENTRY SYSTEM OPERATION," the first paragraph is revised as follows:

> "The telephone entry system at the north and west sides of the building shall be installed, wired, and interconnected with the intrusion and access control system so that all three systems communicate with each other and work in harmony with each other. Provide and install additional hardware, software, and cables that are not shown but are required for the complete functioning of the system as described herein."

In the Special Provisions, Section 12-16.15, "SEWAGE LIFT STATION," is added as attached.

In the Bid book, in the "Bid Item List," Items 57, 59, 61, and 62 are revised as attached.

To Bid book holders:

Replace pages 5 and 6 of the "Bid Item List" in the Bid book with the attached revised pages 5 and 6 of the Bid Item List. The revised Bid Item List is to be used in the bid.

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the Notice to Bidders section of the Notice to Bidders and Special Provisions.

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

Submit bids in the Bid 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 addendum and attachments are available for the Contractors' download on the Web site:

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/04/04-014084

If you are not a Bid 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,

for REBECCA D. HARNAGEL
Chief, Office of Plans, Specifications & Estimates
Office Engineer
Division of Engineering Services

Attachments

12-2.20 SEWAGE LIFT STATION BASIN

PART 1 - GENERAL

SUMMARY

Scope: This work shall consist of furnishing and constructing a sewage lift station basin in accordance with the details shown on the plans and these special provisions.

Sewage lift station basin shall consist of fiberglass reinforced polyester wet well, cast-in-place concrete top slab and electrical panel pad, access door, vent pipe, ground rod, concrete valve box, and other work as necessary for a complete installation.

Earthwork, including excavation and backfill, shall conform to the requirements in "Earthwork for Building Work," in this Section 12-2.

Pervious backfill material shall conform to the requirements in "Free Draining Granular Material," in this Section 12-2.

Cast-in-place concrete shall conform to the requirements for structural work in "Cast-In-Place Concrete" in Section 12-3, "Concrete and Reinforcement" in these special provisions.

Bar reinforcing steel shall conform to the requirements in "Cast-In-Place Concrete," in Section 12-3, "Concrete and Reinforcement," in these special provisions.

Sewage lift station equipment shall conform to the requirements in "Sewage Lift Station Equipment," in Section 12-11, "Equipment," of these special provisions.

SUBMITTALS

Product Data: Manufacturer's descriptive data for fiberglass wet well and access door shall be submitted for approval.

Engineering Calculations: Registered Civil or Structural Engineering calculations for anti-flotation, reinforced concrete base, and concrete top slab cover of the fiberglass wet well shall be submitted for approval.

LEED Submittals: Submit under "LEED Requirements" in Section 5-1 of these special provisions:

Credit MR 4.1 and 4.2, Recycled Content: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include cost for each product.

Credit MR 5.1 and 5.2, Regional Materials: For products regionally extracted or manufactured, provide each product's source location, manufacture location, distance of each from job site, and material cost as defined under "LEED Requirements" in Section 5-1 of these special provisions.

QUALITY ASSURANCE

Certificates of Compliance: Certificates of Compliance shall be furnished for fiberglass wet well in accordance with the requirements specified in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

DELIVERY, STORAGE, AND HANDLING

Do not drop or impact the wet well. Use chocks if stored horizontally. To move the wet well, install lifting lugs, sling, or choker as recommended by manufacturer. Use of chains or cables is prohibited.

PART 2 - PRODUCTS

MANUFACTURED UNITS

Fiberglass wet well shall be not less than 72 inches in diameter and conform to the requirements in ASTM Designation: D3753. Wet well shall have an access door providing a 30" x 48" clear opening. Include stiffening ribs with arrangement as determined by manufacturer to suit intended loading. Provide anti-flotation flange as shown on plans and as required to suit high ground water table condition at the project site.

Fiberglass Manhole Base Section: Fiberglass manhole base section shall be integral with sidewalls. Base shall extend to form an anti-flotation flange to assist in anchoring the wet well.

Fiberglass wet well shall be as manufactured by Triple D Pump Company, Myers Pentair Water, Zoeller Engineered Products, or equal.

MATERIALS

Resin: Fiberglass reinforced polyester wet well shall be manufactured from commercial grade polyester resin or vinyl ester resin with fiberglass reinforcements. The resin system shall be suitable for atmospheres containing hydrogen sulfide and dilute sulfuric acid as well as other gases associated with wastewater collection systems. Materials shall conform to the requirements of ASTM D 3753.

Reinforcing Materials: Reinforcing materials shall be commercial E-glass in the form of a mat of continuous or chopped strands or roving fabric, with a coupling agent that provides a suitable bond between glass reinforcement and resin. If reinforcing materials are used on the surface exposed to the contained substance, they shall be commercial grade chemical-resistant glass that will bond with the resin and leave a resin-rich surface.

Fillers and Additives: If used, fillers and additives shall be inert to the environment and wet well construction.

FABRICATION

Workmanship shall conform to the requirements of ASTM D 3753.

A gray pigment shall be applied to the resin on the exterior surface of the wet well as a UV inhibitor, for a minimum thickness of 0.125 inches.

The fiberglass reinforced bottom shall be attached to the wet well barrel with fiberglass layup in accordance with ASTM D 3299. When reinforcement is necessary for strength, reinforcement shall be fiberglass channel laminated to the wet well bottom in accordance with ASTM D 3299.

The fiberglass wet well shall have an internal sloped fillet bottom. The fillet shall be constructed of the same fiberglass material as the wet well and shall be integral with the wet well. The fiberglass fillet shall have a 1:1 slope and shall be constructed so it does not interfere with the pump mounting in the wet well.

Stub-outs for effluent, service, or discharge lines shall be factory installed with fiberglass layup in conformance with ASTM D 3299.

The exterior surface shall be smooth with no sharp projections. Handwork finish is acceptable if enough resin is present to eliminate fiber show.

The interior surface shall be resin rich with no exposed fibers and no wrinkles of 1/8 inch or greater in depth.

Defects not permitted include:

Exposed fibers: Glass fibers not wet out with resin
Resin runs: Runs of resin and sand on the surface
Dry areas: Areas with glass not wet out with resin
Delamination: Separation of layers
Blisters: Light colored areas larger than 1/2 inch in diameter
Crazing: Cracks
Pits or voids: Air pockets
Sharp projection: Fiber or resin projections necessitating gloves for handling

Wet well shall be permanently marked with manufacturer's name or trademark, product number, total length, and nominal diameter.

PHYSICAL REQUIREMENTS

The complete wet well shall have a dynamic load rating of not less than 16,000 ft-lbs when tested in accordance with ASTM D 3753. To establish this rating, the complete wet well shall not leak, crack, or suffer other damage when load tested to 40,000 ft-lbs and shall not deflect vertically downward more than 1/4 inch at the point of load application when loaded to 24,000 lbs.

The wet well cylinder shall have a minimum pipe stiffness value as follows when flexural strength is tested in accordance with ASTM D 3753.

Length (feet)	Stiffness (F/AY-PSI)
10-20	2.01
21-30	3.02
31-40	5.24

Compressive strength, flexural strength, and modulus of elasticity of the fiberglass wet well shall be not less than the following values when tested in accordance with ASTM D 3753.

	In Hoop Direction	In Axial Direction
Tensile Strength (psi)	18,000	5,000
Tensile Modulus	0.8×10^6	0.7×10^6
Flexural Strength (psi)	26,000	4,500
Flexural Modulus:		
No ribs: 48", 60", 72"	1.4×10^6	0.7×10^6
With ribs: 96", 144"	0.7×10^6	0.7×10^6

ACCESSORIES

Access Door:

Access door shall be single or double leaf, 1/4-inch minimum extruded aluminum frame with built-in neoprene cushion and strap anchors suitable for installation in concrete. Door shall be aluminum diamond plate reinforced with aluminum stiffeners as required. Steel hinges shall be bolted to underside and pivot on tension bars for easy opening. Cover to withstand a load of not less than 150 pounds per square foot, open to 90 degrees and lock open in that position, and equipped with snap lock and removable handle. Door hardware shall be corrosion resistant. Aluminum shall be mill finish and bituminous coating shall be applied to exterior of frame by manufacturer.

The clear door opening shall conform to the requirements of the equipment manufacturer to permit installation and removal of the lift station equipment.

Access door shall be Babcock-Davis Hatchways, Inc., Type FB; Bilco Co., Type K or KD; Halliday Products; or equal.

Vent pipe: Vent pipe shall be commercial quality galvanized steel pipe and fittings.

PART 3 - EXECUTION

INSTALLATION

Excavate, backfill, and prepare for installation in accordance with "Earthwork for Building Work" in Section 12-2, "Sitework," of these special provisions.

Provide a poured concrete base sufficient to account for buoyancy. The wet well shall be based on a minimum of 12 inches of reinforced concrete base and 24 inches larger than fiberglass wet well outside diameter. Pour the balance of the concrete over the anti-flotation flange.

Make necessary cutouts in the wet well using a cutting tool such as a jigsaw or hole saw. Do not use impact tools.

Install piping connections in accordance with manufacturer's instructions.

Pour reinforced concrete top slab as shown on plans. Top slab shall be designed by a civil or structural engineer registered to practice in California.

FIELD QUALITY CONTROL

Testing:

When, in the opinion of the Engineer, the groundwater table is too low to permit visual detection of leaks, lift station enclosure shall be hydrostatically tested.

Inlets and outlets shall be plugged and the enclosure filled to the height determined by the Engineer.

Enclosure may be filled 24 hours prior to testing to permit normal absorption into the walls to take place.

Leakage in the enclosure shall not exceed 0.1 gallon per hour per foot of head above the invert.

Enclosures that do not meet the hydrostatic test shall be repaired or replaced.

12-11.08 SEWAGE LIFT STATION EQUIPMENT

PART 1 - GENERAL

SUMMARY

Scope: The work shall consist of furnishing and installing sewage lift station equipment in accordance with the details shown on the plans and these special provisions.

Earthwork, foundations, electrical, and all other work incidental and necessary for the proper installation and operation of the work shall conform to the requirements for similar type work elsewhere in these special provisions.

SUBMITTALS

Product Data:

Manufacturer's descriptive data for all equipment, including installation instructions, shall be submitted for approval.

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

Sewage grinder pumps
Valve box
Flexible expansion coupling
Check valve
Gate valve
Discharge pipe and fittings

Working Drawings: Working drawings shall be submitted for approval. Working drawings shall show any changes in the proposed work, installation details of pumps and associated hardware, and dimensions and accurate locations of pumping equipment to avoid conflict with other work.

In the event the pumping equipment manufacturer requires a seal failure alarm system in order to warrant his equipment, the Contractor shall submit details of the circuit modification for approval and shall provide all necessary additional components and do all additional work connected thereto at no additional cost to the State.

Changes required by the Contractor's selection of pumping equipment from the details shown on the plans are to be made at no cost to the State and no further compensation will be allowed.

CLOSEOUT SUBMITTALS

Operation and Maintenance Manuals: Before completion of project, 3 bound identified copies of operation maintenance instructions and parts lists for equipment furnished shall be delivered to the Engineer at the jobsite. Manuals that are inadequate or incomplete will be returned and the Contractor shall resubmit adequate and complete manuals.

QUALITY ASSURANCE

Certificates of Compliance: Certificates of Compliance shall be furnished for sewage pumps in accordance with the requirements specified in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

WARRANTY

Warranties and Guarantees: Manufacturer's standard warranties and guarantees furnished for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

PART 2 - PRODUCTS

MANUFACTURED UNITS

Sewage Pump Units:

Sewage pump for Lift Station shall be a duplex unit, guide rail mounted, submersible grinder type sewage pump capable of handling raw, unscreened sewage. The pump shall be capable of delivering the indicated flow and head as shown on the plan. The grinder shall be capable of shearing and reducing to a fine slurry all material normally found in domestic and commercial sewage such as wash rags, paper, wood, plastic, glass, rubber, and the like. The slurry shall be capable of freely passing through the passages of the pump discharge system including valves. The grinder shall be constructed so as to eliminate clogging and jamming under all normal operating conditions including starting. Sewage pump units shall be complete equipment furnished by the manufacturer, including flexible expansion couplings, pump mating base, discharge pipe and fittings, check valves, and gate valves.

Sewage Pump Guide Rails and Mounts:

Sewage pump shall be guide rail mounted. The design of the guide rails shall be such that the pump unit shall be automatically and firmly connected to the discharge elbow when lowered into place by its mating connection. The pump shall be easily removable for inspection and service, without requiring bolts or other fasteners to be disconnected or removed.

Pump casing, bracket, and volute shall be gray cast iron construction.

The pump mating base shall be bolted to the sump floor with stainless steel expansion anchors. The mating base elbow shall be supplied with standard flanged connection for discharge pipe.

Each sewage pump supplied shall be factory tested and certified capable of pumping water, under test, according to given flow rates at the total heads indicated on the plans. Documentation of the certified test shall be submitted for approval prior to installation of the pump and shall include performance curves of the pump supplied showing flow rate, total head, kilowatt rating, rpm, efficiency and the actual impeller diameter. The pump, as installed, shall not load the motor to more than the actual full load nameplate amperage regardless of head.

The pump motor shall be a submersible type, explosion proof, UL or FM approved for Class 1, Group D, Division 1 locations. Motor shaft shall be stainless steel. Motor shall be housed in a cast iron casing and shall have built-in thermal overload protection. Horsepower rating and voltage shall be as shown on the plans. The impeller shall be dynamically balanced and factory certified to not exceed 0.026 ounce-inch/pound of rotating mass at 1800 RPM. Balancing of impeller shall not weaken or deform the impeller. For the grinder pump, the common pump and motor shaft and grinder cutter shall be of a harden 400 series stainless steel.

The pump motor shall be protected from contamination, by the liquid being pumped, by a tandem, double-mechanical seal running in an oil reservoir. The outer seal shall be tungsten carbide. The oil reservoir of the pump shall be equipped with a seal failure alarm system as recommended by the pump manufacturer.

The pump motor shall have portable Type-SO cord, or cords for pump power and control, of sufficient length to reach from the pump to motor starter enclosure without splicing. Cords shall be sealed into the motor by the pump manufacturer.

EQUIPMENT

Check Valve: Check valve shall be ball type with removable bolted top, ANSI B16.1 Class 125 flanges, with hollow steel ball with rubber cover.

Gate Valve: Gate valve shall have iron body and trim, ANSI B16.1 Class 125 flanges.

Discharge Pipe (Ductile Iron):

Discharge pipe shall be Class 53 ductile iron, 125 psi factory assembled threaded flanges, asphalt coated and shall conform to ANSI/AWWA Designation: C115/A21.5. Flanges shall conform to ANSI B16.1, Class 125.

Discharge pipe fittings shall be ductile iron, 125 psi flanges with smooth insides and asphalt coating, and shall conform to ANSI/AWWA, Designation: C110/A21.10.

Flexible Couplings: Flexible couplings shall be gasketed short sleeve type couplings consisting of a mild steel middle ring with pipe stop, 2 rubber compounded wedge-section ring gaskets, 2 mild steel follower rings and sufficient mild steel bolts to compress the gaskets. All ferrous parts of the couplings shall be hot-dipped galvanized after fabrication. The couplings shall be assembled in such a manner as to insure a permanent watertight joint.

MISCELLANEOUS

Fasteners: Fasteners, including external nuts, bolts and washers shall be stainless steel unless otherwise shown on the plans.

Expansion Anchors: Expansion anchors shall be stainless steel, ICC approved, integral stud type anchor or internally threaded type with independent stud, hex nut and washer. Expansion anchors shall be ¼-inch diameter, embedment shall be as recommended by the manufacturer.

Lifting Cable: Lifting cable shall be Type 302 stainless steel of adequate strength to raise and lower the pump, of length as required and diameter as determined by manufacturer. All related hardware shall be stainless steel.

Valve Box: Valve box shall be precast standard commercial quality product with steel covers and extensions as required. Size shown on the plans shall be minimum internal clearances.

PART 3 - EXECUTION

INSTALLATION

The sewage lift station equipment shall be installed in accordance with the manufacturer's recommendations and the details shown on the plans.

FIELD QUALITY CONTROL

Tests:

Sewage pump shall be capable of pumping water, under test, at the given rates at the total heads indicated on the plans.

The pump, as installed, shall not load the motor to more than the nameplate amperage on the motor at the specified head. Service factor shall not be included in the rating.

12-16.15 SEWAGE LIFT STATION

PART 1 - GENERAL

SUMMARY

Scope: This work shall consist of furnishing and installing sewage lift station pumps control equipment in accordance with the details shown on the plans and these special provisions.

Related Work: Thermal and moisture protection for submersible pump motor shall conform to the requirements of Section 12-11.08, "Sewage Lift Station Equipment," of these special provisions.

Concrete and reinforcement for foundation shall conform to the provisions in Section 12-3, "Concrete and Reinforcement," of these special provisions.

Nameplates, warning plates and device plates shall be as specified in "Electrical Equipment" in Section 12-16, "Electrical," of these special provisions.

SUBMITTALS

Product Data:

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

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions, and component layout shall be included where applicable. All control and power conductors on the working drawings shall be identified with wire numbers.

PART 2 - PRODUCTS

Sewage Lift Station Pumps Control Panel:

Sewage lift station pumps control panel shall be single exterior hinged door NEMA Type 4 enclosure containing a fixed interior electrical mounting panel and hinged interior door. The enclosure shall be made of 0.075-inch (14-gage) steel minimum with all seams continuously welded. A rolled up lip shall be provided around three sides of the hinged exterior door and around all sides of the enclosure opening. The hinged exterior door shall be provided with a neoprene gasket that is attached with an oil-resistant adhesive. The exterior door shall be maintained closed with door clamps. A hasp and staple for padlocking shall be installed near the center of hinged exterior door edge. Control panel shall be provided with floor stands as shown.

Circuit breaker handles, alarm reset, alarm tests switch, selector switches and digital multimeters shall be externally operable after the hinged exterior door is opened. The hinged interior door shall not be capable of being opened unless the main circuit breaker is in the "off" position.

The enclosure shall be factory pre-wired in conformance with NEMA Class IIC wiring. All wires entering or leaving the enclosure shall terminate on terminal blocks. Control wiring shall be 7 strand No. 14 MTW except for hinge wiring, which shall be 19 strand No. 14 MTW. Panel shall be wired using red colored insulation conductors for general wiring and white colored insulation conductors for neutrals. Use of gray colored insulation conductors for wiring is prohibited. Wires shall be neatly trained and bundled, and wiring troughs shall be provided in the enclosure as necessary. Wiring shall be arranged so that any piece of apparatus may be removed without disconnecting any wiring except the leads to that piece of apparatus. No equipment or devices shall be mounted on the side or at the bottom of the panel. A minimum of 6 inches of empty space shall be provided at the bottom of the panel for bundling field conductors and terminating field conduits.

A schematic diagram encased between two heat-fused laminated plastic sheets shall be provided with brass mounting eyelets and attached to the inside of the enclosure.

Sewage Pump Main Breaker, SMB: Sewage pump main breaker, SMB, shall be 3-pole, 240-volt, AC, molded case circuit breaker with 100-ampere frame, 40-ampere trip, and interrupting capacity of not less than 22,000 amperes (symmetrical) at 240 volts. Power distribution blocks shall be installed on load side of the circuit breaker.

Starter, ST1 and ST2: Starters, ST1 and ST2, shall be NEMA Size 1, NEMA rated, 3-pole, 230-volt, contactors with 120-volt coil, and non-adjustable overload relays. Overload relays shall be resettable by an externally operable pushbutton on the hinged interior door. Overload relays shall have 3 thermal overload elements and shall trip between 115 and 125 percent of full load motor current, as quoted on the nameplate by the motor manufacturer. Starters shall have one normally-open auxiliary contact and one normally-closed auxiliary contact.

Pump Disconnects, PD1 and PD2: Pump disconnects, PD1 and PD2, shall be 3-pole, 240-volt, AC, 100-ampere frame, 20-ampere trip, molded case circuit breakers. The interrupting capacity of the breakers shall be not less than 22,000 amperes (symmetrical) at 240 volts.

Control Disconnect, CD, Spare Disconnect, SPD, and receptacle Disconnect, RD, Control disconnect, CD, Spare disconnect, SPD, and receptacle disconnect, RD, shall be single pole, 120/240-volt, AC, 100-ampere frame, 20-ampere trip, molded case circuit breakers. The interrupting capacity of the breakers shall be not less than 10,000 amperes (symmetrical) at 120 volts.

Power Supply, PS: Power supply, PS shall be UL listed, Class 2, din-rail mounting type power supply suitable for 120-volt, AC, input. PS shall have 12-volt DC output. PS shall be suitably sized to supply all the needs of the fiber optic float system and shall have an additional 50 percent capacity for future expansion, over temperature protection, and LED pilot lights. PS shall have fuses at the input and output sides. Fuse sizes shall be as recommended by the fiber optic float system manufacturer.

Control Relays, CR1 through CR8: Control relays, CR1 through CR8, shall be 120-volt, AC, general purpose relays with 3-pole, double-throw, 10-ampere, 120-volt, AC, contacts with pilot light. Relays shall be enclosed in clear plastic with 11-pin tube type plug base. Sockets for relays shall be barrier type, 11-contact relay socket with 10-ampere contacts and screw terminals.

Time Meters, TM1 and TM2: Time meters, TM1 and TM2, shall be 120-volt, 60 Hz running time meters with 0 to 99,999.9 hours range without a reset.

Seal Failure Relays, SFR1 and SFR2: Seal failure relays, SFR1 and SFR2, shall be 120-volt, 60 Hz, transformer and relay combinations. Seal failure relays shall be as shown on the plans or as recommended by the pump manufacturer. The seal failure relays, complete with pump leak detector light, sensor probe continuity test pushbutton and test indicator light, shall be a factory assembled unit mounted inside the control panel as shown on the plans in a NEMA Type 1 enclosure. Relays shall include one normally open and one normally closed contact having a rating of 10 amperes at 120 volts AC.

Current Sensors, CS1 and CS2: Current sensors, CS1 and CS2 shall be self-powered, solid state, alternating current sensing switch. Switch shall have a single-pole, normally-open contact rated 2 ampere at 240 volts, AC. Current sensing level shall be chosen between a low range of one to 15 amperes and a high range of 15 to 300 amperes. Switch shall have a thru-hole of 1/2-inch minimum diameter for sensing the alternating current.

Terminal Block, TB: Terminal block, TB, shall be 30-ampere, 600-volt, molded plastic with two or more mounting holes and two or more terminals in each cast block. The molded plastic shall have a high resistance to heat, moisture, mechanical shock, and electric potential and shall have a smooth even finish. Each block shall have a molded marking strip attached with screws. The identifying numbers of the terminating wires as shown on the working drawings shall be engraved in the marking strip. Terminal blocks shall have tubular, high-pressure clamp connectors.

Ground and Neutral Bars: Ground and Neutral bars shall be 100-ampere copper neutral bars with circuit tabs.

Alarm Reset, AR: Alarm reset, AR, shall be 1 1/8-inch heavy duty oil-tight pushbutton with one normally- closed contact. The contact shall have an inductive pilot duty rating of 60 amperes (make), 6 amperes (break) and 10 amperes (continuous) at 120 volts and 35 percent power factor.

Alarm Test Switch, AT: Alarm test switch, AT, shall be the same as AR, except that the contact shall be normally open.

Selector Switches, SS1 and SS2: Selector switches, SS1 and SS2, shall be rotary action single-pole, 3- position, 10-ampere, 120 -volt switches. Switch contacts shall have an inductive pilot duty rating of 60 amperes (make), 6 amperes (break), and 10 amperes (continuous) at 120 volts and 35 percent power factor. Selector switches, SS1 and SS2, shall have legend plate marked "HAND-OFF-AUTO."

Selector Switches, SS3 and SS4: Selector switches, SS3 and SS4, must be toggle switch, single-pole, 2- position, 10-ampere, 120 -volt switches. Switch contacts must have an inductive pilot duty rating of 60 amperes (make), 6 amperes (break), and 10 amperes (continuous) at 120 volts and 35 percent power factor. Selector switches, SS3 and SS4, shall have legend plate marked "ON-OFF."

Pilot Lights, PL1 through PL7: Pilot lights, PL1 through PL7, shall be 30 mm panel mounted pilot lights with lens and screw cap and a high intensity LED, 120-volt AC lamp. Color of pilot lights shall be as shown on the plans.

Fiber Optic Float Switches, FS1 through FS4: Fiber optic float switches, FS1 through FS4, shall be completely fiber optic type, NSF approved, NRTL listed and impact and corrosion resistant float switch with sealed fiber optic cable and external weight. Float switch shall have a minimum of 30 feet in length and be of SJOW type, 2 strands fiber optic cable of the size and type suitable for the transmission distance and for making connection between the float switch and transceiver.

Fiber Optic Float Transceiver, FT1 and FT2: Fiber optic float transceiver, FT1 and FT2, shall be completely solid state and din-rail mounted type transceiver suitable for use with fiber optic float switches specified elsewhere in these special provisions. Transceiver shall be of minimum two channel, fiber optic, input type device with separate output relay for each input channel. Output relay contacts shall be rated 3 amperes at 120-volt, AC.

Digital Multimeters, DMM1 and DMM2: Digital multimeters, DMM1 and DMM2 shall conform to the following:

1. Shall be microprocessor based line of multifunction, three phase current and voltage meter
2. Shall be supplied completely wired with instrument accuracy Class 1 or better type current transformers (CT1 and CT2) at all three phases, and fuses at voltage and auxiliary power inputs.
3. Shall have CTs primary rating selected so that each motor full load current lies between 40% to 80% of its full scale.
4. Shall be capable of operating on a power supply range of 90 to 265 Volts AC.
5. Shall be capable of operating on a direct voltage input range of up to 416 Volts Line to Neutral, and a range of up to 721 Volts Line to Line.
6. Shall be programmable for current to any CT ratio. The use of DIP switches for selecting fixed ratios will not be acceptable
7. Shall have an accuracy of +/- 0.25% or better for volts and amps, and 0.5% for power and energy functions. The meter must meet the accuracy requirements of IEC 687 (class 0.5%) and ANSI C12.20 (Class 0.5%).
8. Shall provide true RMS measurements of phase and line voltage and current.
9. Shall have operating temperature range from -20 to +70 degrees C.

Alternator, ALT: Alternator timer switch, ALT, shall be 120-volt, 60 Hz, synchronous motor driven, mechanical memory, 60-minute recycling timer with single-pole, double-throw, snap action, 15-ampere, 120-volt contacts. Contact positions shall alternate at 30-minute intervals.

Time Delay Relay, TDR: Time delay relay, TDR, shall be solid-state adjustable, plug-in time delay relay with 120-volt, AC, coil, and 2 single-pole, double-throw contacts rated 10 amperes at 120 volts, AC. TDR shall have a time delay on energizing, adjustable from one to 60 minutes, initially set at 30 minutes. Socket for relay shall be barrier type, 8-pin tube type relay socket, with 10-ampere contacts and screw terminals.

Alarm Light, AL: Alarm light, AL, shall be cast-metal, vapor-tight fluorescent lighting fixture for use with threaded rigid conduit. Light fixture shall have a red polycarbonate globe. Lamp shall be 18-watt, 120-volt compact fluorescent lamp, complete with integral ballast.

Ground Fault Circuit Interrupter Duplex Receptacle, (GFCI DP): Ground fault circuit interrupter duplex receptacle, GFCI DP, shall be NEMA Type 5-20R, feed-through type, ivory color, 3-wire, 20-ampere, 125-volt AC, grounding type, specification grade, duplex receptacle with ground fault interruption. Receptacle shall detect and trip at current of 5 milliamperes and shall have front mounted test and reset button.

FABRICATION

Component Mounting:

The following electrical components shall be mounted on the fixed interior electrical mounting panel of the Sewage Lift Station Pumps Control Panel: Sewage pump main breaker, SMB; Control Disconnect, CD; Receptacle Disconnect, RD; Spare Disconnect, SPD; Pump Disconnects, PD1 and PD2; Current Sensors, CS1 and CS2; Starters, ST1 and ST2; Control relays, CR1 and CR8; Seal failure relays, SFR1 and SFR2; Power Supply, PS, Power Distribution Block, PDB, Current transformers, CT1 and CT2, of the digital multimeters, Alternator, ALT; Ground and neutral bars; and Terminal block, TB. Spacers shall be installed with all breakers so that they are externally operable with the interior hinged door closed. The interior hinged door shall only be open when SMB is in the "OFF" position.

The following electrical components shall be mounted on the hinged interior door of the Sewage Lift Station Pump Control Panel: Time meters, TM1 and TM2; Alarm reset, AR; Alarm test switch, AT; Selector switches, SS1 through SS4; Pilot lights, PL1 through PL7; Digital multimeters, DMM1 and DMM2, Overload reset pushbuttons, OL1 and OL2; and GFCI receptacle.

The following equipment shall be mounted on the side of the Sewage Lift Station Pump Control Panel: Alarm light, AL as shown on the plans.

PART 3 - EXECUTION

INSTALLATION

The sewage lift station pumps control panel shall be installed on a concrete pad and oriented as shown on the plans.

All bolts and fasteners in the sump shall be stainless steel.

All concrete around conduit penetrations shall be finished smooth and sloped in a way to avoid standing water around the conduit.

OPERATION

Automatic Operation:

The automatic operation of the sewage lift pumps shall be controlled by switches FS2, FS3 and FS4 as shown on the plans. When the liquid level rises to "Lead Pump ON"elevation, relay CR4 shall be energized, which shall start one of the pumps through alternator, ALT. The pump shall operate until the liquid level lowers to "Both Pumps OFF" elevation, and relay CR3 is de-energized.

The second pump and high liquid level alarm circuit shall be actuated when the liquid level rises to "Lag Pump ON" elevation, and relay CR5 shall be energized. When relay CR5 is energized, it shall start both pumps, bypassing alternator ALT, and shall also energize time delay relay, TDR. Time delay relay TDR shall energize high level alarm light, AL, after a period of 30 minutes if the liquid level does not go down.

The low-level alarm circuit shall be activated by float switch FS1 when the liquid level drops to "Low level alarm" elevation, and relays CR1 and CR2 shall be energized. Relay CR2 shall open contacts to stop the pump motor and relay CR1 shall also energize alarm light, AL. The alarm light, AL, shall stay energized until the alarm-reset pushbutton is pushed.

Each submersible pump motor shall have thermal and moisture protection. The thermal protection shall contain contacts that will open and stop the pump motor should the temperature in the motor rises above the design operating temperature. Attention is directed to "Sewage Pumping Station Equipment," in Section 12-11, "Equipment," of these special provisions.

Each moisture protection shall consist of two electrode sensors, which will detect the presence of water in respective oil filled chamber. The electrodes shall sense this water through seal failure relays, SFR1 and SFR2, located in the pump control panel. Relays SFR1 and SFR2 shall energized alarm light, AL, seal failure indicator pilot lights, PL5 and PL6 when moisture is in the oil filled chambers.

Alternator time switch, TS, shall alternate the pumps after a running time of 30 minutes.

FIELD TESTING

After complete installation work in the field of al various systems, the control station shall be tested in the presence of the Engineer to demonstrate that all functions operate properly. The contractor shall provide all materials and equipment require for testing the system. The contractor shall be responsible for the necessary repairs, replacements, adjustments and retests at his own expense.

BID ITEM LIST

04-014084

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41	025040	LIGHTWEIGHT CELLULAR CONCRETE	CY	1,140		
42	200001	HIGHWAY PLANTING	LS	LUMP SUM	LUMP SUM	
43	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM	LUMP SUM	
44	208000	IRRIGATION SYSTEM	LS	LUMP SUM	LUMP SUM	
45	208301	IRRIGATION CONTROLLER ENCLOSURE CABINET	EA	1		
46	208310	IRRIGATION SLEEVE	LF	97		
47	025041	6" CORRUGATED HIGH DENSITY POLYTHEYLENE PIPE CONDUIT	LF	770		
48	208739	10" CORRUGATED HIGH DENSITY POLYETHYLENE PIPE CONDUIT	LF	280		
49	210110	IMPORTED TOPSOIL (CY)	CY	7,710		
50	260303	CLASS 3 AGGREGATE BASE (CY)	CY	4,630		
51	390132	HOT MIX ASPHALT (TYPE A)	TON	17,100		
52	393004	GEOSYNTHETIC PAVEMENT INTERLAYER (PAVING FABRIC)	SQYD	2,710		
53	394050	RUMBLE STRIP	STA	4.4		
54	394076	PLACE HOT MIX ASPHALT DIKE (TYPE E)	LF	150		
55	395000	LIQUID ASPHALT (PRIME COAT)	TON	67		
56	044121	DRIVE PILE (CLASS 140 ALTERNATIVE X)	EA	8		
57	044122	DRIVE PILE (CLASS 90 ALTERNATIVE X)	EA	308		
58	044123	DRIVE INDICATOR PILE (CLASS 90 ALTERNATIVE X)	EA	6		
59	044124	FURNISH INDICATOR PILING (CLASS 90 ALTERNATIVE X)	LF	698		
60	044125	FURNISH PILING (CLASS 140 ALTERNATIVE X)	LF	826		

BID ITEM LIST

04-014084

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61	044126	FURNISH PILING (CLASS 90 ALTERNATIVE X)	LF	36,550		
62 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	33		
63	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	81		
64	566011	ROADSIDE SIGN - ONE POST	EA	18		
65	620060	12" ALTERNATIVE PIPE CULVERT	LF	1,250		
66	620100	18" ALTERNATIVE PIPE CULVERT	LF	820		
67	620140	24" ALTERNATIVE PIPE CULVERT	LF	520		
68	700617	DRAINAGE INLET MARKER	EA	5		
69	721410	CONCRETE (GUTTER LINING)	CY	120		
70	730020	MINOR CONCRETE (CURB) (CY)	CY	170		
71	735000	PARKING BUMPER (PRECAST CONCRETE)	EA	67		
72 (F)	750001	MISCELLANEOUS IRON AND STEEL	LB	5,370		
73	800103	TEMPORARY FENCE (TYPE CL6)	LF	2,320		
74	800360	CHAIN LINK FENCE (TYPE CL-6)	LF	39		
75	025042	SECURITY METAL FENCE	LF	4,390		
76	025043	18' SECURITY METAL SLIDING GATE	EA	2		
77	025044	35' SECURITY METAL SLIDING GATE	EA	1		
78	025045	3' SECURITY METAL SWING GATE	EA	1		
79	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	7,600		
80	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	260		