MONTEREY PENINSULA WATER SUPPLY PROJECT

REQUEST FOR PROPOSALS

FOR THE

SLANT WELL INTAKE SYSTEM – CIVIL WORK

Issue Date: May 31, 2019

Due Date: July 22, 2019

ADDENDUM NO. 2

July 10, 2019

CALIFORNIA AMERICAN WATER

Pacific Grove, California

Section 1. Questions and Answers. Questions received from potential Proposers and California American Water's answers to those questions are attached hereto as Exhibit A.

Section 2. Revised Request for Proposals. The Monterey Peninsula Water Supply Project Request for Proposals for the Slant Well Intake System – Civil Work is hereby revised as follows:

LOCATION	CHANGE
Section 3 – Description of Procurement Process	**Page 3-1, Section 3.1, Procurement Process Schedule**

REPLACE :

RFP Process	Date
RFP and draft Contract issued to Pre-qualified Respondents	May 31, 2019
RFP Mandatory Pre-Proposal meeting	June 18, 2019
Written questions and comments on RFP and draft Contract due	July 1, 2019
CAWC issues addendum to RFP and distributes answers to written questions	July 2, 2019
CAWC issues addendum to RFP and distributes any additional answers to written questions as CAWC deems necessary or desirable	July 8, 2019
Project Proposals due	July 22, 2019
Selection of preferred Proposer(s)	July 31, 2019
Final draft Contract and all Proposals to Governance Committee for recommendation	August 14, 2019
Governance Committee meeting	August 21, 2019
Contract execution	August 30, 2019

WITH:

RFP Process	Date
RFP and draft Contract issued to Pre-qualified Respondents	May 31, 2019
RFP Mandatory Pre-Proposal meeting	June 18, 2019
Written questions and comments on RFP and draft Contract due	July 1, 2019
CAWC issues addendum to RFP and distributes answers to written questions	July 2, 2019
CAWC issues addendum to RFP and distributes any additional answers to written questions as CAWC deems necessary or desirable	July 10, 2019
Project Proposals due	July 22, 2019

LOCATION	CHANGE
	Selection of preferred Proposer(s) — July 31, 2019 Final draft Contract and all Proposals to Governance Committee for recommendation — August 14, 2019 Governance Committee meeting — August 21, 2019 Contract execution — August 30, 2019
Attachment B Draft Construction Contract	**Delete Draft Agreement (pages AG-1 through AG-11) and replace with Draft Agreement attached to this Addendum (revisions shown in redline)**
Attachment C Bid Package	**Delete Bid Package and replace with Bid Package attached to this Addendum**

Section 3. Revised Technical Specifications and Drawings. Certain Technical Specifications and Drawings have been revised. Please refer to Exhibit B and Exhibit C, attached hereto.

-END-

ATTACHMENT B

DRAFT CONSTRUCTION CONTRACT

AGREEMENT

This Agreement is by and between California-American Water Company, a California corporation (Owner), and [INSERT], a [INSERT] ("Contractor").
Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Slant Well Intake System – Civil Work

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Monterey Peninsula Water Supply Project

ARTICLE 3 – ENGINEER

3.01 The Engineer for the Project is California-American Water Company, acting through Tim O'Halloran who shall be the Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

3.02 The following Owner-affiliated entities or independent engineers, consultants, or managers have been retained by Owner to undertake some or all of Engineer's or Owner's authority, duties, or responsibilities under the Contract Documents:

Michael Baker International, Inc.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and Final Completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion and Final Completion*

A. The Work will be substantially completed on or before August 15, 2021, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before September 30, 2021.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner: (1) **$10,000** for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion, or any extension thereof in accordance with Paragraph 12.02 of the General Conditions, until the Work is substantially complete ; and (2) **$10,000** for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment, or any extension thereof in accordance with Paragraph 12.02 of the General Conditions, until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

A. The Contract Price for all Work is **$[INSERT]**, as further specified in Exhibit C, subject to any subsequent amendments.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions. All invoices will be processed through the Taulia System. For information on how invoices are to be submitted to Taulia, go to: http://supplierinfo.taulia.com/americanwater

Payments shall be remitted to:
[INSERT CONTRACTOR NAME AND ADDRESS]

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer and as otherwise specified in Paragraph 14.02 of the General Conditions. All such payments will be measured by the schedule of values established as provided in Paragraph 2.05.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

B. Prior to Substantial Completion, progress payments will be made in an amount equal to **90%** percent of Work completed (with the balance being retainage), but, in each case, less the aggregate of payments previously made and less such amounts as Engineer

may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.

C. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to **95%** percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less **100%** percent of Owner's determination of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

D. All applications for progress payments shall be accompanied by a conditional lien release and, for payments after the first, an affidavit of payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price, and any retained funds, as provided in said Paragraph 14.07.

B. An application for final payment shall be accompanied by a conditional lien release and an affidavit of payment.

ARTICLE 7 – CONTRACTOR'S REPRESENTATIONS

7.01 To induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been provided pursuant to Paragraph 4.02 of the General Conditions.

E. Contractor has considered the information known to Contractor, information and observations obtained from visits to the Site, information commonly known to contractors doing business in the locality of the Site, the Contract Documents, and the reports and drawings identified in the Contract Documents and referred to in Paragraph 7.01.D above with respect to the effect of such information and observations on: (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques,

sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 7.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor is prepared to comply with the applicable requirements of Owner's safety program, if any.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

K. If checked, Contractor will provide Owner with ☒ a performance bond or ☒ a payment bond, or any combination thereof, as indicated in this Paragraph and conforming to the specifications in Article 5 of the General Conditions.

ARTICLE 8 – CONTRACT DOCUMENTS

8.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages AG-1 to AG-11, inclusive).

2. Notice of Award. (Note: This document is not attached to this Agreement).

3. General Conditions (pages GC-i to GC-70, inclusive).

4. Supplemental General Conditions (pages SC-1 to SC-24, inclusive)

5. Technical Specifications titled *Monterey Peninsula Water Supply Project Slant Well Intake System Civil Construction* dated April 2019 and consisting of 365 pages.

6. Drawings titled *Monterey Peninsula Water Supply Project Slant Well Intake System Civil Construction* dated November 2018 and consisting of 58 pages.

7. American Water *Cut-Off and Ring Saw Safety Operations Practice*, Number PRA-OPS01/01 dated 4/28/2014 and consisting of 15 pages.

8. *DBE Good Faith Efforts Requirements* identified as Attachment 1 and consisting of 12 pages.

9. *Davis Bacon Contract Provisions* identified as Attachment 2 and consisting of 9 pages.

10. Exhibits to this Agreement (enumerated as follows):

    a. Performance bond form, identified as Exhibit A consisting of pages A-1 through A-2;

    b. Payment bond form, identified as Exhibit B, consisting of pages B-1 through B-2.

    c. Contractor's Bid identified as Exhibit C and consisting of pages C-1 through C-[INSERT].

    d. Other exhibits as specified in the General Conditions, which may include but are not limited to, Exhibits G through R, inclusive.

11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

    a. Notice to Proceed (page NP-1).

    b. Work Change Directives substantially conforming to the form attached hereto as Exhibit E.

    c. Change Orders substantially conforming to the form attached hereto as Exhibit F.

B. The documents listed in Paragraph 8.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 8.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 9 – MISCELLANEOUS

9.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions.

9.02 *Assignment of Contract*

A. No assignment by Contractor of any rights under or interests in the Contract will be binding on Owner without the written consent of Owner; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge Contractor from any duty or responsibility under the Contract Documents.

9.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 9.05:

1. "Corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution.

2. "Fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

3. "Collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels.

4. "Coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

B. Contractor certifies that Contractor will to conform its business dealings with the Company in accordance with the underlying principles of the Company's Code of Ethics, a copy of which is available on the Company's website at http://amwater.com.

9.06 *Other Provisions*

A. Government Regulations

The following clauses, where applicable, are incorporated in this Agreement by reference as if fully set out: The Equal Opportunity Clause prescribed in 41 CFR 60-1.40, the Affirmative Action Clause prescribed in 41 CFR 60-250.4, regarding veterans and veterans of the Vietnam Era, and the Affirmative Action Clause for Handicapped Workers prescribed in 41 CFR 60-741.4.

B. Background Check

Contractor shall conduct a background check on each of its employees prior to the employee performing any function or activity under this Agreement involving any direct customer contact, or on-site at any of the Owner's water treatment plants. As used in the Agreement, "direct customer contact" shall include but not be limited to, any activity by the Contractor's employee at or near a customer's premises. The background check conducted by Contractor shall consist of a check of at least the following: Previous employers and dates of employment; Education; Driving record; Criminal history (state and federal); References; Credit history. Prior to commencing any work under this Agreement, Contractor shall provide proof to the Owner that the requirements of this Paragraph have been met. Contractor shall make available to the Owner, upon request, the documentation and results of the background check with respect to any employee of Contractor performing any function under this Agreement involving any direct customer contact.

C. Project Manuals

Owner shall furnish to Contractor up to one (1) printed copy of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

D. Notices

Unless other specified in a specific provision of this Agreement, any notice required by the Contract Documents to be given to the Owner shall be addressed as follows:

Timothy O'Halloran
511 Forest Lodge Road, Suite 100
Pacific Grove, CA 93950

Any notice required by the Contract Documents to be given to the Contractor shall be addressed as follows:

[INSERT CONTRACTOR NAME AND ADDRESS]

9.07 *Diverse Business Enterprise Requirement*

A. Owner utilizes the established guidelines from the California Public Utilities Commission ("CPUC") to qualify diverse suppliers and requires certification as a Diverse Business Enterprise ("DBE") by the Supplier Clearinghouse and/or the California Department of General Services. Generally, a DBE is a business in which 51% or more of the ownership interest is held, and 51% or more of the daily management and control of the business is performed, by one or more certified diverse suppliers. DBEs are divided into four classifications, as follows: Minority Business Enterprises ("MBE"), Women-Owned Business Enterprises ("WBE"), Disabled Veteran Business Enterprises ("DVBE"), and Lesbian, Gay, Bi-Sexual and Transgender Business Enterprises ("LGBTBE").

B. Contractor represents and warrants that the percentage of the Contract Price that will be paid to DBEs, including to the Contractor and any of Contractor's subcontractors, will be at least [TBD]% (the "DBE Requirement"). If Contractor fails to meet the DBE Requirement, such failure will be deemed a Default and may result in termination of this Agreement by Owner pursuant to Section 15.02 of the General Conditions.

C. The CPUC requires Owner to report the amount of Owner's DBE spend in compliance with General Order 156. In order for Owner to meet this requirement, Contractor is required to submit a quarterly report to Owner, in a form provided by or acceptable to Owner, identifying (1) the total dollar amount of Contract Price paid by Owner to Contractor as of date of report ("Amount Paid to Date"), (2) the percentage of Amount Paid to Date that has been paid to DBEs, whether to Contractor or any of Contractor's subcontractors ("DBE Percentage"), and (3) the breakdown of the DBE Percentage into a percentage for each of the four classifications of DBEs (i.e., MBE, WBE, DVBE, and LGBTBE). Contractor will participate and assist, as requested by Owner, in any audit activities relating to this program. In addition, Contractor will produce copies of invoices and cancelled checks to DBE subcontractors if requested by Owner.

9.08 *Local Resources Goal*

Owner acknowledges the benefit that the local community receives through utilization of local contractors, laborers, and suppliers. Contractor has submitted a local resources utilization plan which is included in Exhibit C (Local Resources Utilization Plan). Contractor will make a good faith effort to employ qualified individuals who are, and have been for at least one year out of the three years prior to the opening of Proposals, residents of Monterey County, San Benito County, or Santa Cruz County in sufficient numbers so that no less than fifty percent of Contractor's total work force, including any Subcontractor work force (with exception of specialty subcontractor items), measured in labor work hours, is comprised of residents of such counties. Contractor must comply with such plan and shall monitor and report at least quarterly the continued implementation of the Local Resources Utilization Plan throughout the performance of this Contract.

9.09 *Public Funding/Labor Law Compliance*

A. Prevailing Wages and Labor Compliance Program. Contractor shall pay prevailing wage rates. The general prevailing wage rates for the Work are available on the California Department of Industrial Relations' website at http://www.dir.ca.gov. Further, the Work may

be subject to a statutory requirement to adopt and enforce a labor compliance program for the monitoring and enforcement of prevailing wage requirements. Contractor shall, at no additional cost to Owner, comply with any applicable labor law and labor compliance program requirements. Contractor is responsible for all failures by Subcontractors to comply with labor compliance program requirements. Pursuant to section 1773 of the California Labor Code, the general prevailing wage rates in the county in which the Work is to be done have been determined by the Director of the California Department of Industrial Relations.

B. CWSRF Funding Responsibilities.

1. Application and Submittals. Owner shall submit all filings, applications and reports necessary to obtain reimbursement from the Clean Water State Revolving Fund ("CWSRF") for the Project.

2. Contractor Responsibilities. Contractor shall be responsible for cooperating with and providing reasonable assistance to Owner in all activities related to the loan agreement regarding the CWSRF loan from the State Water Resources Control Board ("SWRCB") to the Owner to partially fund the Project ("CWSRF Loan Agreement") including:

(a) coordinating with Owner or Owner's consultant on the schedule and content of the submittals required for the CWSRF program;

(b) assisting Owner or Owner's consultant in developing and furnishing all necessary and reasonably required supporting material;

(c) supplying all data and information which may be reasonably required;

(d) familiarizing itself with the terms and conditions of the CWSRF program relating to construction activities and practices;

(e) complying with the terms and conditions of the CWSRF Loan Agreement or other financing document required by the CWSRF program or by applicable law with respect to construction activities and practices, including requirements described in ~~Exhibits A and B~~Attachments 1 and 2;

(f) attending meetings, as necessary, with SWRCB and other governmental bodies; and

(g) taking all other actions reasonably requested by Owner in order to assist and support Owner related to the CWSRF financing for the Project.

Contractor shall take all reasonable actions necessary to comply with the conditions to disbursement of proceeds of the CWSRF Loan Agreement and to maximize Owner's eligibility to receive timely reimbursement under the CWSRF Loan Agreement. Contractor shall perform its CWSRF-related responsibilities in a manner which complies with all CWSRF program requirements.

3. Data and Information. All data, information and action required to be supplied or taken in connection with any CWSRF financing shall be supplied and taken on a timely

basis considering the CWSRF requirements at Contractor's sole cost and expense. The data and information supplied by Contractor to Owner or Owner's consultant and the SWRCB in connection therewith shall be correct and complete in all material respects and shall be submitted in draft form to Owner or Owner's consultant sufficiently in advance to allow full and meaningful review and comment by Owner. Contractor shall not be entitled to any schedule or price relief or escalation which result from a delay due to the submission of materially incorrect or incomplete information. Owner reserves the right to reject, modify, alter, amend, delete or supplement any information supplied by Contractor pursuant to this Section.

4. CWSRF Requirements. Owner is informed that in order to obtain CWSRF financing for the Project: (a) American Iron and Steel (AIS) requirements will apply; (b) the State Water Resources Control Board ("SWRCB") CWSRF policy will apply; and (c) the SWRCB applies USEPA guidance on AIS requirements. Contractor agrees to cooperate with Owner to meet all CWSRF financing requirements applicable to the Project and Contractor has included all costs necessary to comply with AIS requirements in the Contract Price.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf

This Agreement will be effective on the date it has been executed by OWNER (which is the Effective Date of the Agreement).

OWNER:

California-American Water Company

By: _____

Title: _____

Date:

_____

_____

_____

CONTRACTOR

[INSERT CONTRACTOR NAME]

By: _____

Title: _____

Date:

Attest: _____

Title: _____

Date: _____

Contractor's License No.:

_____

_____

_____

_____

ATTACHMENT C

BID PACKAGE

BID PROPOSAL

Project Name: MPWSP Slant Well Intake System – Civil Construction
Project No. xxxxxxxx

1. Bids shall be completed on the bid schedule (page 6). All numbered bid items must be completed. Numbers shall be stated in figures (numeric) and the bid schedule signed. Any corrections to entries made on bid schedule shall be initialed by the person (s) signing the bid. Before submitting a bid, bidders shall carefully examine the project documents and applicable California American Water "Standards and Specifications", inspect the site of the work, fully inform themselves as to all existing governmental agency conditions and limitations and shall include a total cost figure on the bid proposal form.

2. The undersigned, having familiarized himself/herself with the local conditions affecting the cost of the work, and with the Contract Documents, for the above named project, do hereby propose to perform everything required to be performed, and to provide and furnish all labor, materials (except water meters), tools, expendable equipment, and all utility and transportation services necessary to complete work in the above named project, all in accordance with the prepared drawings, bidding documents and specifications.

3. The undersigned agrees, if awarded the contract, to start work within 15 calendar days after receipt of Notice to Proceed (scheduled to be issued October 15, 2019), and to complete same, ready for substantial and unobstructed use by owner in _545_ calendar days thereafter.

4. In submitting this bid, it is understood that the right is reserved by the owner to reject any and all bids or any portion thereof. It is agreed that this bid may not be withdrawn for a period of ninety (90) days from the opening thereof.

5. The undersigned firm/individual holds California State Construction License Number _____ and Worker's Compensation Policy Number _____ issued by

   _____ .

6. The undersigned acknowledges receipt of the contract documents for the project consisting of the Project Manual dated **_April 2019_** together with all attached documents and has in his possession a copy of the Company's current "Standards and Specifications". The undersigned acknowledges that addenda numbers _____ through _____ have been received and examined as part of the Contract Documents.

7. The undersigned understands that if awarded bid, invoices and payments shall be for actual Quantities of material installed at unit cost for each bid item.

CONTRACTOR: _____

ADDRESS: _____

CITY & STATE: _____

TELEPHONE NO.: _____

BY: _____ TITLE: _____
TYPE OR PRINT NAME OF PERSON SIGNING BID PROPOSAL

BY: _____ DATE: _____
SIGNATURE

BIDS ARE TO BE RETURNED NO LATER THAN 3:00 P.M. ON TUESDAY, JULY 22, 2019 AT CAL-AM'S LOCAL OFFICE. SEE INSTRUCTIONS AND ADDRESS IN SECTION 4.3 PROPOSAL SUBMISSION.

CONTRACTOR: _____

BID SCHEDULE

Item No.	Spec./ Section or Sheet	Item Quantity	Item Unit	Item Description	Unit Cost	Total Item Cost
1	-	1	LSUM	General Conditions, Mobilization, Limits of Construction Boundary Fencing, and Demobilization	$	$
2	G2, 01025	1	LSUM	MSHA Training for ALL Possible Workers that Work on the CEMEX Sand Mining Site.	$	$
3	SGC Section 4	1	LSUM	Environmental Mitigation Measures	$	$
4	C17-C18 01025, 02540	1	LSUM	Stormwater BMP Installation & Maintenance	$	$
5	C2-C,7 01025	1	LSUM	As-Needed Site Grading for Level Well Site (working) Pads and Access Roads	$	$
6	C8-C11, 01025, 15000	1	LSUM	36" PVC C900 (DR-25) Feed Water Pipeline **(HDD segment covered in Bid Item #7)**	$	$
7	C10-C11 01025,	700	LF	36" FPVC (DR_25) Feed Water Pipeline – Horizontal Directional Drill (HDD) Install	$	$
8	01025, 15020, 15025, 15030	1	LSUM	Pipeline Disinfection, Bacteriological Testing, and Pressure Testing (ALL PIPELINES).	$	$
9	M1, 01025, 15151, 15171, 15034, 15065 15191, 16520	1	LSUM	Well Site #1 Mechanical Piping (1 Well)	$	$
10	M2, 01025, 15151, 15155, 15171, 15034, 15065 15191, 16520	1	LSUM	Well Site #2 Mechanical Piping (2 Wells)	$	$
11	M1, 01025, 15151, 15171, 15034, 15065 15191, 16520	1	LSUM	Well Site #3 Mechanical Piping (1 Well)	$	$
12	M1, 01025, 15151, 15171, 15034, 15065 15191, 16520	1	LSUM	Well Site #4 Mechanical Piping (1 Well)	$	$

CONTRACTOR: _____

Item No.	Spec./ Section or Sheet	Item Quantity	Item Unit	Item Description	Unit Cost	Total Item Cost
13	M2, 01025, 15151, 15155, 15171, 15034, 15065 15191, 16520	1	LSUM	Well Site #5 Mechanical Piping (2 Wells)	$	$
14	01025, 03480; S1	7	EA	Concrete Precast Vault with Access Hatch	$	$
15	S1 0102	5	EA	Pump-To-Waste Basins	$	$
16	C3-C7, C12-C13 01025	1,050	LF	8' PVC Coated Chain Link Fence and Gates with Tan (Sand) Colored Privacy Slats	$	$
17	C12, M5, 01025, 11700, 09900	1	LSUM	3,000 Gallon Surge Tank #1	$	$
18	C13, M6, 01025, 11700, 09900	1	LSUM	8,000 Gallon Surge Tank #2	$	$
19	01025, 03300	1	LSUM	Concrete and Reinforcing Steel	$	$
20	E8, S2, M4, 01025	1	LSUM	Well Site #1 Enclosure, Electrical, Controls, and HVAC	$	$
21	E9, S2, M4, 01025	1	LSUM	Well Site #2 Enclosure, Electrical, Controls, and HVAC	$	$
22	E10, S2, M4, 01025	1	LSUM	Well Site #3 Enclosure, Electrical, Controls, and HVAC	$	$
23	E11, S2, M4, 01025	1	LSUM	Well Site #4 Enclosure, Electrical, Controls, and HVAC	$	$
24	E12, S2, M4, 01025	1	LSUM	Well Site #5 Enclosure, Electrical, Controls, and HVAC	$	$
25	01025, 16430	1	LSUM	1,500 KVA & 1,000 KVA Transformers	$	$
26	01025; 16000, 16050, 16051; 16345, 16430,	1	LSUM	All Other Electrical Components including main switchgear, etc.	$	$
27	16050, 16130, 13321	1	LSUM	Fiber Optic Conduit, Pull Boxes, and Patch Panels (FO cable installation by others)	$	$

CONTRACTOR: _____

Item No.	Spec./ Section or Sheet	Item Quantity	Item Unit	Item Description	Unit Cost	Total Item Cost
				TOTAL BID AMOUNT	$	

CONTRACTOR:

DATE:

California American Water
(Bid Verification Only)

_____
Name Date

_____

Exhibit A to Addendum No. 2

Questions and Answers

No.	Question and Answer
1.	**Question**: What are the approved fittings for 36-inch PVC feedwater pipeline.
	Answer: All angle fittings, etc. will be ductile iron pipe (DIP). Each fitting is to be fusion bonded epoxy lined and coasted as described in the original Technical Specifications, *Section 15065 – Ductile Iron Pipe and Fittings*. All mechanical joint restraints shall use EBAA Iron MEGALUG® pipe restraints.
2.	**Question**: Will fiber optic (FO) conduit and pull boxes be required?
	Answer: Yes. Fiber optic conduit, pull boxes, and FO patch panels for each well will be required. Please see the attached (Attach 3 - Sheet E7) with red lines illustrating PVC conduit lengths and approximate pull box locations required for fiber optic wire installation. In addition, wireless radio is no longer being implemented for SCADA communication. Therefore, see revised Control Panel in Attachment 1 - Sheet E19, where MDS Wireless Radio equipment has been removed and a Fiber Optic Patch Panel has been added. In addition, please see Technical Specification, Attachment 4 – *Section 13321 Fiber Optic Cable and Equipment*. This tech spec is from CDM Smith who is the design-build lead for the seawater desal plant. The FO patch panel and terminations need to be consistent with the desalination plant equipment. **NOTE**: Conduit, pull boxes, and FO patch panels in each pump control panel are the only components of the FO system that are part of this bid item. The installation and connection of fiber optic cable (12-strand multi-mode) will be performed by others, from the desalination plant to the well sites.

-END-

Exhibit B to Addendum No. 2

Revised Technical Specifications

Sections *01000 - Summary of Work*, *01025 – Measurement and Payment*, and *13321 – Fiber Optic Cable and Equipment* (provided by CDM Smith)

SECTION 01000

SUMMARY OF WORK

PART 1: GENERAL

1.01 WORK UNDER THIS CONTRACT

The CONTRACTOR shall furnish all labor, materials, equipment and means to construct the project entitled **MPWSP SLANT WELL INTAKE SYSTEM – CIVIL CONSTRUCTION**, as shown on the Drawings and described herein. The work includes, but is not limited to, the following:

Construction and installation of the Monterey Peninsula Water Supply Project (MPWSP) Slant Well Intake System within the CEMEX Sand Mining Site, which includes site grading, feed water pipeline (i.e. PVC C900 ~~PVC or HDPE~~ and DI pipe, DI fittings, valves, air/vacuum release valves with enclosure, blow-offs, and related appurtenances, concrete thrust blocks and thrust restraint joints, trench excavation and backfill, etc.), approx. 700 feet of 36~~42~~-inch FPVC (C900) pipe installed using Horizontal Directional Drilling (HDD), mechanical piping vaults, mechanical piping (i.e. valves, meters, gauges, etc.), concrete electrical enclosures, electrical, instrumentation, and controls, pump to waste basins, site restoration, and existing utilities abandonment in accordance with the plans and specifications that are part of the contract and bid documents for this project and until satisfactory and final acceptance of the work by the OWNER.

The above general outline of principal features does not in any way limit the responsibility of the CONTRACTOR to perform all work and furnish the required materials, equipment, labor and means as shown or required by the Contract Documents as required to provide a complete and functional project.

Materials, equipment, labor, etc., obviously a part of the work and necessary for the proper operation and installation of same, although not specifically indicated in the Contract Documents, shall be provided as if called for in detail without additional cost to the OWNER.

1.02 LOCATION

All work is to be performed within the CEMEX Sand Mining Site, within the City of Marina, at locations shown in the project drawings and specifications for this project.

1.03 WORK BY OTHERS

Michael Baker International, Inc. is the OWNERS Agent (ENGINEER) and Civil Design Team for the MPWSP Slant Well Intake System (within the CEMEX Sand Mining Site). GEOSCIENCE Support Services Inc. is the Slant Well Designer and Boart Longyear is the Slant Well Drilling and Equipping Contractor.

1.04 OWNER FURNISHED PRODUCTS

GEOSCIENCE Support Services Inc. will purchase the pressure transducers for each slant well and with the assistance of Boart Longyear, install them. CAW will purchase the even (7) slant well intake pumps and they will be installed by Boart Longyear.

1.05 CONTRACTOR USE OF SITE

A. Access to site: Limited to areas noted on project drawings.

B. Emergency building exits during construction: Not Applicable

C. Construction operations: Limited to areas noted on project drawings.

D. Time restrictions for performing work: Working Hour Restrictions as specified in Supplemental General Conditions.

E. Utility outages and shutdown: To be coordinated with OWNER, CEMEX, and Pacific Gas and Electric (PG&E) as needed and appropriate.

1.06 FUTURE WORK

Not Applicable

1.07 SEQUENCE OF WORK AND SPECIAL PROJECT REQUIREMENTS

A. **Shutdowns**. Not Anticipated, pipeline does not connect to an active pipeline. A schedule, including time and duration of any anticipated shutdowns shall be submitted to the OWNER for approval prior to the start of construction.

B. **Tapping**. Not Applicable

C. **Schedule**. The CONTRACTOR shall allow for construction and schedule constraints in preparing the construction schedules required under Section 01300: Submittals. The schedule shall include the CONTRACTOR'S activities necessary to satisfy all constraints included and referenced in the contract documents.

D. **Sequence**. The anticipated construction sequence is as follows:

1. The CONTRACTOR shall be required to coordinate his work plan and schedule with the offsite pipeline work which shall be ongoing during the duration of this project:

    a. Feed Water Pipeline (from CEMEX Site to Desalination Plant Site).

2. CONTRACTOR shall coordinate with OWNER and CEMEX to determine location and sequencing for horizontal directional drilling (HDD) pits and operation.
3. CONTRACTOR shall install the feed water pipeline and medium voltage conduits from Main Switchgear to each medium voltage transformer simultaneously to reduce impact along access roads.
4. CONTRACTOR shall construct the feed water pipeline with all gate and butterfly valves installed, so that the pipeline can be cleaned, and pressure tested before connecting to each well site conveyance pipeline.

E. **Alternate Sequence**. The CONTRACTOR shall have the option of submitting an alternate sequence of construction to the OWNER prior to the commencement of work if he/she believes the work can be accomplished in a more efficient manner or logical sequence, and with less impact to CEMEX. The OWNER will review the alternate sequence and provide a final determination as to whether the proposed sequence meets the OWNER's sequencing requirements.

F. **Traffic Control**. Not Applicable

G. **Stormwater BMPs**. Contractor shall furnish, install and maintain Stormwater BMPs in accordance with the drawings prepared for this project and in accordance with local, county, and state requirements.

1.08 CHANGE PROCEDURES

A. The Engineer may issue to CONTRACTOR a Proposal Request which includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Times for executing the change and the period of time during which the requested price will be considered valid. CONTRACTOR will prepare and submit an estimate within 15 working days. The estimate shall contain a detailed breakdown of the labor, equipment, material, subcontract, equipment

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rental, contingencies, overhead, and profit costs associated with the requested change. The estimate shall also include any requested adjustments to Contract Times including the window of time the OWNER has to render a decision on the matter.

1.09 DEFINED TERMS

Terms used in these Specifications which are defined in the General Conditions of the Contract Documents shall have the meanings assigned to them in the General Conditions.

1.10 ABBREVIATIONS

Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth opposite each.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
IEEE	Institute of Electrical and Electronics Engineers, Inc.
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANS	American National Standard
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers

ASTM	American Society for Testing and Materials
AWPA	American Wood-Preservers' Association
AWWA	American Water Works Association
CS	Commercial Standard
IBR	Institute of Boiler and Raditor Manufacturers
IPS	Iron Pipe Size
JIC	Joint Industry Conference Standards
NBS	National Bureau of Standards
NEC	National Electrical Code; Latest Edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
125lb ANS	American National Standard for Cast-Iron Pipe
250lb ANS	Flanges and Flanged Fittings, Designation B16.1-1975, for the appropriate class
AWG	American or Brown and Sharpe Wire Gage
NPT	National Pipe Thread
OS&Y	Outside Screw and Yoke
Stl.WG	U.S. Steel Wire, Washburn and Moen, American Steel and Wire or Roebling Gage
UL	Underwriters' Laboratories
USS Gage	Untied States Standard Gage
WOG	Water, Oil, Gas

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

3.01 FIELD SURVEY WORK

A. Unless otherwise provided in the Supplementary Conditions the ENGINEER shall provide existing engineering control points to establish reference points for construction. Utilizing ENGINEERS's initial control base line, CONTRACTOR shall setup any new control bench marks to be utilized throughout the project. Base line shall be set in accordance with all lines, dimensions, reference points, and elevations given in the Contract Drawings.

B. Should the CONTRACTOR detect a discrepancy between the information as presented in the Contract Drawings and any existing survey grid-work, bench marks, structures, etc., the CONTRACTOR shall notify the ENGINEER immediately. New construction shall not commence until accurate control base lines and bench marks have been established.

C. The CONTRACTOR shall throughout the course of the project, set all additional stakes which are needed for offset stakes, reference points, slope stakes, pavement and curb line and grade stakes, stakes for structures, sewers, utilities, roadway drainage, pipe underdrains, paved gutter, fence, culverts, or other structures, supplementary bench marks, and any other horizontal or vertical controls necessary to secure a correct layout and construction of the work. Stakes for line and grade for pavements, curbs, storm drains, sewers, etc., shall be set at twenty-five (25) foot maximum intervals. Base lines shall be staked in such manner as to clearly define them for the project.

D. It shall be the CONTRACTOR's responsibility that the finished work conform to the lines, grades, elevations and dimensions called for in the Contract Documents. The Work shall be subject to checking by the ENGINEER, but any inspection or checking of CONTRACTOR's layout by the ENGINEER and the acceptance of all or part of it shall not relieve the CONTRACTOR of his responsibility to secure the proper dimensions, grades, elevations and locations on the several parts of the Work. The CONTRACTOR shall exercise care in the preservation of stakes, monuments and bench marks and shall have them reset at his expense when they are lost or displaced.

E. Prior to the commencement of any Work activity, the CONTRACTOR shall survey and layout the Work to be performed and advise the ENGINEER of any conflicts, obstructions, concerns, etc. which will prevent completion of such work in accordance with the requirements of the Contract Documents. If the CONTRACTOR fails to conduct such survey and layout or if the survey and layout fails to identify a conflict, obstruction, etc., which it reasonably should have, and a conflict, obstruction, concern, etc., is discovered, the CONTRACTOR shall bear the cost of any standby time for labor and/or equipment which occurs pending the ENGINEER's direction and the cost of rework of any Work installed which is affected by the conflict, obstruction, etc.

F. Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the Work, the CONTRACTOR shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

3.02 COORDINATION AND MEETINGS

A. The CONTRACTOR will be required to coordinate his work, to phase the construction operations, and provide, install and maintain any temporary connections necessary to prevent interference to operation of OWNER's facilities. Any construction work requiring the shut-down of facilities must be scheduled and performed only at such times as shall be authorized by the ENGINEER and OWNER. Such work must be completed during the specific periods authorized by the OWNER. It may be necessary that work will be performed during several shut-down periods and/or during periods of premium time payment to accomplish the desired construction. All costs to perform the CONTRACTOR's work, including premium time payments, shall be borne by the CONTRACTOR and are included in the Contract price.

B. In addition to the above, the CONTRACTOR shall:

1. Coordinate scheduling, submittals, and work of the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

2. Verify the utility requirement characteristics of operating equipment are compatible with the utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

3. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

4. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

5. Coordinate completion and clean up of Work of separate sections in preparation for substantial completion and for portions of Work designated for OWNERs partial occupancy.

6. After OWNER occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of OWNER's activities.

C. Job Progress Meetings

Progress meetings will generally be held monthly. CONTRACTOR's attendance shall be required.

1. Schedule - The ENGINEER will establish the meeting place, time and date, notify participants and administer the meeting. CONTRACTOR shall notify major subcontractors and suppliers, as appropriate.

2. Attendance

   a. ENGINEER and/or resident project representative.
   b. CONTRACTOR's project manager and project superintendent
   c. OWNER's representative
   d. Subcontractor, as appropriate to the agenda
   e. Suppliers, as appropriate to the agenda
   f. Other parties as determined by ENGINEER and/or OWNER

3. Agenda

   a. Review minutes of previous meeting.
   b. Review of work progress since previous meeting.
   c. Review field observations, problems, conflicts.
   d. Review problems which impede construction schedules.
   f. Review of off-site fabrication, delivery schedules.

g. Review corrective measures and procedures to regain projected schedule.
h. Review revisions to construction schedules.
i. Review plan progress, schedule, during succeeding work period.
j. Review coordination of schedules.
k. Review submittal schedules; expedite as required.
l. Review maintenance of quality standards.
m. Review proposed changes for:
   - effect on construction schedule and on completion date
   - effect on other contracts of the project
n. Other business

4. Minutes - ENGINEER will prepare and distribute copies to participants and OWNER for review at the next meeting.

***** END OF SECTION *****

SECTION 01025

MEASUREMENT AND PAYMENT

SCOPE

This section covers methods of measurement and payment for items of Work under this Contract.

GENERAL

The Contract Price shall cover all Work required by the Contract Documents. All costs in connection with the proper and successful completion of the Work, including furnishing ALL materials, equipment, supplies, and appurtenances; providing all construction plant, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work as indicated on the drawings or specified by these specifications and permit requirements, conduct start-up testing, conduct training, and provide operation and maintenance manuals and record drawings shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of Contractor and all costs in connection therewith shall be included in the prices bid. This requirement shall include all meetings and permit compliance requirements with affected utility companies and agencies with jurisdiction over the project.

ESTIMATED QUANTITIES

All estimated quantities stipulated in the Bid Form or other Contract Documents are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work and (b) for the purpose of comparing the Bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. Contractor agrees that it will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefore.

BASE BID ITEMS

BID ITEM #1: MOBILIZATION, DEMOLITION, BONDS AND INSURANCE

A. Measurement and payment of construction of mobilization, limits of construction fencing (i.e. orange barrier fencing), demolition, set-up of office trailers, temporary utilities, sanitary facilities, employee and visitor parking, installation of project signs, bonds, and insurance will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form.

B. Total amount of premiums, supported with documentation including certified invoices, paid by the Contractor to obtain performance and payment bonds, and

specified insurance shall be paid at one time together with the first progress payment.

C. Total amount for this bid item will be paid at the lump sum price named in the bid form. The amount paid under this bid item shall not exceed five (5) percent of the Total Bid Price.

BID ITEM #2: MINE SAFETY AND HEALTH ADMIN (MSHA) TRAINING

A. Measurement and payment of Mine Safety and Health Administration (MSHA) training will be based upon the component parts listed in the approved Schedule of Values. Total payment for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full training completion.

B. This work includes having ALL contractor personnel who may be working onsite complete MSHA 8-hour new mining training (27 courses). Each personnel can complete training online or Contractor can hire a professional to come to their office and conduct a course. U.S. Dept. of Labor Certificate of Training (MSHA FORM 5000-23) must be provided to the CEMEX front office before personnel can enter the work site.

BID ITEM #3: ENVIRONMENTAL MITIGATION MEASURES

A. Measurement and payment of environmental mitigation measures pursuant to the Supplemental General Conditions (Section 3), will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and functional erosion control system and all appurtenant work.

B. Work included in this bid item includes but is not limited to all work related to developing and implementing environmental protection measures, permit compliance measures, associated reporting requirements as described in the Supplemental General Conditions - Section 3, at all times during construction.

BID ITEM #4: STORMWATER BMP INSTALLATION AND MAINTENANCE

A. Measurement and payment of construction of all erosion control and storm water pollution prevention as it relates to this construction will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and functional erosion control system and all appurtenant work.

B. Work included in this bid item includes but is not limited to all work related to developing, obtaining applicable permits, and maintaining sufficient erosion control and storm water pollution prevention plan at all times during construction.

BID ITEM #5: ONSITE GRADING

A. Measurement and payment of onsite access roads and well site working pads will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable tunnel and pipeline and all appurtenant work.

B. Work included in this bid item involves the grading of ingress/egress site access as shown on Sheet C2 and all site grading at all five (5) well sites. Work includes, but is not limited to, construction staking, site grading, excavation, backfill, compaction, dust control, all equipment, property owner coordination, connecting work to other bid items and all other appurtenant work and materials for a complete and functional access road and well working sites.

BID ITEM #6: ~~30~~36" ~~TO 42"~~ FEED WATER PIPELINE

A. Measurement and payment of construction of all work on the feedwater pipeline between Stations 10+00 and 33+00 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the feedwater pipeline between Stations 10+00 and 33+00, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, and compaction. Work also includes all connections to the well site pipelines, connecting work to other bid items, all pavement removal and road reconstruction, traffic control, structures, valves, labor, equipment, blow-offs, air release, and all other appurtenant work and materials for a complete and functional system as shown in design drawings.

BID ITEM #7: ~~42~~36" FEED WATER PIPELINE – HORIZONTAL DIRECTIONAL DRILLING

A. Measurement and payment of construction of work on the feed water pipeline between Stations 33+00 and 37+20, installed using horizontal directional drilling (HDD), will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the feed water pipeline between Stations 33+00 and 37+20, including but not limited to the excavation pits, shoring, pipe (fused ~~42~~36" PVC (DR-25) ~~or HDPE (DR-17)~~ and

appurtenances installation, backfilling, compaction, pressure and leakage testing, flushing, and cleaning and disinfection of the 36~~42~~-inch feed water pipeline. Work also includes connections to the feed water pipeline, connecting work to other bid items, all pavement removal and road reconstruction, traffic control, structures, valves, labor, equipment, blow-offs, and all other appurtenant work and materials for a complete and functional system.

BID ITEM #8: PIPELINE DISINFECTION AND TESTING

A. Measurement and payment of pipeline disinfection and testing on the feedwater pipeline between Stations 10+00 and 37+20 and all other pipelines will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item, but not limited to, pressure and leakage testing, flushing, cleaning and disinfection of the feedwater pipeline and all other mechanical piping/valves between the well discharge head and the feedwater pipeline connection.

BID ITEM #9: WELL SITE #1 MECHANICAL PIPING (1 WELL)

A. Measurement and payment of construction of all work on Well Site #1 (one well at site) mechanical piping and valving as shown in Sheet M1 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

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B. Work included in this bid item involves all work to be performed concerning Well Site #1 mechanical piping, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, compaction, pipe supports, and cathodic protection. Work also includes pump to waste piping, connecting work to other bid items, structures, labor, equipment, gauges, blow-offs, air release valves, meters, deep well solenoid control valve, and all other valves and appurtenant work and materials for a complete and functional system as shown in the construction drawings.

BID ITEM #10: WELL SITE #2 MECHANICAL PIPING (2 WELLS)

A. Measurement and payment of construction of all work on Well Site #2 (two wells at the site) mechanical piping and valving as shown in Sheet M2 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed concerning Well Site #3 mechanical piping, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, compaction, pipe supports, and cathodic protection. Work also includes pump to waste piping, connecting work to other bid items, structures, labor, equipment, gauges, blow-offs, air release valves, meters, deep well solenoid control valve, and all other valves and appurtenant work and materials for a complete and functional system as shown in the construction drawings.

BID ITEM #11: WELL SITE #3 MECHANICAL PIPING (1 WELL)

A. Measurement and payment of construction of all work on Well Site #3 (one well at site) mechanical piping and valving as shown in Sheet M1 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed concerning Well Site #3 mechanical piping, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, compaction, pipe supports, and cathodic protection. Work also includes pump to waste piping, connecting work to other bid items, structures, labor, equipment, gauges, blow-offs, air release valves, meters, deep well solenoid control valve, and all other valves and appurtenant work and materials for a complete and functional system as shown in the construction drawings.

BID ITEM #12: WELL SITE #4 MECHANICAL PIPING (1 WELL)

A. Measurement and payment of construction of all work on Well Site #4 (one well at site) mechanical piping and valving as shown in Sheet M1 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed concerning Well Site #4 mechanical piping, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, compaction, pipe supports, and cathodic protection. Work also includes pump to waste piping, connecting work to other bid items, structures, labor, equipment, gauges, blow-offs, air release valves, meters, deep well solenoid control valve, and all other valves and appurtenant work and materials for a complete and functional system as shown in the construction drawings.

BID ITEM #13: WELL SITE #5 MECHANICAL PIPING (2 WELLS)

A. Measurement and payment of construction of all work on Well Site #5 (two wells at the site) mechanical piping and valving as shown in Sheet M2 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed concerning Well Site #5 mechanical piping, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, compaction, pipe supports, and cathodic protection. Work also includes all connections to existing utilities, connecting work to other bid items, structures, labor, equipment, gauges, blow-offs, air release valves, meters, deep well solenoid control valve, and all other valves and appurtenant work and materials for a complete and functional system as shown in the drawings.

BID ITEM #14: PRECAST CONCRETE VAULTS WITH ACCESS HATCH

A. Measurement and payment of construction of all work to procure and install seven (7) precast concrete vaults for each well, will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item to procure and install seven (7) precast concrete vaults that include an access Hatch, Fiberglass Ladder w/ Stainless Steel Hardware and Bilco Ladder up Safety Post, Link Seals for Pipe Openings. Work also includes but not limited to the excavation, trenching, shoring, link seals and appurtenances installation, geotextile fabric, crushed rock base, embedment, backfilling, compaction, connecting work to other bid items, labor, equipment, and all other appurtenant work and materials for a complete and functional system.

BID ITEM #15: PUMP TO WASTE BASINS

A. Measurement and payment of construction of all work on five (5) pump to waste will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on each pump to waste basin, including but not limited to construction staking, excavation, rip rap rock class 2, geotextile fabric, and compaction. Work also includes connecting work to other bid items, labor, equipment, and all other appurtenant work and materials for a complete and functional system.

BID ITEM #16: 8' PVC COATED CHAIN-LINK FENCE WITH PRIVACY SLATS

A. Measurement and payment of construction of all 8' Tall PVC Coated chain link fence and gates, including tan (sand) colored privacy slats will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at unit price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to install chain-link privacy fence, including but not limited to construction staking, excavation, PVC coated chain-link fence, privacy slats, and appurtenances installation, backfilling, compaction, labor, equipment, and all other appurtenant work and materials for a complete and functional system.

BID ITEM #17: 3,000 GALLON SURGE TANK #1

A. Measurement and payment of construction of all work on the 3,000-gallon surge tank #1 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed for the 3,000-gallon surge tank #1, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, compaction. Work also includes connecting work to other bid items, structures, valves, gauges, labor, equipment, and all other appurtenant work and materials for a complete and functional surge tank system.

BID ITEM #18: 8,000 GALLON SURGE TANK #2

A. Measurement and payment of construction of all work on the 8,000-gallon surge tank #1 will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed for the 8,000-gallon surge tank #1, including but not limited to construction staking, excavation, trenching, shoring, pipe and appurtenances installation, pipe embedment, backfilling, compaction. Work also includes connecting work to other bid items, structures, valves, gauges, labor, equipment, and all other appurtenant work and materials for a complete and functional surge tank system.

BID ITEM #19: CONCRETE AND REINFORCING STEEL

A. Measurement and payment of construction of all work related to concrete and reinforcing steel for electrical enclosure pads, surge tank pads, electrical cabinet pads, thrust blocks, valve anchors, etc. will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves but is not limited to all concrete and reinforcing steel for electrical enclosure pads, surge tank pads, electrical cabinet pads, thrust blocks, valve anchors, etc., including but not limited to the excavation, trenching, shoring, appurtenances installation, embedment, backfilling, and compaction. Work also includes connecting work to other bid items, labor, equipment, and all other appurtenant work and materials for a complete and functional system.

BID ITEM #20: WELL SITE #1 ENCLOSURE, ELECTRICAL, CONTROLS, AND HVAC

A. Measurement and payment of construction of all work related to the electrical components at Well Site #1 based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the electrical components at Well Site #1, including but not limited to construction staking, Fibrebond concrete enclosure, switchboard, VFD, HVAC, excavation, trenching, conduit and appurtenances installation, labor, equipment, and all other appurtenant work/materials for a complete/functional electrical controls system.

BID ITEM #21: WELL SITE #2 ENCLOSURE, ELECTRICAL, CONTROLS, AND HVAC

A. Measurement and payment of construction of all work related to the electrical components at Well Site #2 based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the electrical components at Well Site #2, including but not limited to construction staking, Fibrebond concrete enclosure, switchboard, VFDs, HVACs, excavation, trenching, conduit and appurtenances installation, labor, equipment, and all other appurtenant work and materials for a complete and functional electrical and controls system.

BID ITEM #22: WELL SITE #3 ENCLOSURE, ELECTRICAL, CONTROLS, AND HVAC

A. Measurement and payment of construction of all work related to the electrical components at Well Site #3 based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the electrical components at Well Site #3, including but not limited to construction staking, Fibrebond concrete enclosure, switchboard, VFD, HVAC, excavation, trenching, conduit and appurtenances installation, labor, equipment, and all other appurtenant work/materials for a complete/functional electrical controls system.

BID ITEM #23: WELL SITE #4 ENCLOSURE, ELECTRICAL, CONTROLS, AND HVAC

A. Measurement and payment of construction of all work related to the electrical components at Well Site #4 based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the electrical components at Well Site #4, including but not limited to construction staking, Fibrebond concrete enclosure, switchboard, VFD, HVAC, excavation, trenching, conduit and appurtenances installation, labor, equipment, and all other appurtenant work/materials for a complete/functional electrical controls system stem.

BID ITEM #24: WELL SITE #5 ELECTRICAL, CONTROLS, AND HVAC

A. Measurement and payment of construction of all work related to the electrical components at Well Site #5 based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the electrical components at Well Site #5, including but not limited to construction staking, Fibrebond concrete enclosure, switchboard, VFDs, HVACs, excavation, trenching, conduit and appurtenances installation, labor, equipment, and all other appurtenant work/materials for a complete/functional electrical controls system.

BID ITEM #25: 1,500 KVA AND 1,000 KVA TRANSFORMERS

A. Measurement and payment of construction of all work on 1,500 KVA and 1,000 KVA Transformers will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item involves all work to be performed on the 1,500 KVA and 1,000 KVA Transformers (stainless steel skin), including but not limited to construction staking, excavation, trenching, conduit and appurtenances installation, embedment, backfilling, compaction. Work also includes all connections to other bid items, tranfmier slab boxes, structures, labor, equipment, and all other appurtenant work and materials for a complete and functional system.

BID ITEM #26: ADDITIONAL ELECTRICAL EQUIPMENT AND INSTALLATION

A. Measurement and payment of construction of all additional electrical equipment will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item for additional electrical equipment includes all work for the main switchgear, PG&E slab Box and transformer, conduits, conductors (i.e. power, grounding, control), Pull Boxes, and Programming, including but not limited to construction staking, excavation, trenching, conduit and appurtenances installation, backfilling, compaction, connections to other bid items, labor, equipment, and all other appurtenant work and materials for a complete and functional electrical and controls system.

BID ITEM #27: FIBER OPTIC CONDUIT AND PULL BOXES

A. Measurement and payment of construction of all work concerning installation of PVC conduit and pull boxes or fiber optic wire will be based upon the component parts listed in the approved Schedule of Values. Total payment for construction for this bid item and all appurtenant work will be made at the lump sum price named in the bid form. Except as otherwise provided under separate bid items, such price names shall constitute full compensation for the construction of a complete and operable systems and all appurtenant work.

B. Work included in this bid item includes all work for the fiber optic conduit and pull boxes, including but not limited to construction staking, excavation, trenching, conduit and appurtenances installation, backfilling, compaction, connections to other bid items, labor, equipment, and all other appurtenant work and materials for a complete and functional fiber optic conduit wire installation.

****End of Section****

SECTION 13321

FIBER OPTIC CABLING AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Work of this Section includes providing a fiber optic communications infrastructure including, but not limited to, fiber optic cable (FOC), patch panels, terminations, testing, and implementation.

B. The Work includes testing individual fiber cables installed under this Contract and testing a completed fiber optic communications network.

1.02 RELATED WORK

A. Delivery, Storage and Handling in Section 01600.

B. Process Instrumentation and Control System in Section 13300 “IC - General Provisions.”

1.03 SUBMITTALS

A. Submit following to the Engineer, in accordance with Sections 01300 and 01730:

1. Catalog Data: Catalog data on fiber-optic cable, termination devices, patch panels, breakout enclosures, splice kits, pigtails, and fan-outs where applicable. Product data sheets shall include the manufacturer's name and catalog number for each item, the manufacturer's descriptive literature, catalog cuts, and any power supply requirements.

2. Certification of compliance in writing stating the fiber optic cable, anticipated layout, and components are compatible, acceptable for use, and in compliance with these specifications.

3. Detailed bill of materials for fiber-optic cable, terminations, patch panels, breakout enclosures, splice kits, connectors, pigtails, and fan-outs.

4. Drawings indicating the locations of all patch panels, termination points, or breakout enclosures.

5. Catalog data on all testing devices proposed for use plus certifications of accuracy, calibration, and traceability to standards of the National Institute for Standards and Testing.

B. Provide four samples of each type of cable, splice, and connector termination kit. Four samples of a completed example of each type of splice and connector termination shall be submitted.

C. The Fiber Optic System Supplier shall provide a fiber optic power budget for each cable run in excess of 1000 feet. The budget shall include transmitter power, receiver sensitivity, connector losses, cable losses, and a 3db-aging margin. Fiber optic transmission line shall maintain a minimum of 10db safety margin.

D. Training plan and schedule for fiber optic cable termination training.

E. Test reports.

F. O&M manuals.

1.04 REFERENCE STANDARDS

A. The optical fiber cable shall conform to the latest issue of the following standards documents, which are incorporated by reference into this Section:

1. EIA-455: Standard Fiber Optic Test Procedures (FOTPs) Devices.
2. EIA-598-A: Standard Colors for Color Identification and Coding.
3. MIL-202: Test Methods for Electronic and Electrical Component Parts.
4. MIL-454: Standard General Requirements for Electronic Equipment.
5. MIL-810: Environmental Test Methods and Engineering Guidelines.
6. EIA-568-B.3: Commercial Building Telecommunications Cabling Standard: Optical Fiber Cabling Components.
7. ICEA 5-83-696: Fiber Optic Premises Distribution Cable (Indoor/Outdoor).
8. National Electrical Code (NEC) Article 770.
9. UL 1581 VW-1 - Vertical Tray Cable Flame Test.
10. UL 1666 - UL Standard for Safety Test for Flame-Propagation Height of Electrical and Optical-Fiber Cables Installed in Vertical Shafts.
11. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use IN Air-Handling Spaces.
12. IEEE Standard 383 - Flame Retardancy.
13. DOD-STD-1678.
14. National Electrical Manufacturers Association (NEMA).
15. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

B. All fiber optical cables shall be constructed in accordance with EIA-455, and 100 percent of all optical fibers and jacketing shall meet or exceed the requirements contained in this specification.

1.05 QUALITY ASSURANCE

A. The cable manufacturer shall be ISO9001 certified and registered.

B. The fiber optic cabling system materials furnished under this Section shall be provided by Fiber Optic Suppliers who have been providing these types of materials for the past three years. The Fiber Optic Suppliers shall provide personnel capable of providing technical assistance during installation.

C. The installation of fiber optic cabling system materials furnished under this Section shall be performed by an installation Contractor who has been installing these types of materials and systems for the past three years.

D. Supplier shall furnish five working installation references.

E. The Engineer shall determine whether a product is an equal based upon the information listed herein and the manufacturer's data sheets regarding the models specified. Alternate equipment shall meet the criteria listed herein and all additional information in the manufacturer's data sheets in order to be accepted as an equal.

1.06 SYSTEM DESCRIPTION

A. N/A

1.07 DELIVERY, STORAGE AND HANDLING

A. The cable shall be packaged in cartons and/or wound on spools or reels. Each package shall contain only one continuous length of cable. The packaging shall be constructed so as to prevent damage to the cable during shipping and handling.

B. When the length of an order requires a large wooden reel, the cable will be covered with a three-layer laminated protective material. The outer end of the cable shall be securely fastened to the reel head so as to prevent the cable from becoming loose in transit. The inner end of the cable shall project into a slot in the side of the reel or into housing on the inner slot of the drum, in such a manner and with sufficient length to make it available for testing.

C. Test tails shall be at least two meters long. The inner end shall be fastened so as to prevent the cable from becoming loose during shipping and installation. Reels shall be permanently marked with an identification number that can be used by the manufacturer to trace the manufacturing history of the cable and fiber.

D. Wooden reels shall be plainly marked to indicate the direction in which it shall be rolled to prevent loosening of the cable on the reel.

E. All fiber optic cables shall be attenuated tested. The attenuation of each fiber shall be provided with each cable reel by the manufacturer.

F. The attenuation shall be measured at 850nm and 1300nm for multimode fiber cables after received on site. The manufacturer shall submit the test results prior to installation of the cable.

G. Packaging:

1. The completed cable shall be packaged for shipment on non-returnable wooden reels. It is the responsibility of the Contractor to determine all required cable lengths.

2. Top and bottom ends of the cable shall be available for testing.

3. Both ends of the cable shall be sealed to prevent the ingress of moisture.

4. Each reel shall have a weatherproof reel tag attached identifying the reel and cable. The reel tag shall include the following information:
   a. Cable Number Gross Weight.
   b. Shipped Cable Length in Meters.
   c. Product Number.

d. Date Cable was Tested.
e. Cable Length Markings Item Number.

H. Each cable shall be accompanied by a cable data sheet.

1.08 SPARE PARTS AND TEST EQUIPMENT

A. Spare Parts:

1. Provide a minimum five percent spares of LC connectors and dust covers, but not less than 20 spare LC style connectors and 40 dust covers.

2. Provide a minimum five percent spare 36" spare multimode patch cables with connectors (both ends) terminated, but not less than ten 36" spare multimode patch cables with connectors (both ends) terminated.

B. Test Equipment and Tools:

1. One complete fiber optic connector termination tool kit. The kit shall be the CTS version with VFL, Model TKT-UNICAM-CTS by Corning Cable Systems, or equal.

2. Optical power source and test meter shall be a combination type unit in a single handheld device.
   a. Optical source shall provide stable transmission of plus or minus 0.1dB at 23 degrees C for eight hours with accurate wavelengths. Sources shall be 850/1300nm multimode (LED) and 1310/1550nm (multimode) or combined quad wavelength source. Provide with visual fault locator (VFL).
   b. Test meter utilizes InGaAs wide area detector calibrated for 850, 1300, 1550, and 1625nm wavelengths. Provide fiber identification by audible detection of 2 kHz tone.
   c. Provide data storage: Windows-based PC software and cabling for reports, printing, viewing, and export.
   d. Power source/meter shall include jumpers, sleeves, cleaning kit, and transit case and shall be Corning Cable Systems Express Series Model No. OTS-3MDSD-KIT, or equal.

PART 2 PRODUCTS

2.01 GENERAL MATERIALS

A. Cabinets: cabinets shall be provided as indicated on the Contract Drawings.

B. Provide tight buffered cables that are not gel filled and are suitable for indoor/outdoor applications. These cables shall be flame retardant for indoor applications and water and fungus resistant for outdoor applications.

C. Optical Fiber Characteristics:

1. All fibers in the cable shall be usable fibers and meet required specifications.

2. Each optical fiber shall consist of a doped silica core surrounded by a concentric silica cladding. The fiber shall be matched clad design.

3. Multi-mode: Provide multimode, optical glass fiber compatible with LED or laser based transmission systems with the following fiber types:

D. Manufacturers:

1. Corning Cable Systems Corp.

2. CommScope.

3. Belden Cable.

4. Or equal.

2.02 STANDARD 50/125 µM FIBER

A. The multimode fiber utilized in the optical fiber cable shall meet EIA/TIA-492AAAB, "Detail Specification for 50-µm Core Diameter/125-µm Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers".

1. Geometry:

Core Diameter (µm)	50.0 ± 3.0
Core Non-Circularity	≤ 5 %
Cladding Diameter (µm)	125.0 ± 2.0
Cladding Non-Circularity	≤ 1.0 %
Core-to-Cladding Concentricity (µm)	≤ 1.5
Coating Diameter (µm)	245 ± 5
Colored Fiber Nominal Diameter (µm)	253 - 259

2. Optical:

Cabled Fiber Attenuation (dB/km) 850 nm 1300 nm	 ≤ 3.5 ≤ 1.5
Point discontinuity (dB) 850 nm 1300 nm	 ≤ 0.2 ≤ 0.2
Cabled Effective Modal Bandwidth[1)] (MHz•km) 850 nm	 ≥ 510
IEEE 802.3 GbE Distance (m) 1000BASE-SX Window (850 nm) 1000BASE-LX Window (1300 nm)	 up to 600 up to 600
OFL Bandwidth (MHz•km) 850 nm 1300 nm	 ≥ 500 ≥ 500
Numerical Aperture	0.200 ± 0.015

[1)]As predicted by RML BW, per TIA/EIA 455-204 and IEC 60793-1-41, for intermediate performance laser based systems (up to 1 Gb/s).

2.03

2.03 FIBER OPTIC DISTRIBUTION CABLE

A. Multi-fiber cables utilizing 900 micron tight-buffered fibers surrounded by dielectric strength members and a flame-retardant outer jacket. Cables shall meet the application requirements of the National Electric Code® (NEC®) Article 770 and shall be listed accordingly:

1. Non-Plenum Applications - Applicable Flame Tests: UL 1666. Cables shall be listed OFNR (OFCR)

2. Plenum Applications - Applicable Flame Test: NFPA 262. Cables shall be listed OFNP (OFCP)

B. Cable Specifications:

1. Fiber Count: 12 Strand.

2. Maximum Tensile Load Short-Term: 148 lbf (660 N)

3. Maximum Tensile Load Long Term: 45 lbf (198 N)

4. Minimum Crush Resistance: 57 lbf/in (100 N/cm)

5. Operating Temperature: -20 to +70 degrees C (OFNR, OFCR) 0 to +70 degrees C (OFNP, OFCP)

2.04 FIBER OPTIC INTERCONNECT CABLE

A. Tight-Buffered fiber surrounded by aramid yarn strength members and flame-retardant jacket.

B. Cable Specifications:

1. Fiber Count: Single or duplex type as required.

2. National Electric Code OFNR designation.

3. Crush Resistance: 20 lbf/in (35 N/cm).

4. Operating Temperature: -20 to +70 degrees C.

C. Fiber Specification Parameters:

1. Required Fiber Grade - Maximum Individual Fiber Attenuation.

2. The fiber manufacturer shall proof-test 100 percent of the optical fiber to a minimum load of 100 kpsi.

2.05 LOOSE TUBE FIBER OPTIC CABLE (INDOOR/OUTDOOR)

A. Cable shall be flame-retardant, UV stabilized, fully water blocked with dielectric central member for use in indoor/outdoor applications. The buffer tubes shall be gel-free. Each buffer tube shall contain a water-swellable yarn for water-blocking protection. Cable manufacturer shall have a minimum of 20 years in manufacturing optical fiber cable in order to demonstrate reliable field performance. Cable and fiber manufacturer shall be the same company to ensure long-term reliability of the cabled fiber and to ensure the availability of fully integrated technical support. Cable shall be suitable for installation in duct, aerial, and riser environments. Cable shall meet UL OFNR specifications and not require transition splicing upon building entry in order to meet fire codes.

B. Optical fibers shall be placed inside a buffer tube.

C. Each buffer tube shall contain up to 12 fibers.

D. In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and not subject to fading or smearing onto each other or into the gel filling material. Colors shall not cause fibers to stick together.

E. Buffer tubes shall be kink-resistant within the specified minimum bend radius.

F. Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed.

G. The central anti-buckling member shall consist of a glass-reinforced plastic rod. The purpose of the central member is to prevent buckling of the cable.

H. The cable core shall contain a water-blocking material. The water-blocking material shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter and shall be readily removable with conventional non-toxic solvents. Cable shall contain water-blocking threads between tubes.

I. The cable shall contain at least one ripcord under the sheath for easy sheath removal.

J. Tensile strength shall be provided by a combination of high tensile strength dielectric yarns.

K. The high tensile strength dielectric yarns shall be helically stranded evenly around the cable core.

L. All dielectric cables (with no armoring) shall be sheathed with medium density polyethylene (MDPE). The minimum normal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members and water-blocking material. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

2.06 ARMOR JACKETED MULTI FIBER CABLE

A. Rugged armored cable with polyethylene inner jacket, steel tape armor and a medium density, water and UV stabilized polyethylene outer jacket, suitable for duct or direct-buried installation. Cable shall be listed with Rural Utilities Service (RUS) 7 CFR 1755.900 and be fully compliant with ICEA S 87 640. Optional Nylon over jacket shall be available for resistance to hydrocarbons, including jet fuel, when required.

B. Cable Specifications:

1. Fiber Count: as indicated

2. Maximum Tensile Load Short-Term: 600 lbf (2700 N)

3. Maximum Tensile Load Long Term: 200 lbf (890 N)

4. Minimum Crush Resistance: 125 lbf/in (220 N/cm)

5. Operating Temperature: -40 to +70 degrees, C

6. Outside diameter: 1.03 inch (26.1 mm) (maximum)

C. The jacket or sheath shall be free of holes, splits, and blisters.

D. The cable jacket shall contain no metal elements and shall be of a consistent thickness.

E. Cable jackets shall be marked with manufacturer's name, sequential meter or foot markings, the year of manufacture, and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC). The actual length of the cable shall be within "one percent of the length markings. The marking shall be in contrasting color with the cable jacket. The height of the marking shall be approximately 2.5 mm.

F. The maximum pulling tension shall be 2700 N (608 lbf) during installation (short-term) and 600 N (135 lbf) long-term installed.

G. The shipping, storage, and operating temperature range of the cable shall be minus 40 degrees C to plus 70 degrees C. The installation temperature range of the cable shall be minus 30 degrees C to plus 70 degrees C.

H. The cable shall be the FREEDM Series as manufactured by Corning Cable Systems, or equal.

2.07 CABLE CONSTRUCTION

A. Riser Cables:

1. Riser cables up to 24 fibers: In cables with more than one fiber, the fibers shall be stranded around a dielectric member and surrounded by layered aramid yarns. The aramid yarns shall serve as the tensile strength member of the cable. A ripcord may be applied between the aramid yarns and the outer jacket to facilitate jacket removal. The outer jacket shall be extruded over the aramid yarns for physical and environmental protection.

2. Riser cables with more than 24 fibers: The buffered fibers shall be grouped into six fiber subunits. In each subunit, the individual fibers shall be stranded around a dielectric central member and surrounded by layered aramid yarns. A ripcord shall be incorporated in the subunit design to facilitate access to the individual fibers. The subunit jacket shall be extruded over the aramid yarns for additional physical and environmental protection. The subunits shall be stranded around a dielectric central member. A ripcord shall be inserted beneath the outer jacket to facilitate jacket removal. The outer jacket shall be extruded around the units for physical and environmental protection.

B. Plenum Cables:

1. Plenum cables up to 24 fibers: The fibers shall be stranded around a dielectric member and surrounded by layered aramid yarns. The aramid yarns shall serve as the tensile strength member of the cable. A ripcord may be applied between the aramid yarns and the outer jacket to facilitate jacket removal. The outer jacket shall be extruded over the aramid yarns for physical and environmental protection.

2. Plenum cables with 24 to 72 fibers: The buffered fibers shall be grouped into six fiber subunits. In each subunit, the individual fibers shall be stranded around a dielectric central member and surrounded by layered aramid yarns. A ripcord shall be incorporated in the subunit design to facilitate access to the individual fibers. The subunit jacket shall be extruded over the aramid yarns for additional physical and environmental protection. The subunits shall be stranded around a dielectric central member. A ripcord shall be inserted beneath the outer jacket to facilitate jacket removal. The outer jacket shall be extruded around the units for physical and environmental protection.

3. Plenum cables with more than 72 fibers: The buffered fibers shall be grouped into twelve fiber subunits. In each subunit, the individual fibers shall be stranded around a dielectric central member and surrounded by layered aramid yarns. A ripcord shall be incorporated in the subunit design to facilitate access to the individual fibers. The subunit jacket shall be extruded over the aramid yarns for additional physical and environmental protection. The subunits shall be stranded around a dielectric central member. A ripcord shall be inserted beneath the outer jacket to facilitate jacket removal. The outer jacket shall be extruded around the units for physical and environmental protection.

C. The strength member shall be a high modulus aramid yarn. The aramid yarns shall be helically stranded around the buffered fibers. Non-toxic, non-irritant talc shall be applied to the yarn to allow the yarns to be easily separated from the fibers and the jacket.

D. Cable Jacket:

1. The jacket shall be continuous, free from pinholes, splits, blisters, or other imperfections. The jacket shall have a consistent, uniform thickness; jackets extruded under high pressure are not acceptable. The jacket shall be smooth, as is consistent with the best commercial practice. The jacket shall provide the cable with a tough, flexible, protective coating, able to withstand the stresses expected in normal installation and service.

2. The cable and subunit jacket color shall be orange for cables containing multimode fibers.

3. For cables with more than two fibers, the cable jacket shall be designed for easy removal without damage to the optical fibers by incorporating a ripcord under each cable jacket. Non-toxic, non-irritant talc shall be applied to the aramid yarns to allow the yarns to be easily separated from the fibers and the jacket.

4. The nominal thickness of the cable outer jacket shall be sufficient to provide adequate cable protection while meeting the mechanical, flammability, low smoke, and environmental test requirements of this document over the life of the cable.

E. The cable shall be all-dielectric.

2.08 CABLE IDENTIFICATION

A. The individual fibers shall be color coded for identification. The optical fiber color coding shall be in accordance with EIA/TIA-598, "Color Coding of Fiber Optic Cables." The coloring material shall be stable over the temperature range of the cable, shall not be susceptible to migration, and shall not affect the transmission characteristics of the optical fibers. Color coded buffered fibers shall not adhere to one another. When fibers are grouped into individual units, each unit shall be numbered in the unit jacket for identification. The number shall be repeated at regular intervals.

B. The outer cable jacket shall be marked with the manufacturer's name or UL file number, date of manufacture, fiber type, flame rating, UL symbol, and sequential length markings every two feet. The markings shall be in contrasting color to the cable jacket.

2.09 CABLE TESTING REQUIREMENTS

A. Fiber cables shall be tested in accordance with the following industry standard (EIA-455) tests:

1. FOTP-41, Compressive Loading Resistance Test.

2. FOTP-104, Fiber Optic Cable Cyclic Flexing Test.

3. FOTP-25, Repeated Impact Testing.

4. FOTP-33, Fiber Optic Cable Tensile Loading and Bending Test.

5. FOTP-85, Fiber Optic Cable Twist Test.

6. FOTP-181, Lightning Damage Susceptibility Test.

7. FOTP-3, Procedure to Measure Temperature Cycling Effects on Optical Fibers, Cables, and other Passive Fiber Optic Components.

8. FOTP-82, Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable.

9. FOTP-37, Low or High Temperature Bend Test for Fiber Optic Cable.

10. FOTP-98, External Freezing Test.

11. FOTP-27, Fiber Diameter Measurements.

12. FOTP-28, Measurement of Dynamic Tensile Strength.

13. FOTP-34, Interconnection Device Insertion Loss Test.

14. FOTP-89, Cable Jacket Elongation and Tensile Strength Test.

B. Submit laboratory test reports on representative samples of similar cable design to demonstrate compliance prior to cable installation.

2.10 FIBER CABLE TERMINATIONS, CONNECTORS, AND CABLE ASSEMBLIES

A. Pigtail Splicing:

1. For termination of fiber cables at a termination or connector panel (patch panel), with one end of a piece of cable pre-connected and the other end unterminated for splicing to the cable that needs to be terminated. Splicing and connectors shall meet the requirements listed in this Section.

2. A splice/termination tray shall house the splices and serve to fully protect excess lengths of loose tube fibers from exposure. Splice tray shall be compatible with the selected patch panel and installed for easy access to the spliced cable sections.

3. Pigtail assemblies shall match fiber cable type and model and shall be as manufactured by Corning Cable Systems or equal.

B. Buffer Tube Fan-Out Kits:

1. Individual fibers within a loose tube cable with 250 µm coated fibers shall use a fan-out kit to maintain flexibility and ease of handling fibers within a termination cabinet. Fan-out kits shall be installed in the patch panel enclosures to transition the loose tube fibers to ruggedized tight-buffered fiber pigtail cables. Optical fusion splices shall connect the loose tube fibers to the tight-buffered pigtail cables. The optical splice loss shall comply with the specifications for optical splices. Splice protection sleeves shall be employed on all splices to protect the splices.

2. The tight-buffered pigtails shall be factory pre-connected with STTM connectors as specified.

C. Connectors (Cable Assemblies):

1. The fiber optic communications system shall utilize connector type LC, which is complying with TIA-604-10-B. The connectors shall be designed for use with 50/62.5/125/250 micron cable. Each connector shall cause a maximum signal attenuation of 0,75 dB.

2. Field-Installed Connectors: Type LC design with ceramic or polymer ferrule and strain relief boot. The connector installation shall not require the use of epoxies, adhesives or ovens. The connector shall be installable upon 900 µm buffered fiber in one minute or less and upon 2.9 mm jacketed cable in three minutes or less total time. The connector shall contain a mechanical splice and have a tool kit available to aid in assembly. The installation tools used to terminate the connector shall be able to terminate other small-form-factor and single-fiber UniCam connector designs. The connector shall not require end-face polishing in the field. The connector shall have a factory polished optical fiber stub in the connector ferrule that is bonded in the ferrule micro hole. Ferrule material shall be available in ceramic or polymer. Connector specifications shall be as follows:
   a. Insertion loss (typical): 0.3 dB.
   b. Durability (mating cycles): 500 (minimum).
   c. Repeatability: Less than 0.2 dB.
   d. Operating Temperature: 0 to plus 60 degrees C.

3. After termination with connectors, the fiber ends shall be visually inspected at a magnification of not less than 100 power for multimode to check for cracks or pits in the end face of the fiber.

4. Connectors shall have a maximum allowable connection loss of 0.3 dB per mated pair, as measured per EIA-455-34. No index-matching gel is to be used; dry interfaces only.

5. Each connector shall be of the industry standard; designed for multimode tolerances; shall meet or exceed the applicable provisions of EIA-455-5, 455-2A, and 455-34; and shall be capable of 100 repeated ratings with a maximum loss increase of 0.1 dB. Connectors shall incorporate a key-way design and shall have a Zirconia ceramic ferrule. Connector bodies and couplings shall be made of corrosion-resistant and oxidation-resistant materials such as nickel-plated zinc, designed to operate in humid environments without degradation of surface finishes. Connectors shall be capable of operating in a range of -40 to 80 degrees C.

6. Manufacturers:
   a. Corning Cable Systems, Hickory, NC.
   b. AMP, Inc., Harrisburg, PA.
   c. 3M Telecom Systems Group, Austin, TX or equal.

D. Fiber Optic Patch Cables:

1. Fiber optic patch cable shall be two-fiber zip cord 50/62.5/125 core/clad micron multimode riser rated cable.

2. Installation of patch cables shall include all spares and observe the minimum fiber bend radius and strain relief.

2.11 FIBER OPTIC TERMINATION PATCH PANELS

A. General:

1. Patch panels shall be suitable for wall mounting, comprised of internal mounting plate, cable holders, slack cable take up/organizer blocks, patch block with connectors, and ground lugs as indicated. Panels shall be NEMA 4X, Type 316 stainless steel construction for outdoors; and NEMA 12, Type 316 stainless steel or fiberglass for indoor use. Patch panels shall be suitable for multimode system operation at 800 and 1300 nanometers. Patch panels shall be suitable for ST or LC connectors. The patch panels shall be sized to handle the number of fibers as required. All fibers shall be terminated in the patch panel.

2. Where shown on the plans or in the related specification sections, the fiber optic cable shall terminate inside a communications cabinet on a termination patch panel. All fiber sub-cables within the exposed buffer tube shall be terminated with fan-out kits with pre-connected pigtails. The patch panel shall have a fiber capacity equal to the total number of fibers (connected and spare) for all cables to be connected.

3. Unused buffer tubes shall be uncut and looped within the patch panel for continuous routing of the fiber buffer tube within the cable assembly.

4. Patch panels shall be designed for either rack mounting on a standard equipment rack or housed in an enclosure for direct wall mounting. The patch panel shall contain "ST" type bayonet or LC couplings. All unused couplings shall have protective dust covers. All panels shall be furnished with locking doors.

5. Factory-terminated, tight-buffered, aramid-reinforced fiber optic jumper assemblies or interconnect cables, standard 3.0-mm O.D., shall connect the optical cable terminations to the patch panel couplings.

6. The termination patch panel shall be equipped with a suitable means for routing and securing of cables and shall provide a suitable means of protection for the mounted fiber connectors to prevent damage to fibers and connectors during all regular operation and maintenance functions. All cables shall be provided with strain relief. Bend diameters on cable fibers and jumpers must be greater than four inches at all times to ensure optical and mechanical integrity of the optical fibers.

7. Termination panels shall be equipped with splice trays (where applicable) and holders for pigtail and through fiber splicing.

8. Termination panels shall be provided with all hardware, options, and accessories to provide for a complete installation of the fiber optic system.

9. Panels shall be as manufactured by Corning Cable Systems LANscape or equal.

B. Rack Mount Fiber Distribution Center (FDC) Splice Housing:

1. A rack-mountable Fiber Distribution Center splice housing shall be provided for pigtail splicing and through fiber splicing equipment.

2. The splice housing shall be compatible with the FDC for interconnection of the splicing equipment with the fiber cable management, termination, and distribution rack equipment.

3. Splice trays shall be provided for pigtail splicing.

4. The splice housing shall be sized and equipped with sufficient capacity to terminate and feed through all required fiber cable, plus an additional 20 percent.

5. Provide one spare splice tray.

6. Splice housing shall be Corning Cable Systems LANscape CSH series.

C. Rack Mount Fiber Distribution Center (FDC):

1. The Fiber/Network equipment rack shall be supplied with two rack-mountable Fiber Distribution Centers (FDCs) capable of 48 ST fiber termination points each. The connector center shall be 19" rack-mountable and provide for internal fan-out, splicing, and connection of the fiber optic cable to front panel ST connection patch panel.

2. The FDC shall provide backbone and intermediate connects and cable strain relief for a maximum of five fiber cable systems. The front shall be swing open construction with keyed latch mechanism.

3. The FDC shall be compatible for interconnection with the FDC Splice Housing and provide space and support the addition of fiber cable splice trays for future cable connection and termination.

4. The Fiber Connection Center shall be Corning Cable Systems LANscape CCH series.

D. Wall/Panel Mount Fiber Distribution Center (WDC):

1. The field-mounted fiber termination enclosures shall be supplied with a Wall Mount Fiber Distribution Center (WDC) capable of 48 ST fiber termination points. The distribution center shall be panel-mounted and provide for internal fan-out, splicing, and connection of the fiber optic cable to the patch panel assemblies.

2. Splice trays shall be provided for pigtail splicing. The WDC shall be provided with pass-thru splice trays for continuation of the fiber cable system to additional sites.

3. Provide one spare splice tray.

4. The WDC shall provide space and support the addition of future fiber cable splice trays.

5. The Wall Mount Fiber Distribution Center shall be Corning Cable Systems LANscape (WCH) series.

PART 3 EXECUTION

3.01 GENERAL

A. Provide all material, equipment, and labor to test and integrate the fiber optic system as indicated and as specified.

B. Installation shall comply with EIA/TIA Standards 568 and 569.

C. Fiber optic cables shall be continuous from component to component. Intermediate fiber splices shall not be allowed.

D. Provide delivery, storage and handling of materials and equipment in accordance with Section 01600.

3.02 IDENTIFICATION

A. Label each termination point.

B. Label each cable, buffer tube, and fiber with permanent waterproof typewritten tags.

3.03 PHYSICAL CHECKOUT

A. General Procedures:

1. Conduct physical checkout of the fiber optic data highway network.

2. Physical checkout shall be performed prior to functional testing.

B. Check Procedures:

1. Verify that fiber optic cable reels have been off-loaded from truck carefully and not damaged.

2. Submit to the Engineer all test data provided by the fiber manufacturer.

3. Verify that the optical fibers of the cable assembly are the type and quantity as specified and as recommended by the Instrumentation System Supplier.

4. Verify that cable construction is the type specified.

5. Verify that fiber optic patch panels have been installed plumb and level at locations indicated.

6. Verify that optical fiber connections or terminations within patch panels and splice closures are in accordance with cable manufacturer's recommendations.

3.04 FIBER OPTIC CABLE TESTING

A. General: The Contractor shall perform pre-installation and post-installation FOC tests. The Engineer shall be notified a minimum of 10 days in advance so that these tests are witnessed. All test equipment shall be traceable to NIST standards.

B. Test equipment: The Contractor shall use the following to perform pre-installation and post-installation FOC tests:

1. Optical time domain reflectometer (OTDR). The OTDR shall be laser precision, and be able to test multimode systems with a visual fault locator. The OTDR shall be as manufactured by Corning, Agilent Technologies, Fluke Networks, or equal.

C. Pre-installation Tests:

1. The purpose of these tests is to perform acceptance tests on the cable prior to installation to verify that the cable conforms to the manufacturer's specifications; is free of defects, breaks, and damages by transportation and manufacturing processes; and to provide baseline readings in dB.

2. Prior to removal of each cable from the delivery reel, all optical fibers within the cables shall be tested by the Contractor using an OTDR. The OTDR tests shall consist of end-to-end length and fiber attenuation (dB/km) measurements to ensure proper performance of the fiber optic cable. The tests shall be performed from both ends of each fiber to ensure complete fiber continuity within the cable structure.

3. Pre-installation, "on-reel" test results shall be compared with the manufacturer's test report delivered with the cable. Gross dissimilarities shall be noted and remedied between the Contractor and manufacturer. In all cases, all fibers shall meet the optical attenuation specifications prior to cable installation.

4. Perform tests on all reels of cable. The Engineer shall be notified a minimum of 15 days prior to any test.

5. Document each test and submit the report to the Engineer for review. Documentation shall consist of both hard copy and 3.5 inch electronic disk complete with all application software.

6. Cable shall not be installed until the Engineer has reviewed the test report.

D. Post-installation tests: After FOC has been installed and connected, the following tests shall be performed:

1. Visually inspect terminal connectors for out-of-round condition and surface defects such as micro-chips and cracks using a 200X (minimum) inspection microscope.

2. A recording OTDR shall be used to test for end-to-end continuity and attenuation of each optical fiber. The OTDR shall have an X-Y plotter to provide a hard copy record of each trace of each fiber. The OTDR shall be equipped with sufficient internal masking to allow the entire cable section to be tested. This may be achieved by using an optical fiber pigtail of 30 feet or more to display the required cable section.

3. The OTDR shall be calibrated for the correct index of refraction to provide proper length measurement for the known length of reference fiber.

4. A transmission test shall be performed with the use of a 1310 and 1550 nm stabilized light sources and 1310 nm/1550 nm power meters for SMF. This test shall be conducted in both directions on each fiber of each cable.

5. Hard and electronic copies of test documentation shall be submitted to the Engineer. The documentation shall include:
   a. The trace plot.
   b. Index.
   c. dB/km loss.
   d. Cable length.
   e. Date and time of test.
   f. Wavelength.
   g. Pulse width.
   h. The test site.
   i. Cable ID.
   j. Fiber number and type.
   k. Operator's initials.
   l. Compare the pre-installation test results to the post-installation results. If a deviation of greater than one dB occurs, the Engineer shall be notified in writing by the

Contractor, and the cable shall be removed and replaced at no additional cost to the Owner.

6. Upon completion of the previous tests, all FOC coils shall be secured with ends capped to prevent intrusion of dirt and water.

E. Certification of completion of pre- and post-fiber installation testing including test results shall be provided to the Engineer. Test results shall be submitted on paper in a binder, including results indicated in tables or a spreadsheet. Test results that exceed specification limits shall be noted. The electronic copy shall be included in the binder.

F. Required OTDR Trace Information:

1. All traces shall display the entire length of cable under test, highlighting any localized loss discontinuities (installation-induced losses and/or connector losses). The trace shall display fiber length (in kilofeet), fiber loss (dB), and average fiber attenuation (in dB/km), as measured between two markers placed as near to the opposite ends of the fiber under test as is possible while still allowing an accurate reading. Care shall be taken to ensure that the markers are placed in the linear region of the trace, away from the front-end response and far-end Fresnel reflection spike. Time averaging shall be used to improve the display signal to noise ratio. The pulse width of the OTDR shall be set to a sufficient width to provide adequate injected power to measure the entire length the fiber under test.

2. If connectors exist in the cable under test, then two traces shall be recorded. One trace shall record the fiber loss (dB) and average attenuation (dB/km) of the entire cable segment under test, including connectors. The second trace shall display a magnified view of the connector regions, revealing the connector losses (dB). All connector losses shall be measured using the five-point splice loss measurement technique.

3. The OTDR trace shall also include the following information:
   a. The date and time of the test.
   b. The cable ID number.
   c. The cable segment ID number.
   d. The fiber color or sub-cable number.
   e. Launch point connector number.
   f. The optical wavelength used for the test.
   g. The refractive index setting of the OTDR.
   h. The pulse width setting of the OTDR.
   i. The averaging interval of the test.

3.05 TRAINING

A. Provide one half-day training on termination techniques and testing for up to three students prior to installation.

B. Provide training as soon as possible following submittal of proposed fiber optic cable.

3.06 WARRANTY

A. Refer to Section 13300.

B. Provide an unconditional warranty on all installed cable for a minimum period of 20 years, commencing at the time of final acceptance by the Owner.

C. This Section describes the material and installation requirement for the fiber optic cabling system and associated equipment.

END OF SECTION

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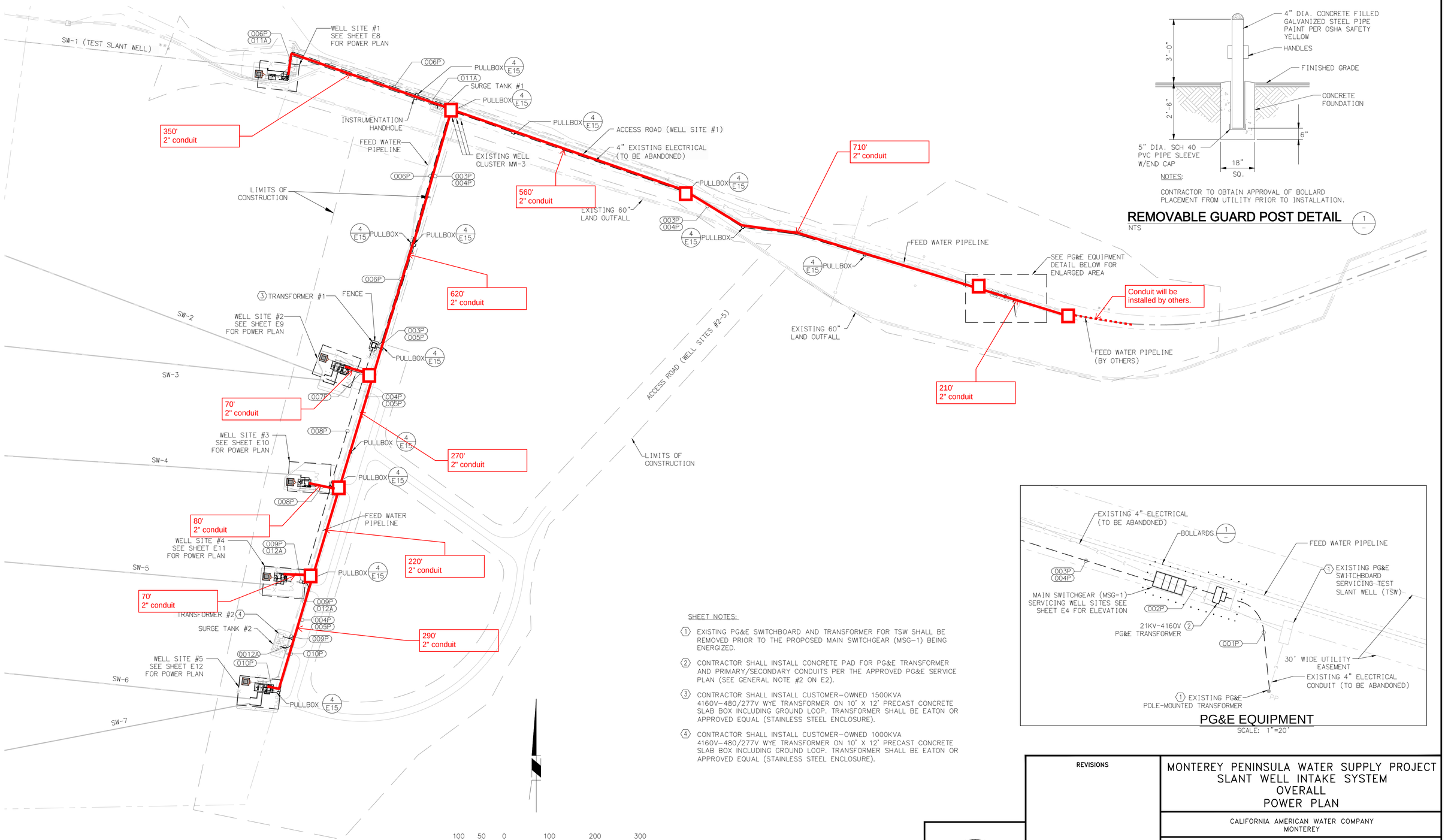
Exhibit C to Addendum No. 2

Revised Drawings



OVERALL POWER PLAN

REMOVABLE GUARD POST DETAIL 1/–
NTS

PG&E EQUIPMENT
SCALE: 1"=20'

SHEET NOTES:

1. EXISTING PG&E SWITCHBOARD AND TRANSFORMER FOR TSW SHALL BE REMOVED PRIOR TO THE PROPOSED MAIN SWITCHGEAR (MSG-1) BEING ENERGIZED.
2. CONTRACTOR SHALL INSTALL CONCRETE PAD FOR PG&E TRANSFORMER AND PRIMARY/SECONDARY CONDUITS PER THE APPROVED PG&E SERVICE PLAN (SEE GENERAL NOTE #2 ON E2).
3. CONTRACTOR SHALL INSTALL CUSTOMER-OWNED 1500KVA 4160V-480/277V WYE TRANSFORMER ON 10' X 12' PRECAST CONCRETE SLAB BOX INCLUDING GROUND LOOP. TRANSFORMER SHALL BE EATON OR APPROVED EQUAL (STAINLESS STEEL ENCLOSURE).
4. CONTRACTOR SHALL INSTALL CUSTOMER-OWNED 1000KVA 4160V-480/277V WYE TRANSFORMER ON 10' X 12' PRECAST CONCRETE SLAB BOX INCLUDING GROUND LOOP. TRANSFORMER SHALL BE EATON OR APPROVED EQUAL (STAINLESS STEEL ENCLOSURE).

Michael Baker INTERNATIONAL

REGISTERED PROFESSIONAL ENGINEER MARK PRZYWARA No. E 14537 Exp. 6/30/18 ELECTRICAL STATE OF CALIFORNIA

REVISIONS

MONTEREY PENINSULA WATER SUPPLY PROJECT
SLANT WELL INTAKE SYSTEM
OVERALL
POWER PLAN

CALIFORNIA AMERICAN WATER COMPANY
MONTEREY

MICHAEL BAKER INTERNATIONAL
9755 CLAIREMONT MESA BLVD
SAN DIEGO, CA 92124
858-614-5000

CALIFORNIA AMERICAN WATER

DRAWN BY
PROJECT ENG'R MAKROM SHATILA DATE 11/01/2018
APPROVED PROJECT MPWSP
USE DIMENSIONS ONLY
SCALE 1"=100'

USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES

36 E7

BID SET – NOT FOR CONSTRUCTION

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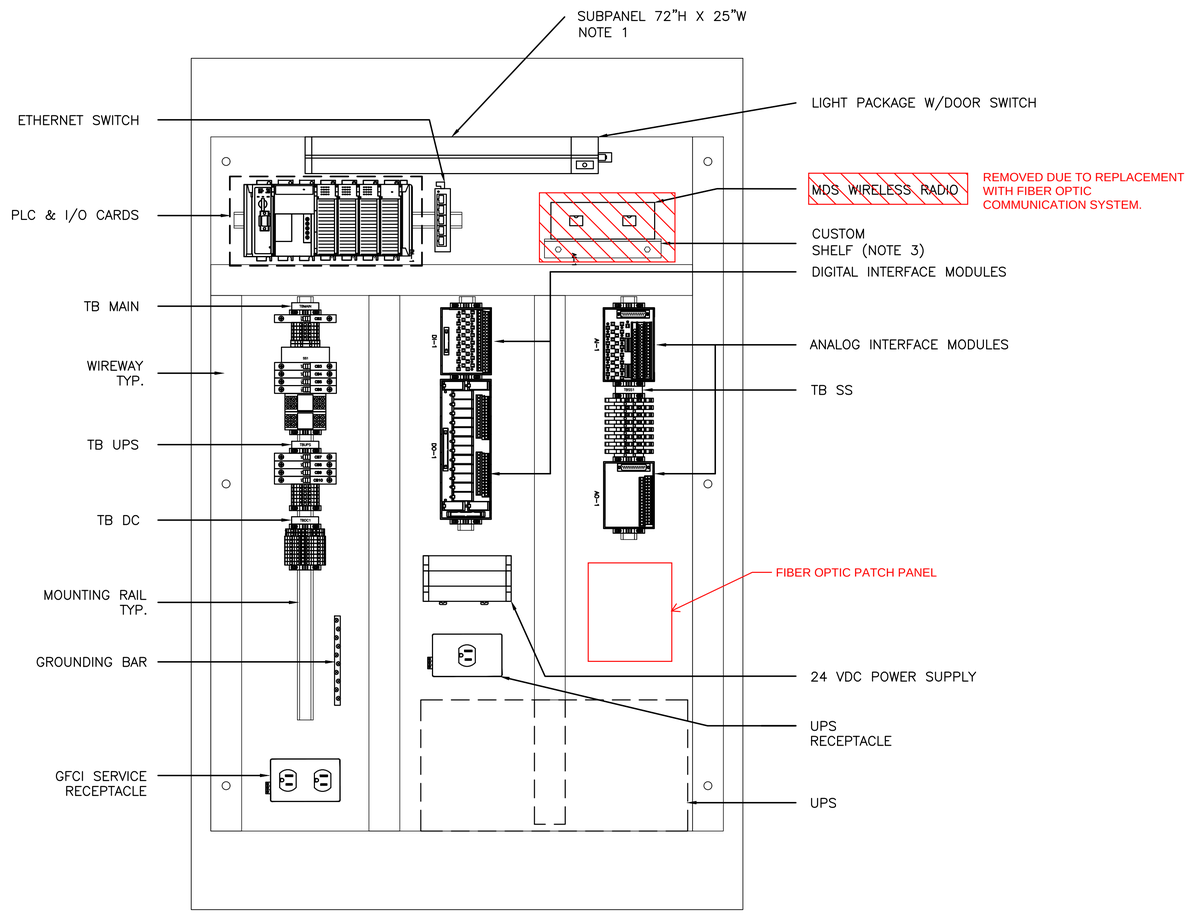

CONTROL PANEL BACKPAN
NOT TO SCALE

NOTES:

1. ENCLOSURE SUBPANEL. CUSTOM SIZE TO MOUNT IN CONTROL PANEL SECTION IN SIWTCHBOARD SUPPLIED AND INSTALLED BY CONTRACTOR. SEE SHEET E5 AND E6 FOR ADDITIONAL PANEL LAYOUT INFORMATION.
2. CONTRACTOR SHALL FURNISH AND INSTALL NEW INTRUSION SWITCH FOR CABINET INTRUSION. FURNISH AND INSTALL BRACKET FROM BACKPANEL TO DOOR LOCATION MOUNT SWITCH ON END OF BRACKET. DO NOT MOUNT SWITCH TO CABINET.
3. CONTRACTOR SHALL FURNISH AND INSTALL CUSTOM SHELF FOR RADIO(S) AS REQUIRED.
4. RADIO CONTRACTOR SHALL INSTALL POLYPHASE LIGHTING ARRESTORS.

Michael Baker INTERNATIONAL

REGISTERED PROFESSIONAL ENGINEER
SANDER PRZYWARA
No. E 14537
Exp. 6/30/18
ELECTRICAL
STATE OF CALIFORNIA

REVISIONS

MONTEREY PENINSULA WATER SUPPLY PROJECT
SLANT WELL INTAKE SYSTEM
CONTROL PANEL ELEVATION

CALIFORNIA AMERICAN WATER COMPANY
MONTEREY

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48 E19

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