

YUROK TRIBE PLANNING AND COMMUNITY DEVELOPMENT



PROJECT MANUAL

REQUEST FOR BIDS

YUROK KE-NEK WATER TREATMENT PLANT AND WATER MAIN

IHS Project CA 21-F05 - Ke-nek Water Treatment Plant and Water Main

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DOCUMENT 010 REQUEST FOR BIDS

YUROK TRIBE PLANNING AND COMMUNITY DEVELOPMENT

CA 21-F05 Yurok Ke-nek Water Treatment Plant and Water Main

I. INTRODUCTION

The Yurok Tribe Planning and Community Development Department is circulating this Request for Bids to solicit **Construction Bids** for **CA 21-F05 Yurok Ke-nek Water Treatment Plant and Water Main**. Bidder must have a current California Contractors License appropriate for the nature of work to be performed. Bidders (Licensed and Bonded in accordance with current California State Contractor's Law) shall have a Class A License. Any Contractor claiming Indian Preference shall complete and submit, with the bid, the form entitled "Application for Contractor/Business Certification" (included in the bidding package).

Federal Davis Bacon Wage Rates shall apply to CA IHS Project 21-F05. The Contractor can locate the current wage rates at the following web address: (<https://www.wdol.gov/dba.aspx>). The Contractor can locate the current version of the Department of Labor's WH-347 form and instructions for its completion at the following web address: (<https://www.dol.gov/whd/forms/wh347instr.htm>).

The Water Treatment Plant will be constructed in the community of Ke-nek on Tulley Creek Road (41.2198 N, 123.7729 W) in Humboldt County, California. All work must be completed in a manner compliant with all applicable Federal laws, State laws, Tribal laws and County building codes.

The range of bids for this work is estimated to be between **\$3,500,000 and \$5,500,000**

Contract time is **300 days** as specified in the Bid form.

II. PROJECT PROFILE

The Yurok Tribe has been awarded funding from the US Environmental Protection Agency through a Drinking Water Tribal Set Aside grant. The funding will be used by the Yurok Tribe to install 8,500 LF of water mains, 750 LF of water service lines, and approximately 2,000 LF of transmission main. Flow meters, hydrants, and assorted valving installation will accompany these water lines. In addition, a 60,000-gallon bolted steel water tank, a roughing filter, a slow sand filter building, a chemical treatment and monitoring building, and backup generator power for these facilities will be constructed.

A non-mandatory pre-bid meeting and walk through will be offered to all bidders, meeting outside of the Yurok Tribe Tulley Creek Fire Station, located at [41.220153°, -123.772560°], at **11am on Thursday, January 29th, 2026**.

III. AREA PROFILE

The site location for the contract is on Tulley Creek Road, serving the community buildings, the recent Alvarez development, and the McCoy community, located within Humboldt County, in Northwestern California. The site is a rural area with nearby electricity. The surface water system in place currently intakes water from both Owl Creek by impoundment and Tulley Creek by infiltration gallery. There is currently a

water treatment system and tank serving the McCoy community, and another water tank that serves the offices, fire department, and other community buildings with untreated water.

IV. SCOPE OF WORK

It is the intent of the Yurok Tribe to hire a licensed contractor, in good standing, who possesses a valid California General Contractor's License (Class A) to manage and construct the project.

i. Standard and Guidelines

- a. California Building Code (CBC), latest edition
- b. Humboldt County Building Codes, latest edition
- c. American Water Works Association Standards, latest edition
- d. National Electric Code, latest edition
- e. Uniform Plumbing Code (UPC), latest edition
- f. State of California Energy Codes, latest edition
- g. Federal Americans with Disabilities Act of 1990, Accessibility Guidelines for Building and Facilities (ADA) with multi-use functions.
- h. National Fire Code (NFC), latest edition
- i. Uniform Mechanical Code (UMC), latest edition
- j. National Sanitation Foundation, latest edition
- k. California Department of Water Well Standards, latest edition
- l. US Environmental Protection Agency Water Well Standards, latest edition
- m. State Water Resources Control Board Underground Storage Tank Regulations, Title 23, California Code of Regulations, Chapter 16, latest edition
- n. Yurok Tribe Tribal Employment Rights Ordinance (TERO)
- o. Yurok Tribe Water Quality Certification
- p. Other applicable building codes and regulations

ii. Construction Phase

- a. The Contractor shall obtain the following permits:
 - a) Yurok Tribe TERO permit – Justin Woods – 707-457-7637
 - b) Yurok Tribe Environmental Program water quality control permit – Joshua Cahill – 707-954-7519
- b. The Contractor will be responsible for complying with the Yurok Tribe Cultural Resources Management Permits and potential onsite monitoring requirements.
- c. The Contractor will be responsible for attending a Preconstruction Meeting with the Yurok Tribe, the Engineer, and any Sub-Contractor as the Contractor deems necessary. At the preconstruction meeting, the Contractor will be responsible for presenting all construction time tables, schedules and approval processes. The meeting shall also cover the project's method of communication, conflict resolution and discussion of the project's major obstacles or potential problems. All consultants, contractors and subcontractors shall be apprised of the Tribes TERO Ordinance and the TERO permitting process.
- d. The Contractor shall be responsible for preparation of a construction schedule and payment schedule for the entire project from start to finish.
- e. The Contractor shall schedule at least one monthly meeting with the Indian Health Service, Yurok Tribe's authorized representatives and any subcontractors or vendors necessary to complete the project in a timely manner. Additional informal meetings may be called if necessary to gather input, provide clarification, and resolve issues that may arise during construction of the work.

- f. The Contractor shall be responsible for the submission of Submittals to the Engineer for all materials used in the project.
- g. The Contractor shall be responsible for preparing the meeting minutes for the monthly meetings.
- h. Approved change orders must be submitted with monthly Request for Payments.

iii. BID REQUIREMENTS

- a. The Bid shall include the name of the firm submitting the Bid, its mailing address/telephone number, Contractor license number, state, and type, and the name of the individual to contact if further information is desired.
- b. The prospective contractor shall designate, by name, the project manager to be employed. The selected contractor shall not cause the substitution of the project manager without prior approval by the Yurok Tribe Planning and Community Development Department.
- c. The prospective contractor shall provide names, addresses, and telephone numbers for at least three clients for whom the prospective contractor has performed work similar to that proposed in this request. A brief abstract shall be provided for the reference projects.
- d. Provide a listing of all Native American projects and all similar construction projects within the past 2 years, including a list of references (with phone numbers and addresses) for each project.
- e. Provide a plan for maximum utilization of American Indian Workers as required in the TERO permit. Include a Narrative of TERO compliance experience on previous projects.
- f. If subcontractors are to be used, the prospective contractor must submit a description of each person or company, license number, and the work to be done by each subcontractor.
- g. The prospective contractor shall describe the qualifications of all subcontractors to be used on the project.
- h. The prospective contractor shall prepare a detailed budget (see Bid Schedule) for the work to be performed. The budget shall use line items to distinguish cost in the Schedule of Values.
- i. The prospective contractor shall disclose any and all relationships with clients, entities, agencies, or individuals bearing interests within the scope of the project, or who may benefit in any manner from the products of the project.
- j. The sealed Bid shall be transmitted with a cover letter that must be signed by an official authorized to bind the bidder contractually and shall contain a statement to the effect that the Bid is a firm offer for a 60-day period. The letter accompanying the technical Bid shall also provide the following: name, title, address, and telephone number of submitter.

V. BID REVIEW

Each Bid will be reviewed to determine if it meets the Bid packet requirements. Failure to meet the requirements for the Request for Bids may be cause for rejection of the Bid.

The Yurok Tribe Planning Department may reject any Bid if it is conditional, incomplete, or contains irregularities. The Yurok Tribe may waive an immaterial deviation in a Bid. Waiver of an immaterial deviation shall in no way modify the Request for Bids documents or excuse the bidder from full compliance with the contract requirements if the bidder is awarded the contract.

VI. INDIAN PREFERENCE

Indian preference in Contract Award and equal employment opportunities shall apply. All BIDDERS requesting Indian preference shall submit their request for Indian preference along with their Bid.

Qualified, responsible and responsive Indian bidders, who submit Bids that are within 5% of the lowest Bid, shall be given the opportunity to lower their Bid to below the lowest Bid amount and become the lowest bidder.

VII. BID EVALUATION CRITERIA

1. The award will be made to the lowest responsive, responsible BIDDER with due consideration for Indian Preference.
2. Bidder's qualification will be evaluated to determine:
 - a. The firm's qualification and reputation in general.
 - b. Valid California Contractor's License in Good Standing
 - c. Qualifications of staff.
 - d. The firm's experience in the type of work that the project requires.
 - e. Related experience of the proposed project manager and project team.
 - f. Past performance on related assignments.
 - g. Information obtained from references.
 - h. Other investigations, as deemed necessary, to determine the ability of the BIDDER to perform the work.
3. Indian Preference for the bidders who submit the required verification with their BID.

IIX. CONTRACT AWARD

A contract will be negotiated with the lowest responsive, responsible BIDDER with due consideration for Indian Preference. The Yurok Tribe Planning Department will award a contract at the Yurok Tribe office in Klamath, CA.

If a contract cannot be negotiated with the firm submitting the lowest responsive, responsible Bid, then staff shall commence negotiation with the firm submitting the second most responsive, responsible BID.

IX. BID SUBMITTALS AND CONDITIONS

Bids will be received by the Yurok Tribe, at the Yurok Tribal Office located at 190 Klamath Blvd., Klamath, CA, until **2:00 P.M. on Thursday, February 19th, 2026**, and then at said office opened publically immediately after time for receipt of Bids. The Owner will make the Bids public, and the Owner may provide a summary of the total Bid amounts after an Agreement has been executed with an acceptable bidder.

The following documents constitute a complete Bid and are required to be submitted to form a responsive Bid:

- a) Cover Letter – Refer to Section IV (iii)(j) of this document
- b) Bid Form
- c) List of Subcontractors
- d) Contractor's Questionnaire
- e) Non-Collusive Affidavit
- f) Application for Contractor/Business Certification (If Claimed)
- g) Bid Bonds (in the amount sum no less than five (5%) percent of Bid Price.

Each BID must be submitted in a sealed envelope, addressed to Mike Seracy, Planner, Yurok Tribe, P.O. Box 1027 (mailing address), 190 Klamath Blvd (physical address), Klamath, CA 95548. Bids must be received by **2:00 P.M. on Thursday, February 19th, 2026**. The sealed envelope containing the BID must

be plainly marked on the outside as BID for the **21-F05 Ke-nek Water Treatment Plant and Water Main**, and the envelope should also bear on the outside the name of the BIDDER, their address and license number.

The sealed envelope containing the BID together with the remaining required documents must be enclosed in another envelope addressed to Mike Searcy, Planner, Yurok Tribe at PO Box 1027 (mailing address), 190 Klamath Blvd (physical address), Klamath, CA 95548.

Bids received prior to the time of opening will be securely kept, unopened. The official who is to open the Bids will decide when the specified time has arrived, and no Bid received thereafter will be considered. No responsibility will attach to office personnel for the premature opening of a Bid not properly addressed and identified. Telegraphic Bids or modifications will not be considered.

Any BIDS may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. A conditional or unqualified BID will not be accepted.

BIDDERS shall have a current California Contractors License appropriate for the nature of work to be performed. Bonafide BIDDERS (Licensed and Bonded in accordance with current California State Contractor's Law) shall have a License Class A.

Federal Davis Bacon Wage Rates shall apply to CA IHS Project 21-F05. The Contractor can locate the current wage rates at the following web address: (<https://www.wdol.gov/dba.aspx>). The Contractor can locate the current version of the Department of Labor's WH-347 form and instructions for its completion at the following web address: (<https://www.dol.gov/whd/forms/wh347instr.htm>).

Indian preference in Contract Award and equal employment opportunities shall apply. All BIDDERS requesting Indian Preference shall submit their request for Indian preference to the Yurok TERO Office for approval. A TERO tax of 5% of the total gross amount of the contract shall be applicable in accordance with the TERO provisions of the Yurok Tribe.

Contact Justin Woods, (707) 457-7637 for questions on the Yurok TERO policy.

LATE SUBMITTALS

Bids received after this specified time will not be considered and may be returned to bidder unopened.

MODIFICATION OR WITHDRAWALS OF BIDS

Any Bid received to the date and time specified above for receipt of Bids may be withdrawn or modified by written request of the bidder. To be considered, however the modified Bid must be received by the date and time specified above.

PROPERTY RIGHTS

Bids received within the prescribed deadline become the property of the Yurok Tribe Planning Department and all rights to the contents therein become those of the Yurok Tribe Planning Department.

AMENDMENTS TO REQUEST FOR BID

The Yurok Tribe Planning Department reserves the right to amend the Request for Bids by addendum prior to the final date of Bid submission.

FUNDING

Funding for this project is provided through the Indian Health Service grant program.

NON-COMMITMENT OF THE YUROK TRIBE PLANNING DEPARTMENT

This Request for Bid does not commit the Yurok Tribe to award a contract, to pay any costs incurred in the preparation of a Bid to this request, or to procure or contract for services or supplies. The Yurok Tribe reserves the right to accept or reject any or all Bids received as a result of this request, to negotiate with any qualified firm, or to modify or cancel in part or its entirety the Request for Bids if it is in the best interest of the Yurok Tribe to do so.

TERO

The Yurok Tribe's Tribal Employment Rights Ordinance (TERO) shall apply. A copy of the TERO Indian Preference Plan has been included in Division 0-Bidding Requirements of the Project Manual. Any questions regarding the TERO ordinance should be forwarded to the Yurok Tribe's TERO officer:

Justin Woods, TERO Officer
Yurok Tribe
P.O. Box 1027 (mailing address)
190 Klamath Blvd. (physical address)
Klamath, CA 95548
Phone # (707) 457-7637

QUESTIONS

Questions regarding this Request for Bid will be received by telephone or in writing. Written questions should include the individual's name, the name of the firm, address, and telephone number. The Yurok Tribe Planning Department website contains electronic copies of the Project Manual, Addenda, Plan Set and related documents (<http://www.yuroktribe.org/departments/planning/RequestforProposal.htm>).

Project questions shall be directed to:

Mike Searcy, Planner
Yurok Tribe Planning Department
PO Box 1027 (mailing address)
190 Klamath Boulevard (physical address)
Klamath, CA 95548
Phone # (707) 382-1457
misearcy@yuroktribe.nsn.us

Technical questions shall be forwarded to the Engineer no less than seven (7) days before date set for receipt of Bids. Replies will be made by Addenda. Technical questions shall be directed to:

Maxwell Moore, EiT, Environmental Engineer
Indian Health Service
1125 16th Street Suite 100
Arcata, CA 95521
Phone # (707) 822-1688
max.moore@ihs.gov

DOCUMENT 040 BID FORM

To: Yurok Tribe

Project: CA 21-F05 Yurok Ke-nek Water Treatment Plant and Water Main

Bid of _____ (Company Name)

(hereinafter called "BIDDER"), organized and existing under the laws of the State of California, doing business as _____ (a corporation, a partnership, an individual, etc.) to the Yurok Tribe (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the completion of **CA 21-F05 - Yurok Ke-nek Water Treatment Plant and Water Main**.

The Yurok Tribe has been awarded funding from the US Environmental Protection Agency through a Drinking Water Tribal Set Aside grant. The funding will be used by the Yurok Tribe to install 8,500 LF of water mains, 750 LF of water service lines, and approximately 2000 LF of transmission main. Flow meters, hydrants, and assorted valving installation will accompany these water lines. In addition, a 60,000-gallon bolted steel water tank, a roughing filter, a slow sand filter building, a chemical treatment and monitoring building, and backup generator power for these facilities will be constructed.

All work shall be completed in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated in the BID SCHEDULE.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID, each party hereto certifies as to his organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE to PROCEED and to fully complete the PROJECT within three-hundred (300) consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$150.00 for each consecutive calendar day thereafter as provided in Section 34, Liquidated Damages, of the General Conditions.

BIDDER acknowledges of receipt of the following ADDENDUM(s):

NUMBER

DATE

#1: _____

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the unit prices or lump sum stated in the Bid Schedule. Bids are considered valid for 60 days from Bid closing date.

BID SCHEDULE

PROJECT DESCRIPTION

The following is a construction contract for completion of the specified work in the contract documents.

ITEM	ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL PRICE
1	Mobilization / Demobilization (NTE 10% of Total Bid)	LS	1		
	Section 01 27 00				
2	Hot Mix Asphalt	CY	220		
	Section 02 30 00				
3	Concrete	CY	169		
	Section 03 30 00				
4	Wood Frame Building - Water Treatment Building	LS	1		
	Section 06 10 00				
5	Metal Frame Building - Sand Filter Building	LS	1		
	Section 13 34 19				
6	5000 Gallon Poly Tank	LS	1		
	Section 22 11 00				
7	Roughing Filter	LS	1		
	Section 22 11 00				
8	Booster Pump	EA	2		
	Section 22 11 00				
9	Unistrut - 1-5/8"	LF	85		
	Section 22 11 00				
10	Magnetic Flow Meter (No Box)	EA	1		
	Section 01 11 90 / 22 11 00				
11	Magnetic Flow Meter and Box	EA	1		
	Section 01 11 90 / 22 11 00				
12	Pressure Gauge	EA	3		
	Section 01 11 90 / 22 11 00				
13	4" Conduit and Cable	LF	2055		
	Section 26 05 33				
14	2" Conduit and Cable	LF	7870		
	Section 26 05 33				
15	18kW Propane Generator	EA	1		
	Section 01 11 90 / 26 32 13				
16	Automatic Transfer Switch	EA	1		
	Section 01 11 90 / 26 32 13				
17	Retaining Wall	LS	1		
	Section 31 22 13				
18	Excavation and Grading	LS	1		
	Section 31 22 13				
19	Cultural Monitoring	LS	1		
	Section 31 23 17				
20	4' Manhole Drain Inlet	LS	1		
	Section 31 25 13				

21	Drain Dissipater	EA	2		
	<i>Section 01 11 90 / 31 37 00</i>				
22	Class 2 Aggregate Base	CY	535		
	<i>Section 32 11 23</i>				
23	Class 3 Aggregate Base	CY	2		
	<i>Section 01 11 90 / 32 11 23</i>				
24	Imported Fill	CY	975		
	<i>Section 01 11 90 / 32 11 23</i>				
25	10" Drain Line - PVC C900	LF	5		
	<i>Section 33 11 13</i>				
26	10" Drain Line - CPP	LF	335		
	<i>Section 33 11 13</i>				
27	6" Water Main - PVC C900	LF	4340		
	<i>Section 33 11 13</i>				
28	4" Water Main - PVC C900	LF	3620		
	<i>Section 33 11 13</i>				
29	3" Water Main - PVC SCH80	LF	370		
	<i>Section 33 11 13</i>				
30	2" Water Main - PVC SCH80	LF	428		
	<i>Section 33 11 13</i>				
31	1.5" Water Main - PVC SCH80	LF	260		
	<i>Section 33 11 13</i>				
32	3/4" Water Main - PVC SCH80	LF	25		
	<i>Section 33 11 13</i>				
33	6" Water Main - HDPE	LF	450		
	<i>Section 33 11 13</i>				
34	4" Water Main - HDPE	LF	155		
	<i>Section 33 11 13</i>				
35	4" Water Main - Ductile Iron Pipe	LF	45		
	<i>Section 33 11 13</i>				
36	1" Water Service Line - PE Pipe	LF	740		
	<i>Section 33 11 13</i>				
37	2" Transmission Main - PE Pipe	LF	1900		
	<i>Section 33 11 13</i>				
38	Connection at Intake	LS	1		
	<i>Section 33 11 13</i>				
39	Culvert Crossing	EA	7		
	<i>Section 33 11 13</i>				
40	6" Gate Valve (No Box)	EA	1		
	<i>Section 33 11 16</i>				
41	4" Gate Valve (No Box)	EA	2		
	<i>Section 33 11 16</i>				
42	6" Gate Valve and Riser	EA	20		
	<i>Section 33 11 16</i>				
43	4" Gate Valve and Riser	EA	14		

	<i>Section 33 11 16</i>				
44	3" Gate Valve and Riser	EA	1		
	<i>Section 33 11 16</i>				
45	2" Gate Valve and Riser	EA	1		
	<i>Section 33 11 16</i>				
46	1" Gate Valve and Riser	EA	1		
	<i>Section 33 11 16</i>				
47	6" Check Valve and Box	EA	1		
	<i>Section 33 11 16</i>				
48	4" Check Valve and Box	EA	2		
	<i>Section 33 11 16</i>				
49	3" Check Valve and Box	EA	1		
	<i>Section 33 11 16</i>				
50	2" Check Valve and Box	EA	1		
	<i>Section 33 11 16</i>				
51	2" PVC Check Valve (No Box)	EA	8		
	<i>Section 33 11 16</i>				
52	Flush Hydrant	EA	1		
	<i>Section 33 11 16</i>				
53	Altitude Valve and Box	LS	1		
	<i>Section 01 11 90 / 33 11 16</i>				
54	Combination Air Valve	EA	4		
	<i>Section 33 11 16</i>				
55	Air Release Valve	EA	1		
	<i>Section 33 11 16</i>				
56	Float Valve	EA	1		
	<i>Section 01 11 90 / 33 11 16</i>				
57	3" Pressure Reducing Valve and Box	EA	1		
	<i>Section 01 11 90 / 33 11 16</i>				
58	6" Pressure Reducing Valve and Box	EA	1		
	<i>Section 01 11 90 / 33 11 16</i>				
59	Residential Water Meter	EA	3		
	<i>Section 01 11 90 / 33 12 13</i>				
60	Residential Water Connection	EA	4		
	<i>Section 33 12 13</i>				
61	60,000 Gallon Bolted Steel Storage Tank	LS	1		
	<i>Section 33 16 20</i>				
62	Slow Sand Filter Media	LS	1		
	<i>Section 33 19 00</i>				
63	Slow Sand Filter Basins	LS	1		
	<i>Section 03 30 00</i>				
64	Slow Sand Filter Vault	LS	1		
	<i>Section 03 30 00</i>				
65	500-gallon Propane Tank and Foundation	LS	1		
	<i>Section 01 11 90 / 33 51 00</i>				

66	Water Monitoring Equipment, Pipe, Tubing, and Controls	LS	1		
	Section 44 10 15				
SUBTOTAL:					
	TERO Fee [2.0% of Subtotal]	LS	1		
Total of All Unit Price Bid Items				\$	

Respectfully Submitted:

Signature

Address

Title

Date

License No.

Expiration Date

DOCUMENT 041

BID FORM SUPPLEMENTS

To: Yurok Tribe

Project: CA 21-F05 Yurok Ke-nek Water Treatment Plant and Water Main

Date:

Submitted by:
(full name)

(full address)
.....

In accordance with Document 010 – Request For Bids and Bidder Information and Document 040 - Bid Form, we include the Appendices to Bid Form Supplements listed below. The information provided shall be considered an integral part of the Bid Form.

The following Appendices are attached to this document:

Appendix A - List of Subcontractors: Include names of all Subcontractors and portions of the Work each Subcontractor will perform.

BID FORM SUPPLEMENTS SIGNATURES

The Corporate Seal of

.....
(Bidder - print the full name of your firm)

was hereunto affixed in the presence of:

.....
(Authorized signing officer) (Title)

(Seal)

.....
(Authorized signing officer) (Title)

(Seal)

APPENDIX A - LIST OF SUBCONTRACTORS

Herewith is the list of subcontractors referenced in the bid submitted by:

(Bidder)

To (Owner) Yurok Tribe

Dated and which is an integral part of the Bid Form.

The following work will be performed (or provided) by subcontractors and coordinated by us:

Bidder will use Sub Contractors for the Work: Yes_____

If yes, provide in the spaces below (a) the name and the location of business of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specifically fabricates and installs a portion of the work or improvement according to the detailed drawings contained in the plans and specifications, in an amount in excess of $\frac{1}{2}$ of 1 percent of the prime contractors total bid, (b) the portion of the work which will be done by each subcontractor. The prime contractor shall List only one subcontractor for each portion as defined by the prime contractor in its bid.

	Subcontractor	
Portion of the Work Activity (e.g. electrical, mechanical, concrete)	Name AND License Number	Location (City, State)

END OF DOCUMENT

DOCUMENT 043 BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_____ as Principal, and

_____ as Surety, are hereby held and firmly bound unto the Yurok Tribe, as OWNER in the penal sum of _____ for payment of which, well and truly to be made, we hereby jointly and severely bind ourselves, successors and assigns.

Signed, this _____ day of _____, 2025.

The Condition of the above obligation is such that whereas the Principal has submitted to the Owners a certain bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for completion of Yurok Ke-Nek Water Treatment Plant and Water Main, to construct 8,500 LF of water mains, 750 LF of water service lines, and approximately 2,000 LF of transmission main. Flow meters, hydrants, and assorted valving installation will accompany these water lines. In addition, a 60,000-gallon bolted steel water tank, a roughing filter, a slow sand filter building, a chemical treatment and monitoring building, and backup generator power for these facilities will be constructed. Work will be completed in Humboldt County, California.

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the form attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation, shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal

By: _____ (Seal)

Surety

By: _____ (Seal)

IMPORTANT – Surety companies executing BONDS must be authorized to transact business in the state where the project is located.

DOCUMENT 044 - CONTRACTOR QUESTIONNAIRE

Name: _____

Employer Tax

Identification Number: _____

DBA: _____

Street Address: _____

City: _____ Telephone: _____

State License No.: _____ Type of License: _____

DUNS Number: _____ Email Address: _____

Bank References _____

List three most recent projects by name and address: _____

How long in business: _____ # Of Employees: _____

Are you an equal opportunity employer: _____

Are you eligible to perform federal government work: _____

Name and address of insurance carrier: _____

Conflict of Interest: Are you or any member of your family related to:

(1) Any employee of the Owner or member of the governing board of the Owner?

No: _____ Yes: _____

(2) If yes, please explain relationship: _____

Signature of License Holder

Signature of Company Representative
if different

Date

Date

DOCUMENT 045 - NON-COLLUSIVE AFFIDAVIT
FORM OF NON-COLLUSIVE AFFIDAVIT

AFFIDAVIT

State of _____

County of _____

_____, being first duly sworn, deposes and says:
(Print name)

That I am an owner, a partner or an officer of _____ the party making the foregoing proposal for bid, that such proposal or bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not, in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price submitted or of any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Owner or any person interested in the proposed contract, and that all statements in said proposal for bid are true.

Project Name _____

Location _____

Signature

(Signature should be notarized.)

Name and title

Date

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness,

State of _____

County of _____

Subscribed and sworn to (or affirmed) before me _____, Notary Public
(Name of Notary)

on this date _____ by _____
(Date the Signer personally appeared and signed the document) (Name of document signer (affiant))

Proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

WITNESS my hand and official Seal

Signature of Notary Public

(notary seal)

DOCUMENT 046 INDIAN ENTERPRISE QUALIFICATION STATEMENT

NOTE: Submit completed questionnaire to the Yurok Tribe Planning Department within the time frame specified. Use additional sheets to complete answer if needed.

The Undersigned certifies under oath the truth and correctness of all answers to questions made hereinafter:

1. Applicant wishes to qualify as:

An "Economic Enterprise" as defined in Section 3(e) of the Indian Financing Act of 1974 (P.L. 93-262); that is "any Indian-Owned...commercial, industrial or business activity established or organized for the purpose of profit: Provided, that such Indian Ownership shall constitute not less than 51 percent of the enterprise:

--or--

A "Tribal Organization" as defined in Section 4(c) of the Indian Self-Determination and Education Assistance Act (P.L. 93-638); that is: "the recognized governing body of any Indian Tribe; any legally established organization of Indians which is controlled, sanctioned or chartered by such governing body or which is democratically elected by the adult members of the Indian community to be served by such organization and which includes the maximum participation of Indians in all phases of its activities: Provided, that in any case where a contract is let or grant made to an organization to perform services benefiting more than one Indian Tribe, the approval of each such Indian Tribe shall be a prerequisite to the letting or making of such contract or grant..."

2. Name of Enterprise or Organization: _____

Address: _____

Telephone No.: _____

3. Check One:

____ Corporation

____ Joint Venture

____ Partnership

____ Other:

____ Sole Proprietorship

4. Answer the following:

If a Corporation:

- a. Date of Incorporation: _____
- b. State of Incorporation: _____
- c. Give the names and addresses of the officers of this Corporation and establish whether they are Indian (I) or Non-Indian (NI).

<u>Name and Social Security No.</u>	<u>I or NI</u>	<u>Title</u>	<u>Address</u>	<u>% of Stock Ownership</u>
_____	_____	<u>President</u>	_____	_____
_____	_____	<u>Vice-President</u>	_____	_____
_____	_____	<u>Secretary or Clerk</u>	_____	_____
_____	_____	<u>Treasurer</u>	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

- d. Complete the following information on all stockholders who are not listed in c. above, owning 0% or more of the stock. Establish whether they are Indian (I) or Non-Indian (NI).

<u>Name and Social Security No.</u>	<u>I or NI</u>	<u>Address</u>	<u>% of Stock Ownership</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

If a Sole Proprietorship or Partnership:

a. Date of Organization: _____

b. Give the following information on the individual or partners and establish whether they are Indian (I) or Non-Indian (NI).

<u>Name and Social Security No.</u>	<u>I or NI</u>	<u>Address</u>	<u>% of Stock Ownership</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

If a Joint Venture:

a. Date of Joint Venture Agreement: _____

b. Attach the information for each member of the joint venture prepared in the appropriate format given above.

5. Give the name, address, and telephone number of the principal spokesperson of your organization: _____

6. Has any officer or partner of your organization listed in #4 been an officer or partner of another organization that failed in the last ten years to complete a contract? _____

If yes, state circumstances:

7. Has this enterprise failed in the last ten years to complete any work awarded to it or to complete the work on time? _____

If so, note when, where and why:

8. Will any officer or partner listed in #4 be engaged in out-side employment?

_____ Yes

_____ No

If Yes, complete:

<u>Name/Title</u>	<u>Hours Per Week Outside the Enterprise</u>
_____	_____
_____	_____
_____	_____
_____	_____

9. Is the enterprise or anyone listed in #4 above, currently subject to an administrative sanction issued by any department or agency of the Federal Government?

_____ Yes

_____ No

If Yes, complete:

<u>Name of person/business</u>	<u>Date of Action</u>	<u>Type of Action</u>	<u>Department or Agency</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

10. Does this enterprise have any subsidiaries or affiliates or is it a subsidiary or affiliate of another concern?

_____ Yes

_____ No

If Yes, complete:

Name and address of subsidiary,
affiliate or other concern

Description
of Relationship

11. Does this enterprise or any person listed in #4 above have or intend to enter into any type of agreement with any other concern or person which relates to or affects the on-going administration, management or operations of this enterprise? These include but are not limited to management, and joint venture agreements and any arrangement or contract involving the provision of such compensated services as administrative assistance, data processing, management consulting of all types, marketing, purchasing, production and other types of compensated assistance.

_____ Yes

_____ No

If yes, attach a copy of any written agreement or an explanation of any oral or intended agreement.

12. Has this enterprise ever been subject to a judgment of any court or administrative sanction (Federal, State, or Tribal)?

_____ Yes

_____ No

Has any individual listed in #4 ever been subject to judgment of any court or administrative sanction (Federal, State, or Tribal)?

_____ Yes

_____ No

If the answer is Yes to either question, furnish details in a separate attachment.

13. Has any tax lien or other collection procedure been instituted against this enterprise or the individuals listed in #4 as a sole proprietor or partner in their capacities with this enterprise or other enterprise?

_____ Yes

_____ No

If yes, furnish details in a separate exhibit.

14. Has this enterprise or any person listed in #4 ever been involved in a bankruptcy or insolvency proceeding?

_____ Yes

_____ No

If yes, provide details in an attachment.

15. What dollar amount of Working Capital is available to your enterprise prior to the start of construction?

\$ _____

Explain the source of these funds: _____

Include a copy of the Company's most recent audited financial statement.

16. How will project development bookkeeping and payroll be maintained: (check one)

a. By contract with an outside professional accounting firm: _____

Name: _____

Address: _____

Telephone: _____

b. Records are to be kept by enterprise personnel: _____
If "b" has been checked-state the qualifications of your personnel to perform this function:

c. Other: _____

17. Trade References (include addresses and phone numbers):

18. Bank and credit references (including addresses and phone numbers):

19. Indicate the core crew employees in your work force, their job titles, and whether they are Indian or Non-Indian. Core crew is defined as an individual who is either a current bonafide employee or who is not a current employee but who is regularly employed in a supervisory or other key skilled position when work is available.

- b. Over the past three years, what has been the average number of employees:

20. Attach certification by a tribe or other evidence of enrollment in a federally recognized tribe for each officer, partner or individual designated as an Indian in #4.
21. Attach a certified copy of the charter, article of incorporation, by-laws, partnership agreement, joint venture agreement and/or other pertinent organizational documentation.
22. Explain in narrative form the stock ownership, structure, management, control, financing, and salary or profit sharing arrangements of the enterprise, if not covered in answers to specific questions heretofore. Attach copies of all shareholder agreements, including voting trust, employment contracts, agreements between owners and enterprise. Include information on salaries, fees, profit sharing, material purchases, and equipment lease or purchase arrangements.

Evidence relating to structure, management, control, and financing should be specifically included. Also, list the specific management responsibilities of each principal, sole proprietor, partner, or party to a joint venture (as appropriate) listed in response to #4.

23. Attach evidence that the enterprise (or an individual in it) is appropriately licensed for the type of work that is to be performed. Include Federal ID Number.
24. Attach a brief resume of the education, technical training, business, employment, design and/or construction experience for each officer, partner or sole proprietor listed in #4. Include references.

NOTES:

I. Omission of any information may be cause for this statement not receiving timely and complete consideration.

II. The persons signing below certify that all information in this INDIAN ENTERPRISE QUALIFICATION STATEMENT, including exhibits and attachments, is true and correct.

III. Print and type name below all signatures.

If applicant is Sole Proprietor, Sign Below:

_____	_____
Name	Date

If applicant is in a Partnership or Joint Venture, all Partners must sign below:

_____	_____
Name	Date

_____	_____
Name	Date

If applicant is a corporation, affix corporate seal

Corporate Seal

By: _____	_____
President's Signature	Date

Attested by: _____	_____
Corporate Secretary's Signature	Date

WARNING: U.S. Criminal Code, Section 1010, Title 18, U.S.C. provides in part: "Whoever...makes, passes, utters, or publishes any statement, knowing the same to be false...shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

Revised February 1998

Notice of Award

Dated _____

Project: Ke-nek Water Treatment Plant and Water Main	Owner: Yurok Tribe	Owner's Contract No.:
Contract: Ke-nek Water Treatment Plant and Water Main		Engineer's Project No.: CA 21-F05

Bidder:

Bidder's Address: (send Certified Mail, Return Receipt Requested)

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for:

Installing 8,500 LF of water mains, 750 LF of water service lines, and approximately 2000 LF of transmission main. Flow meters, hydrants, and assorted valving installation will accompany these water lines. Includes a 60,000-gallon bolted steel water tank, a roughing filter, a slow sand filter building, a chemical treatment and monitoring building, and backup generator power.

The Contract Price of your Contract _____
_____ Dollars (\$_____).

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.
_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within 10 days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract Bonds as specified in the Request For Bids and Bidder Information and General Conditions.
3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Owner
By: _____
Authorized Signature

Title

Copy to Engineer



NOTICE TO PROCEED

To: _____

Date: _____

Project:

Ke-nek Water Treatment Plant and Water Main - CA 21-F05

You are hereby notified to commence WORK in accordance with the Agreement dated _____, on or before _____, and you are to complete the WORK within _____ consecutive calendar days thereafter. The date of completion of all WORK is therefore _____.

Prior to commencing work, you shall obtain Certificates of Insurance acceptable to the OWNER and place them on file with the OWNER. In addition, you shall provide a TERO compliance plan and obtain a TERO permit as required in the attached TERO policy.

Within ten (10) days of this notice, you shall provide a Construction Progress Schedule to the Owner through the Contract Manager for approval.

Owner: Yurok Tribe

By: _____

Title: _____

Date: _____

DOCUMENT 061 PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address): **Yurok Tribe PO Box 1027 Klamath, CA 95548**

CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Bond Number:

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties,
if required.)

Attest:

Signature and Title

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title

(Attach Power of Attorney)

Attest:

Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.
2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.
3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
 - 3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
 - 3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and
 - 3.3. Owner has agreed to pay the Balance of the Contract Price to:
 1. Surety in accordance with the terms of the Contract;
 2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.
4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:
 - 4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
 - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
 - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:
 1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
 2. Deny liability in whole or in part and notify Owner citing reasons therefor.
5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.
6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:
 - 6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;
 - 6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and
 - 6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.
7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.
8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

DOCUMENT 062 PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address): **Yurok Tribe PO Box 1027 Klamath, CA 95546**

CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Bond Number:

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title

(Attach Power of Attorney)

Attest:

Signature and Title

SURETY

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title

(Attach Power of Attorney)

Attest:

Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
 - 2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
 - 4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2. Claimants who do not have a direct contract with Contractor:
 1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
 - 6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 6.2. Pay or arrange for payment of any undisputed amounts.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

- 15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
- 15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

DOCUMENT 063 Contractor's Application For Payment No. _____

	Application Period:	Application Date:
To (Owner): Yurok Tribe	From (Contractor):	Via (Engineer) Maxwell Moore
Project: Ke-nek Water Treatment Plant and Water Main	Contract: CA 21-F05 Ke-nek Water Treatment Plant and Water Main	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: CA 21-F05

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	\$	
2. Net change by Change Orders	\$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2).....	\$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	\$	
5. RETAINAGE:		
a. ____ % x \$ _____ Work Completed	\$	
b. ____ % x \$ _____ Stored Material	\$	
c. Total Retainage (Line 5a + Line 5b)	\$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c).....	\$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	\$	
8. AMOUNT DUE THIS APPLICATION	\$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	\$	

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:
-----	-------

Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is recommended by:	_____	_____
	(Engineer)	(Date)
Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is approved by:	_____	_____
	(Owner)	(Date)
Approved by:	_____	_____
	Funding Agency (if applicable)	(Date)

Progress Estimate

Contractor's Application

[illegible]

Stored Material Summary

Contractor's Application

For (contract): CA 21-F05 Ke-nek Water Treatment Plant and Water Main					Application Number:				
Application Period:					Application Date:				
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage (\$) (D + E - F)
			Date (Month/Year)	Amount (\$)	Amount (\$)	Subtotal	Date (Month/Year)	Amount (\$)	
		Totals							

Certificate of Substantial Completion

Project: Ke-nek Water Treatment Plant and Water Main	Owner: Yurok Tribe	Owner's Contract No.:
Contract: Ke-nek Water Treatment Plant and Water Main		Date of Contract:
Contractor:		Engineer's Project No.: CA 21-F05

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- ☐ All Work under the Contract Documents: ☐ The following specified portions:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- ☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer

Date

Accepted by Contractor

Date

Accepted by Owner

Date

DOCUMENT 070 - GENERAL CONDITIONS

1. DEFINITIONS

Contract - "Contract" means the entire agreement entered into between the Owner and the Contractor. It includes the Invitation for Bids, Instructions to Bidders, the form of Bid, the Bid Bond or Letter of Credit, the Performance and Payment Bond (or **other form of assurance of completion**), Non-Collusive Affidavit, Notice to Proceed, the form of Construction Contract, General Conditions of the Contract for Construction, any applicable Special Conditions, and specifications and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.

Contracting Officer - The person within the Owner organization authorized to administer the Contract for the Owner. This person need not be the person executing the Contract for the Owner. The Owner shall advise the Contractor as to the identity of the designated Contracting Officer, and may change such designation from time to time by notification to the Contractor.

Contract Price - The amount payable to the Contractor under the Contract.

Contract Work - The work to be performed under the Contract.

Drawings - The drawings enumerated in the schedule of drawings contained in the specifications and as described in the section clause entitled Specifications and Drawings for Construction.

Engineer – The individual or entity named as such in the Contract Documents.

IHS – Indian Health Service.

Indian-Owned Economic Enterprise - Any Indian-owned, commercial, industrial or business activity establishing or organized for the purpose of profit; provided that such Indian ownership shall constitute not less than 51 percent of the enterprise.

Owner - The Indian tribe which is a party to the Contract with the Contractor.

Project - The Project to be constructed in whole or in part under this Contract.

Specifications - The written technical requirements for construction, including the criteria and tests for determining whether the requirements are met.

Tribal Organization - The recognized governing body of any Indian tribe; any legally established organization of Indians which is controlled, sanctioned or chartered by such governing body or which is democratically elected by the adult members of the Indian community to be served by such organization and which includes the maximum participation of Indians in all phases of its activities.

2. PRE-CONSTRUCTION CONFERENCE AND NOTICE TO PROCEED

A. Within ten calendar days of contract execution, and prior to the Notice to Proceed of work, the Contractor shall attend a pre-construction conference with representatives of the Owner, its Engineer and other interested parties convened by the Owner. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The Owner will provide the Contractor with the date, time, and place of the conference.

B. The Contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice.

3. OBLIGATIONS OF CONTRACTOR

A. Except as otherwise specifically stated in the Contract, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, heat and power, transportation, superintendence, temporary construction of every nature, taxes legally payable because of Contract work, and all other services and facilities of every nature whatsoever necessary to perform the Contract work and deliver it complete in every respect within the specified time.

B. The Contractor shall supervise the work, and shall have a competent superintendent on the work at all times with full authority to act for the Contractor. The Contractor shall also provide a staff adequate to coordinate and expedite his work and that of his subcontractors to ensure compliance with Contract requirements.

C. The Contractor may authorize his superintendent or other individuals to sign for him and his name if the Contractor has filed with the Owner a notarized statement evidencing such authorization and authenticating the signature to be so honored.

D. The Contractor shall lay out the work and be responsible for all lines, levels, and measurements of all work executed under the Contract. He shall verify the figures before laying out the work and will be held responsible for any error resulting from his failure to do so.

E. Nothing in this Contract shall be construed to create or be relied upon to create any contractual relationship between the Contractor and the Indian Health Service.

F. The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save the Owner, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

G. The Contractor shall confine all operations (including storage of materials) on Owner's premises to areas authorized or approved by the Contracting Officer.

H. The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the Owner and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.

I. The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

4. OTHER CONTRACTS

The Owner may award other contracts for additional work, and the Contractor shall fully cooperate with such other contractors and carefully fit his own work to that provided under other contracts as may be directed by the Owner. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor. Where other contractors are employed for such additional work, it shall be the responsibility of the Owner, or designee, to coordinate the work of all such contractors unless otherwise expressly provided elsewhere in this Contract.

5. ASSIGNMENT OF CONTRACT

The Contractor's obligations and duties under this Contract shall not be assigned in whole or in part by the Contractor without the written approval of the Owner, but this shall not prohibit the assignment of the proceeds due hereunder to a bank or financial institution,

nor shall this provision preclude the Contractor from subcontracting, in accordance with this Contract, parts of the work in accordance with the general practice of the building industry. No assignment shall be made except to an entity authorized to accept such assignment.

6. CONSTRUCTION PROGRESS SCHEDULE

A. The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring labor, materials, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments or take other remedies under the contract until the Contractor submits the required schedule.

B. The Contractor shall enter the actual progress on the chart as required by the Contracting Officer, and within seven (7) days deliver three copies of the annotated schedule to the Contracting Officer. If the Contracting Officer determines, upon the basis of inspection conducted pursuant to the clause entitled Inspection and Acceptance of Construction, herein that the Contractor is not meeting the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Owner. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

C. Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the Default clause of this contract.

7. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

A. The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads, (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials, or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Owner.

B. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Owner. Nor does the Owner assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

8. DIFFERING SITE CONDITIONS

A. The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

B. The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the Owner within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery

schedule, or both shall be made under this clause and the contract modified in writing accordingly.

C. No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (A) above for giving written notice may be extended by the Contracting Officer.

D. No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

9. SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION

A. The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

B. Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

C. Where "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place", that is "furnished and installed".

D. "Shop drawings" means drawings, submitted to the Owner by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the

work required by the contract. The Owner may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

E. If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with order requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Owner's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (F) below.

F. If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Engineer approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

G. It shall be the responsibility of the Contractor to make timely requests of the Owner for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be required in the planning and production of the work. Such requests may be submitted as the need arises, but each such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

H. The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Owner and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.

I. This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

10. AS-BUILT DRAWINGS

A. "As-built drawings," as used in this clause, means drawings submitted by the Contractor or subcontractor at any tier to show the construction of a particular structure or work as actually completed under the contract. "As-built drawings" shall be synonymous with "record drawings."

B. As required by the Contracting Officer, the Contractor shall provide the Contracting Officer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final location of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.

C. This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by subcontractors are submitted to the Contracting Officer.

11. MATERIAL AND WORKMANSHIP

A. All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. Reference in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

B. The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

C. The Contractor shall comply with the prohibition against the use of lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

12. SAMPLES, CERTIFICATES AND TESTS

A. When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.

B. Certificates shall be submitted in triplicate, describing each sample submitted for approval, and certifying that the material, equipment, or accessory complies with Contract requirements. They shall include the name and brand of the product, name of manufacturer, and the location where produced.

C. Approval of any material, equipment, or accessory by the owner shall not constitute a waiver of the Owner's right to demand full compliance with Contract requirements. Materials, equipment, and accessories may be rejected by the Owner for cause even though such articles have been given approval.

D. Wherever materials are required to comply with recognized standards for Federal Specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other Contract requirement". The Owner may require laboratory test reports on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use, only as frequently as the Owner considers necessary to ensure compliance of materials.

E. Except as otherwise specifically stated in the Contract, the costs of testing will be divided as follows:

(1) the Contractor will furnish without extra cost, including packing and delivery charges, all samples required for testing purposes;

(2) the Contractor will assume all costs of re-testing materials which fail to meet Contract requirements;

(3) the Contractor will assume all costs of testing materials offered in substitution for those found deficient; and

(4) the Owner will pay all other expenses.

F. After approval, samples will be kept in the Contractor's project office until completion of work. Materials representing approved samples may be built into the work as approved by the Owner or the Owner's designee.

13. COMPLIANCE WITH APPLICABLE LAW

A. The Contractor shall give all notices and comply with all applicable Federal, state, Tribal and local laws (including ordinances, codes, rules, and regulations, and waivers). The intent of this provision is that the Contractor shall base his bid upon the drawings and specifications, but that all work installed shall comply with applicable laws and waivers. Before performing the Contract Work, the Contractor shall examine the drawings and the specifications for compliance with the applicable laws and waivers, and shall immediately report any noncompliance to the Owner/Owner's designee when the requirements of the drawings and specifications do not comply with such applicable law, unless waivers have been obtained.

B. The Contractor shall secure and pay for all permits, fees , and licenses including TERO, necessary for the proper execution and completion of the work. Where the Owner can arrange for the issuance of all or any of these permits, fees, and licenses without cost to the Contractor, the Contract Price shall be reduced accordingly.

14. REQUESTS FOR SUPPLEMENTARY INFORMATION

It shall be the responsibility of the Contractor to make timely requests of the Owner for such large scale and full size drawings, color schemes, and other additional information, not already in the Contractors possession, which the Contractor will require in the planning and production of the work. Such requests may be submitted from time to time as the need is approached, but each such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

15. HEALTH, SAFETY, AND ACCIDENT PREVENTION

A. In performing this contract, the Contractor shall:

1. Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety;
2. Protect the lives, health, and safety of other persons;
3. Prevent damage to property, materials, supplies, and equipment; and,

4. Avoid work interruptions.

B. For these purposes, the Contractor shall:

1. Provide appropriate safety barricades, signs, and signal lights;
2. Furnish, install, and maintain ample sanitary facilities for the workers. These facilities shall be sufficient to meet the project needs and be located to the satisfaction of the Contracting Officer. All such facilities and services shall be furnished in strict accordance with governing health regulations; and,
3. Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.

C. The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. The Contractor shall report this data in the manner prescribed by the Contracting Officer.

D. The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.

E. The Contractor shall be responsible for its subcontractors compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as the Owner, or the Secretary of Labor shall direct as a means of enforcing such provisions.

16. PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS

A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.

B. The Contractor shall only remove trees when specifically authorized to do so,

and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

C. The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground on the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.

D. The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.

E. Any new equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

F. New work which connects to existing work shall correspond in all respects with that to which it connects unless otherwise required by the specifications.

G. No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.

H. If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.

I. The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.

J. The Contractor shall indemnify and save harmless the Owner from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which the owner may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

K. The Contractor shall repair any damage to vegetation, structure, equipment, utilities, or improvements, including those that are the property of third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

17. TEMPORARY HEATING

The Contractor shall provide and pay for temporary heating, covering and enclosures necessary to protect properly all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the Owner in the condition, and at the time, required by the Specifications.

18. AVAILABILITY AND USE OF UTILITY SERVICES

A. The Owner shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Owner or, where the utility is produced by the Owner, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

B. The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Owner, the Contractor shall remove all the temporary connections, distribution lines, meters and associated paraphernalia.

19. TEMPORARY BUILDINGS AND TRANSPORTATION OF MATERIALS

A. Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Owner. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

B. The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, state, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

20. INSPECTION AND ACCEPTANCE OF CONSTRUCTION

A. As used in this clause:

1. "Acceptance" means the act by which the Contracting Officer assumes ownership of the work performed under this contract. Acceptance may be partial or complete.
2. "Inspection" means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.
3. "Testing" means that element of inspection that determines the properties or elements, including functional operation, materials, equipment, or their components, by the application and established scientific principles and procedures.

B. The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to Owner inspection and testing at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract. However, all instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer only and not by anyone else.

C. Owner inspections and tests are for the sole benefit of the Owner and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of the Owner after acceptance of the completed work under paragraph (J) below.

D. The presence or absence of the Owner's inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization.

E. The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Owner may charge to the

Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes re-inspection or retest necessary. The Owner shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

F. The Owner may conduct routine inspections of the construction site on a daily basis.

G. The Contractor shall, without charge, replace or correct work found by the Owner not to conform to contract requirements, unless the Owner decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The contractor shall promptly segregate and remove rejected material from the premises.

H. If the Contractor does not promptly replace or correct rejected work, the Owner may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.

I. If any work requiring inspection is covered up without approval of the Owner, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. Further, if at any time before final acceptance of the entire work, the Owner considers it necessary or advisable to make an examination of work already covered or completed, the Contractor shall on request promptly furnish all necessary facilities, labor, and material to uncover the work for such examination and for satisfactory reconstruction after the examination. If such work is found to be defective or non-conforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

J. The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Engineer determines that the state of preparedness is as represented, the Owner will promptly arrange for the inspection. Unless otherwise specified in the contract, the Owner shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Owner's right under any warranty or guarantee.

21. WARRANTY OF TITLE

The Contractor warrants good title to all materials, supplies, and equipment

incorporated in the work, and agrees to deliver the premises and all improvements free from any claim, lien, security interests, or charges, and agrees further that neither he nor any other person, firm, or corporation shall have any right to a lien or security interest upon the premises or improvements.

22. WARRANTY OF CONSTRUCTION

A. In addition to any other warranties in this Contract, the Contractor warrants, except as provided in paragraph (J) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of (one year unless otherwise indicated) from the date of final acceptance of the work. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the Owner takes possession.

B. The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to Owner-owned or controlled real or personal property when the damage is the result of:

1. The Contractor's failure to conform to contract requirements; or
2. Any defects of equipment, material, workmanship or design furnished by the Contractor.

C. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.

D. The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

E. If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Owner shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.

F. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and material furnished under this contract, the Contractor shall:

1. Obtain all warranties that would be given in normal commercial practice;
2. Require all warranties to be executed in writing, for the benefit of the Owner, and
3. Enforce all warranties for the benefit of the Owner.

G. In the event the Contractor's warranty under paragraph (A) of the clause has expired, the Owner may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

H. Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defect of material or design furnished by the Owner nor for the repair of any damage that results from any defect in Owner furnished material or design.

I. Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (A) and (C) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the work.

J. This warranty shall not limit the Owner's rights under the Inspection and Acceptance of Construction section of this contract with respect to latent defects, gross mistakes or fraud.

23. CONTRACT PERIOD

The Contractor shall complete all work required under this Contract within the specified time in the Bid form., or within the time schedule established in the notice to proceed issued by the Contracting Officer, whichever is shorter.

24. CONFLICT OF LAWS

In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail unless otherwise specified in the Special Conditions. In the event of a conflict between the Contract and any applicable Tribal, state or local law, the Tribal, state or local law shall prevail; provided, that such Tribal, state or local law does not conflict with, or is less restrictive than, applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

25. SUBCONTRACTS

A. As used in this provision and throughout the Contract:

1. "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor

to furnish supplies, materials, equipment, and services for the performance of the prime contractor a subcontractor.

2. "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.

B. The Contractor shall not enter into any subcontract with any subcontractor who is presently denied participation in a Federal program or who is presently suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this Contract is to be performed.

C. The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.

D. The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this Contract insofar as they are applicable to the work of subcontractors.

E. Nothing contained in this Contract shall create any contractual relationship between any subcontractor and the Owner or between the subcontractor and the Indian Health Service.

26. PAYMENTS

A. The Owner shall pay the Contractor the price as provided in this contract.

B. The Owner shall make progress payments approximately every 30 days as the work proceeds based on estimates of work accomplished which meets the standards of quality established under the Contract, as approved by the Contracting Officer. The Owner may, subject to written determination and approval of the Contracting Officer, make more frequent payments to the contractors which are qualified small businesses.

C. Before the first progress payment under this Contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total Contract Price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a basis for determining progress payments. The breakdown shall be approved by the Contracting Officer. If the Contract covers more than one project, the Contractor shall furnish a separate breakdown for each. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the Contract.

D. The Contractor shall submit, on forms approved by the Owner, periodic estimates showing the value of the work performed during each period based upon the approved breakdown of the contract price. Such estimates shall be submitted not later than 7 days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Engineer prior to payment. If the Contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.

E. Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made:

I hereby certify, to the best of my knowledge and belief, that:

1. The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the Contract;
2. Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
3. This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

(Name) _____

(Date)

(Title) _____

F. Except as otherwise provided under applicable laws, the Owner shall retain ten (10) percent of the amount of progress payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Engineer, determines that the Contractor's performance and progress are satisfactory, the Owner may reduce the retainage to five (5) percent of the amount of progress payments until completion and acceptance of all work under the contract. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, the Owner shall reinstate the ten (10) percent (or other percentage as provided in local law) retainage until such time as the Contracting Officer determines that performance and progress are satisfactory.

G. The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments. Material

delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of the Owner's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the Owner.

H. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Owner, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the Owner to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the Owner in the course of their employment, the Contractor shall restore such damaged work without cost to the Owner and to seek redress for its damage only from those who directly caused it.

I. The Owner shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the Owner arising by virtue of this Contract, other than claims, in stated amounts that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this Contract has been assigned.

J. Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.

K. The Owner shall not (1) determine or adjust any claims for payment or disputes arising thereunder between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the Owner to withhold moneys from the Contractor shall in no way impair the obligations of any surety or sureties under any bonds furnished under this Contract.

27. CONTRACT MODIFICATIONS

A. Only the Contracting Officer has authority to modify any term or condition of this Contract. Any contract modification shall be authorized in writing.

B. The Contracting Officer may modify the contract unilaterally: (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or responsibilities of the parties (e.g., change in the Owner's address). All other contract modifications shall be in the form of supplemental agreements (i.e., change orders) signed by the Contractor, Engineer, and the Contracting Officer.

28. CHANGES

A. The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:

1. In the specifications (including drawings and designs);
2. In the method or manner of performance of the work;
3. Owner-furnished facilities, equipment, materials, services, or site; or,
4. Directing the acceleration in the performance of the work.

B. Any other written order or oral order (which, as used in this paragraph (B), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.

C. Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

D. If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no proposal for any change under paragraph (B) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the Owner is responsible, the equitable adjustment shall include any increased cost

reasonably incurred by the Contractor in attempting to comply with the defective specifications.

E. The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (A) of this clause, or (2) the furnishing of a written notice under paragraph (B) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (B) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

F. The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with the itemized breakdown of all increases and decreases in the contract with at least the following details:

1. Direct Costs. Materials (list individual items, the quality and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours and unit costs (identified with specific work to be performed); Construction equipment exclusively necessary for the change; Costs of preparation and/or revision to shop drawings resulting from the change; Worker Compensation and Public Liability Insurance; Employment taxes under FICA and FUTA and, Bond Costs-when size of change warrants revision.

2. Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.

G. The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.

H. The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.

I. Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.

J. Except in an emergency-endangering life or property, no change shall be made by the Contractor without a prior order from the Contracting Officer.

29. SUSPENSION OF WORK

A. The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Owner.

B. If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

C. A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

30. DISPUTES

A. "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

B. Except for disputes arising under the Section 41 of the Contract, entitled Disputes Concerning Labor, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved in accordance with this clause.

C. All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the Owner against the Contractor shall be subject to a written decision by the Contracting Officer.

D. The Contracting Officer shall, within 60 days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.

E. The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in the Owner in accordance with the Owner's policy and procedures, or (2) in accordance with the procedures set forth below, refers the appeal to an independent mediator, and if mediation fails, then the appeal may be referred to binding arbitration, or (3) files suit in a court of competent jurisdiction. Prior to filing suit, a party to the Contract must have attempted in good faith to resolve the dispute by exercise of one or more of the other remedies set forth above.

F. Appeals as referenced in this Disputes section must be made within 30 days after receipt of the Contracting Officer's decision. Further, the remedies contained in this Disputes section shall be cumulative. Except as expressly stated herein, the exercise of any one of the remedies outlined above shall not preclude the exercise of any of the other remedies outlined above.

G. The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

31. DISPUTE RESOLUTION

A. Parties agree that in the event any disputes arising from or out of this Agreement occur, Parties shall first attempt to settle the dispute through a meet and confer process. If the meet and confer does not resolve said dispute the PARTIES hereby agree to settle such disputes through mediation to be conducted by Del Norte Mediation Services or such other mediator(s) the PARTIES may agree upon. The mediator deciding the dispute shall be bound and limited by this paragraph and no court may enforce any award against either party that goes beyond the scope of this paragraph or the limitation on damages set forth in this paragraph. The arbitrator or arbitrators shall only award and the courts shall only enforce against PARTIES orders for specific performance and shall not award or enforce punitive, exemplary, speculative or other types of damages. Each party acknowledges its respective obligation to take reasonable steps to mitigate damages. Except for the limited waiver set forth herein, the TRIBE does not consent to any action brought in any court arising out of or related to this Contract.

32. INDEPENDENT MEDIATION

The Owner or Contractor may initiate independent mediation by filing a written request for such mediation with the American Arbitration Association (AAA). Subject to mutual consent by the Owner and the Contractor, any claim, controversy, or dispute arising out of or related to the Contract may be settled by independent mediation in accordance with the current Construction Industry Mediation Rules of the AAA. Prior to submitting a matter to arbitration, a party to the Contract must refer the claim, controversy, or dispute to an independent mediator for resolution.

33. ARBITRATION

A. Matters submitted to Arbitration. Any claim, controversy, or dispute arising out of or related to the Contract may be settled by arbitration in accordance with the following procedures, and judgment upon the award rendered by the arbitrators may be entered in any court having jurisdiction thereof.

B. Procedure.

1. Upon failure to obtain a satisfactory resolution to a claim, controversy, or dispute through independent mediation, either party may demand such arbitration in writing, which demand shall include the name and address of the arbitrator appointed by the party demanding arbitration, together with a statement of the matter of controversy.

2. Within 20 days after such demand, the other party shall designate its arbitrator in writing by name and address, or in default of such designation, such arbitrator shall be designated by the American Arbitration Association. The two arbitrators so selected shall name a third arbitrator within 20 days after the second arbitrator is designated. In the event that no agreement on a third arbitrator is reached by the two arbitrators, the appointment shall be made by the American Arbitration Association. Questions regarding hearing procedures and introduction of evidence shall be decided by the third arbitrator.

3. The arbitration costs and expenses of such party (e.g. witness expenses and attorney fees) shall be borne by that party, and all arbitrators' fees and other expenses shall be borne equally by both parties.

4. The arbitration hearing shall be held at such time and place as designated by the arbitrators on at least 20 days written notice to the parties. The arbitration hearing shall not commence, however, until the project has reached the date of substantial completion as determined by the Owner. In exceptional circumstances, the arbitration hearing may be held prior to the date of substantial completion for the project. The arbitration hearing shall be held either in the county in which the Indian tribe is located or in the county in which the project site is located.

5. An award rendered by a majority of the arbitrators appointed pursuant to this agreement shall be final and binding on all parties to the proceeding, and the parties hereto agree to be bound by such award. If a party after being notified fails to appear or participate in arbitration proceedings, or fails to produce evidence demanded by the arbitrators, the arbitrators are authorized to make their award based on the evidence produced at the hearings by the party who does participate. No award shall be enforceable for a monetary amount in excess of the total contract amount . It is expressly understood and agreed by the parties that IHS is neither a party to this Contract nor is IHS a party to any arbitration arising out of the Contract.

6. As to any procedures regarding the conduct of the arbitration that are not specified either in this Contract or in, another written agreement signed in advance of the hearing, the parties shall follow the current Construction Industry Arbitration Rules of the American Arbitration Association.

7. The award may be enforced by having a judgment entered in accordance with applicable law in any court having jurisdiction.

C. Survival of the Arbitration Agreement. The arbitration provision of this Contract shall, with respect to such controversy or dispute, survive the termination or expiration of this contract.

D. Statute of Limitations. A demand for arbitration shall be made within a reasonable time after the claim, dispute or other matter in question has arisen. In no event shall the demand for arbitration be made after the date when the initiation of legal or equitable proceedings based on such claim would be barred by the applicable statute of limitations.

E. Lack of Arbitrator's Authority to Modify Contract.

Nothing contained in this Contract shall be deemed to give the arbitrators any authority, power, or right to alter, change, amend, modify, add to, or subtract from any of the provisions of this Contract.

F. Federal Responsibilities. Nothing herein shall prohibit any agency of the Federal Government from discharging its administrative and contractual duties to the Owner.

34. DEFAULT

A. If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this Contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to proceed with the

work (or separable part of the work) that has been delayed. In this event, the Owner may take over the work and complete it, by contract or otherwise, and may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Owner resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Owner in completing the work.

B. The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if:

1. The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of the Owner or other governmental entity in either its sovereign or contractual capacity, (iii) acts of another contractor in the performance of a contract with the Owner, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors for supplies at any tier arising from unforeseeable causes beyond the control and with the fault or negligence of both the Contractor and the subcontractors or supplies; and

2. The Contractor, within 10 days from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes section of this contract.

C. If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for the convenience of the Owner.

35. LIQUIDATED DAMAGES

A. If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor shall pay to the Owner as liquidated damages, the sum as specified in the Bid form for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in the contract, liquidated damages shall not be due the Owner. The Contractor remains liable for damages caused other than by delay.

B. If the Owner terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Owner in completing the work.

C. If the Owner does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

36. TERMINATION FOR CONVENIENCE

A. The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of the Owner. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.

B. If the performance of the work is terminated, either in whole or in part, the Owner shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt of the Owner of a properly presented claim

setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by the Owner to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until the Owner or assignee takes possession thereof or assumes responsibility therefor; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to the Owner; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.

C. The Contracting Officer will act on the Contractor's claim within 60 days of receipt of the Contractor's claim.

D. Any disputes with regard to this section are expressly made subject to the provisions of the Disputes section of this contract.

37. INSURANCE

A. Before commencing work, the Contractor and each subcontractor shall furnish the Owner with certificates of insurance showing the following insurance is in force and will insure all operations under the Contract:

1. Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.

2. Commercial General Liability with a combined single limit for bodily injury and property damage of not less than \$1,000,000.00 per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims-made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

3. Automobile Liability on owned and non-owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than \$1,000,000.00 per occurrence.

B. All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non-renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

38. ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss resulting from use of a particular design or process or the product of a particular manufacturer or manufacturers specified in the Contract, but if the Contractor has reason to believe that the design or process or product specified is an infringement of a patent, the Contractor shall be responsible for such loss unless he promptly gives such information to the Owner.

39. COMPLIANCE WITH COPELAND REGULATIONS (29 CFR Part 3)

A. All mechanics and laborers employed in the development of the Project will be paid unconditionally and not less often than once a week, and without subsequent deduction rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act, 40 U.S.C. 276c, 29 CFR Part 3), the full amounts due at time of payment. For the purpose of this clause, regular contributions made or costs incurred for more than a weekly period under plans, funds, or

programs, but covering the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

B. The Contractor shall comply with the Copeland Regulations (29 CFR Part 3) of the Secretary of Labor which are herein incorporated by reference.

40. PAYROLLS AND RELATED REPORTS

A. When Davis Bacon Wage Rates requirements apply, payrolls and basic records relating thereto shall be maintained during the course of the work and preserved by the Contractor and all subcontractors for a period of three years thereafter for all laborers and mechanics employed in the development of the Project. Such records shall contain the name and address of each such employee, and the employee's correct classification, rates of pay, daily and weekly number of hours worked, deductions made and actual wages paid.

B. A submission of a "Weekly Statement of Compliance" is required under this Contract and the Copeland Regulations of the Secretary of Labor (29 CFR Part 3).

C. The Contractor shall also furnish to the Owner any other information or certifications relating to employees in such forms as the Owner may request.

41. TERMINATION BECAUSE OF VIOLATION OF LABOR PROVISIONS

Contractor's breach of Section 38 or 42 may be grounds for termination of this Contract and for debarment as provided in 24 CFR Part 24.

42. DISPUTES CONCERNING LABOR

All questions arising under this Contract for any subcontract relating to the application or interpretation of the Copeland Act shall be referred by the Owner to the Federal funding agency for decision or, at the option of the agency, referral to the Secretary of Labor. The ruling or interpretation by the agency or the Secretary of Labor, as the case may be, shall be final.

43. INSERTION OF LABOR PROVISIONS IN SUBCONTRACTS

The Contractor shall insert in any subcontracts the provisions (appropriately modified) of Section 38 and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts they may enter into, together with a clause requiring this insertion in any further subcontract that may in turn be made.

44. INDIAN PREFERENCE

This Contract is subject to the following Indian Preference requirements pursuant to 24 CFR 953.510.

A. The work to be performed under this Contract is on a project subject to Section 7(b) of the Indian Self Determination and Education Assistance Act (25 U.S.C. 450c(b) (Indian Act). Section 7(b) requires that to the greatest extent feasible (1) preferences and opportunities for training and employment shall be given to Indians and (2) preferences in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned economic enterprises.

B. The parties of this contract shall comply with the provisions of Section 7(b) of the Indian Act.

C. In connection with this Contract, the Contractor shall, to the greatest extent feasible, give preference in the award of any subcontracts to Indian organizations and Indian-owned economic enterprises, and preferences and opportunities for training and employment to Indians and Alaskan Natives.

D. The Contractor shall include this Section 7(b) clause in every subcontract in connection with the project, and shall, at the direction of the Owner, take appropriate action pursuant to the subcontract upon a finding by the Owner or Indian Health Service that the subcontractor has violated the Section 7(b) clause of the Indian Act.

45. INDIAN PREFERENCE IN HIRING

A. The Contractor and each of his subcontractors shall give preference in all hiring to Indians as required by the Indian Preference section of this Contract.

B. Upon initial hiring and whenever a job opening occurs thereafter, the Contractor and each subcontractor shall give written notice of such opening to the Owner stating the time when, and the local place where, job applications will be accepted. Except in cases of an emergency, no one other than an Indian shall be hired for any job until 48 hours (not counting Sundays and holidays) following the notice to the Owner.

C. The Contractor shall have the right to reject any job applications for a valid reason, or to terminate the employment of any Indian for appropriate reasons, but in either event, the Contractor shall, within three days, send a written statement of the reasons for such action to the Owner.

46. EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this Contract, the Contractor agrees as follows:

A. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or against otherwise qualified disabled individuals.

B. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or disability. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship.

C. The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this cause.

D. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or disability.

E. The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

F. The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

G. The Contractor shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor shall permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

H. In the event of a determination that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or Federally assisted construction contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may

be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

I. The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

The Contractor shall take such action with respect to any subcontract or purchase order as the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

J. Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

47. SUBCONTRACTING WITH SMALL AND MINORITY BUSINESS FIRMS, WOMEN'S BUSINESS ENTERPRISES AND LABOR SURPLUS AREA FIRMS

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

A. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

B. Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;

C. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;

D. Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and

E. Using the services and assistance of the U. S. Small Business Administration, the Minority Business Development Agency of the U. S. Department of Commerce, and State and local governmental small business agencies.

48. NOT USED

49. INTEREST OF MEMBERS OF CONGRESS

No member of or delegate to the Congress of the United States of America or Resident Commissioner shall be admitted to any share or part of this Contract or to any benefit to arise herefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

50. CONFLICT OF INTEREST

No member, officer, or employee of the Owner, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the Owner was activated, and no other public official of such locality or localities which exercises any functions or responsibilities with respect to the project shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

51. REVIEW OF WORK: ACCESS TO RECORDS

The Owner, Indian Health Service, and the Comptroller General of the United States, or any of their duly authorized representatives, shall at all times and places have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, contracts, books of account, and other relevant data and records.

52. CLEAN AIR AND WATER

A. Definition. "Facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by the Contractor or any subcontractor, used in the performance of the contract or any subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the Environmental Protection Agency (EPA) determines that independent facilities are collocated in one geographical area.

B. In compliance with regulations issued by the United States Environmental Protection Agency (EPA), 40 CFR Part 15, pursuant to the Clean Air Act, as amended ("Air Act"), 42

U.S.C. 7401, et seq., the Federal Water Pollution Control Act, as amended ("Water Act"), 33 U.S.C. 1251, et seq., and Executive Order 11738, the Contractor agrees to:

1. Not utilize any facility in the performance of this contract or any subcontract which is listed on the EPA List of Violating Facilities pursuant to Part 15 of the regulations for the duration of time that the facility remains on the list;
2. Promptly notify the Contracting Officer if a facility the Contractor intends to use in the performance of this contract is on the EPA List of Violating Facilities or the Contractor knows that it has been recommended to be placed on the List;
3. Comply with all requirements of the Air Act and the Water Act, including the requirements of Section 114 of the Air Act and Section 308 of the Water Act, and all applicable clean air and clean water standards; and,
4. Include or cause to be included the provisions of this clause in every subcontract, and take such action as Indian Health Service may direct as means of enforcing such provisions.

53. MANDATORY STANDARDS AND POLICIES RELATING TO ENERGY EFFICIENCY

The Contractor agrees to comply with all mandatory standards and policies relating to energy efficiency which are contained in the State Energy Conservation Plan issued in compliance with the Energy Policy and Conservation Act (PUB L. 94-163).

54. TRIBAL EMPLOYMENT RIGHTS ORDINANCE (TERO).

Contractor acknowledges that Contractor has had the opportunity to read the Yurok Tribe TERO Ordinance, is fully aware of the legal effects of the TERO Ordinance on this agreement, and agrees to comply with the TERO Ordinance, including payment of all applicable TERO taxes. *(The TERO Ordinance calls for a one-time fee of 5% of the total contract for construction contracts or 1/2 of 1% for all other contracts. The TERO tax will be deducted from each payment request submitted)*

YUOK TRIBE

TRIBAL EMPLOYMENT RIGHTS OFFICE

190 Klamath Blvd., P.O. Box 1027 Klamath, California 95548 (707) 482-1350 (707) 482-1377 Fax



Jobs in the private employment sector are an important resource on the Yurok Reservation, thus the Yurok Tribe is committed to securing such jobs for its Tribal members and local Indians as they become available. Furthermore, the Tribe helps drive the local economy and asks employers to use local goods and services when developing a project, with first preference given to qualified Indian-owned businesses and entrepreneurs.

Contractor Obligations:

As a contractor/subcontractor conducting business within the Yurok Tribe's Ancestral Territory, or with the Yurok Indian Housing Authority (YIHA), your specific obligations under the Tribal Employment Rights Ordinance (TERO), TERO Permit and Indian Preference Plan include the following:

1. Provide TERO with a precise listing of positions you will use on this project from the superintendent on down, and the number of each craft. Contractors/employees shall be required to hire and maintain as many local Tribal Members as apply for and are qualified for each craft or skill. The order of hiring shall be according to the Tribe's Hiring Preference Policy as follows:
 - Tier 1: Qualified Yurok Tribal Members
 - Tier 2: Spouses of Yurok Tribal Members
 - Tier 3: Other Indians of Federally recognized Tribes
 - Other qualified persons
2. Identification of Core/Key Employees. A Core/Key employee is an employee of a covered employer in a managerial or project supervisory position, or who performs an essential job function as identified on a case by case basis by TERO and prior to issuance of a TERO Permit.
3. The contracting and subcontracting preference shall be manifested through giving bidding preference to Indian-owned businesses. Indian Preference Applications and Certification are obtained through the TERO Office.
4. Inform TERO of all signatory trade unions to be involved in the project. TERO obligations have priority over union obligations by a contractor signatory to any trade unions. However, TERO will consider Indian workers of the trade unions in order for contractors to meet their hiring goals.
5. Notify TERO of all job vacancies. All available Indian applicants shall be considered first before any non-Indians are considered for employment and training. If no qualified Indians are available, TERO will provide a consent form to waive this obligation.

6. Employees referred by the TERO office will have preference in retention of employment from the beginning to the end of the project. Inform TERO of any lay-offs.
7. Before any TERO referral is terminated from the project you must inform TERO immediately to allow for informal counseling.
8. Allow on-site inspections by TERO representatives.
9. Provide copies of certified payroll reports to the TERO office upon request.
10. No work on the scheduled project will begin until all applicable agreements are signed and a TERO Permit has been issued. Failure to sign the required agreements shall serve as just cause for the contractor/subcontractor to be subject to sanction(s) as prescribed in the TERO Ordinance.
11. Any employer, contractor, subcontractor, or union who violates the TERO Ordinance or the rules, regulations, or orders promulgated by the TERO Officer or Council will be subject to penalties for such violations, including the maximum monetary civil penalty permitted under the Indian Civil Rights Act of 1968, 25 U.S.C. § 1302. Every day during which a violation exists shall be deemed a separate occurrence. (See the Yurok Tribe TERO Ordinance, Chapter 8, for Enforcement & Sanctions.)

Certification of Service:

I, _____, respectfully submit as evidence by my signature that I understand my obligations of Indian Preference hiring as a contractor conducting business on the Yurok Reservation or with the Yurok Indian Housing Authority. I attest to the fact that the TERO representative whose signature is found below did in fact explain these specific obligations and allowed for an opportunity to represent questions, comment or discussion on these requirements related to this agreement.

Company/Contract Representative	Position	Date
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Company Name

TERO Representative	Position	Date
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Labor Force Projection - Section A: Project Information

PROJECT:			
EMPLOYER/SUPPLIER:			
MAILING ADDRESS:	CITY	STATE:	ZIP:
E-MAIL:	PHONE:	FAX:	CELL:
CONTACT PERSON:		PHONE:	
SCOPE OF WORK:			
START DATE:		COMPLETION DATE:	
AMOUNT OF CONTRACT:		TERO FEE: 3% of Total Project Cost	

TERO Fee:

With respect to each project/contract or subcontract of \$5,000.00 or more, operating within the exterior boundaries of the Yurok Indian Reservation or with the Yurok Indian Housing Authority, the contractor shall pay a onetime fee of 3% of the total project/contract costs (i.e. equipment, labor, materials and operations), and any increase of the contract/project or subcontract amount prior to commencing work. If the covered employer initially enters into a contract/project or subcontract of less than \$5,000.00, but subsequently increases costs, as a result in the total contract/project or subcontract amount of \$5,000.00 or more, the fee shall apply to the total amount including increases.

Checks are to be made payable to: YUOK TRIBE TERO.

Job Qualifications, Personnel Requirements & Cultural Traditions Requirement:

An employer may not use any job qualification criteria or personnel requirements which serve as barriers to the employment of Native Americans which are not required by business necessity. Any education &/or certification(s) required of TERO members for employment must also be provided for all employees of the covered employers within the same classification. The TERO Officer will review the job duties and may require the employer to eliminate the personnel requirements at issue. Employers shall also make reasonable accommodation to the tribal holidays and cultural traditions of Native workers.

Labor Force Projection - Section B: Work Force

Core/Key Employees:

Name	Position	Wage	Hire Date	Native: Y/N

Tribal Member Hiring:

The TERO representative shall establish and administer a Tribal hiring opportunity to assist employers in placing preferred employees in job positions. An employer may recruit and hire workers from whatever sources are available to them to achieve the same preference hiring goals, but is subject to inform the TERO representative. The employer may not employ a non-local Indian until the employer has given the TERO office 72 hours to locate and refer a qualified local Indian.

Positions needed for Project	# of Positions	Wage	Start Date/End Date

Contracting & Subcontracting:

The preference requirements contained in the TERO Ordinance shall be binding on all contractors and subcontractors, regardless of tier, and shall be deemed a part of all resulting subcontract specifications. The covered employer shall have the initial and primary responsibility for ensuring that all contractors and subcontractors comply with these requirements. TERO Certified Indian Firms that are qualified and come within 5% of the low bid, will be provided negotiated preference.

All Subcontractors must submit an Indian Preference Plan to be negotiated with TERO.

Labor Force Projection - Section C: Compliance

I declare that all the answers and statements are true, correct and complete to the best of my knowledge. I understand that untruthful or misleading answers are cause for denial of my application and may follow under the Yurok Tribe TERO Ordinance, Chapter 8:

Enforcement and Sanctions - A covered employer who violates this ordinance shall be subject to sanctions for such violations. Such sanctions shall be remedial in nature and shall be designed and intended to compel compliance, prevent future violation, or compensate injured parties and shall include, but not be limited to:

- Denial of right to commence or continue business or contracts inside the Yurok Indian Reservation, with a Tribal entity, or involving Tribal funds;
- Suspension of all operations inside the Reservation;
- Debarment or prohibition from engaging in commerce or contracts on Yurok lands;
- Payment of back pay and damages to compensate any injured party;
- An order to stop work until the provisions of the TERO ordinance are satisfied;
- An order to summarily remove employees hired in violation of the TERO Ordinance;
- An order requiring employment, promotion and training of Indians injured by the violation;
- An order mandating changes in procedures and policies necessary to eliminate or correct the violation;
- An order making any other provisions deemed by the Tribal Council and Tribal Court to alleviate, eliminate or compensate for any violation; and
- Imposition of monetary civil penalties for each violation. Each day during which a violation exists shall constitute a separate violation.

Signature

Print Name

Title

Date

Please submit application to: Yurok Tribe TERO P.O. Box 1027 Klamath, CA. 95548 or
jwoods@yuroktribe.nsn.us

DOCUMENT 080: SUPPLEMENTAL CONDITIONS

1.1 SUMMARY

- A. Document Includes:
 - 1. Supplemental Conditions.
- B. Related Documents:
 - 1. Document 070 General Conditions.

1.2 SUPPLEMENTAL CONDITIONS

- A. These Supplemental Conditions amend or supplement the General Conditions of the Construction Contract, and other provisions of the Contract Documents as indicated below. All provisions, which are not so amended or supplemented, remain in full force and effect.

1.3 Add the following paragraph to Section 1 in Document 070 General Conditions to read as follows:

- A. The Indian Health Service is designated as the Engineer for this contract.

1.4 Add the following paragraph to Section 3 in Document 070 General Conditions to read as follows:

- A. The Contractor representative shall be a permanent fulltime employee of the Contractor and shall be onsite during all phases of construction. The Contractor may not appoint a Sub-contractor as the Contractor's representative without review and approval of the Engineer and the express written permission of the owner.

1.5 Add the following paragraph to Section 9 in Document 070 General Conditions to read as follows:

- A. Owner shall furnish to Contractor up to **three** printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

1.6 Add the following paragraph to Section 9 in Document 070 General Conditions to read as follows:

- A. Order of Precedence: In the event of an inconsistency between provisions of this contract, the inconsistency shall be resolved by giving precedence in the following order:
 - 1. Bid Form
 - 2. Written bidding instructions.
 - 3. Supplemental Conditions.
 - 4. General Conditions.
 - 5. Submittals.
 - 6. Technical Specifications (Divisions 2-16).
 - 7. Drawings.

1.7 Add the following paragraph to Section 12 in Document 070 General Conditions to read as follows:

- A. The Contractor shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Substantial Completion of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defect including the repairs of the damage of other parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred.

1.8 Add the following paragraph Section 20 in Document 070 General Conditions to read as follows:

- A. The Resident Project Representative furnished by the Engineer will be the Engineering Technician of the Indian Health Service.

1.9 Add the following paragraph to read as follows:

- A. **Thirty (30)** days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 26 of Document 070-General Conditions) become due, and when due will be paid by Owner to Contractor.

1.10 Add the following paragraph Section 26 in Document 070 General Conditions to read as follows:

- A. The Indian Health Service (IHS) shall act as a technical consultant to the Owner. The IHS and its representatives cannot act as an agent or represent the Owner and, as such, IHS is not responsible for construction, means, methods or the contractor's safety program. Any IHS recommendations regarding the administrative and technical aspects of the work, acceptability of materials furnished, and work performed will be made to the Owner. The IHS will make visits to the site to make oversight inspections and to insure that the federal government's interest is being protected.

1.11 Add the following paragraph to Section 29 in Document 070 General Conditions read as follows:

- A. Endangered Species Act and Other Biological Requirements – This contract is governed by a limited construction window. The Contractor shall have all submittals, including shop drawings, approved by the project engineer.
- B. Violations of Endangered Species Act requirements, may subject the Contractor to (1) Civil penalties of up to \$25,000 per violation, or (2) Criminal penalties of up to \$50,000 and/or imprisonment of up to 1 year per violation, or (3) both.

1.12 Add the following paragraph Section 52 in Document 070 General Conditions to read as follows:

- A. When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:

1. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.
2. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.
3. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the Yurok Tribal Historic Preservation Officer (THPO).
4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

END OF DOCUMENT

DOCUMENT 085

LABOR – DAVIS BACON ACT

I. DAVIS-BACON ACT

- a. All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section l(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions or paragraph (d) of this clause also, regular contributions made or costs incurred for more than a weekly period (but not less than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for classification of work actually performed without regard to skill, except as provided in the clause entitled "Apprentices" and "Trainees." Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (b) of this clause) and the Davis-Bacon poster (WH-l32l) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.
- b. The owner shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The owner shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met.
- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (2) The Classification is utilized in the area by
 - (3) The proposed wage rate, including any bonafide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (a) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the owner agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the owner to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator or an approved authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the owner or will notify the owner within a 30-day period of that additional time is necessary.
- (b) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the owner do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the owner shall refer the questions, including the views of all interested parties and the recommendation of the owner, to the Administrator of the Wage and Hour Division for determination. The Administrator or an authorized representative, will issue a determination within 30 days of receipt and so advise the owner or will notify the owner within the 30-day period that additional time is necessary.
- (c) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (b)(2) or (b)(3) of this clause, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. CONTRACT WORK HOURS, SAFETY STANDARDS
ACT.- OVERTIME COMPENSATION

- a. Overtime requirements: No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which individual is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- b. Violation, liability for unpaid wages, liquidated damages: In the event of any violation of the provisions set forth in paragraph (a) of this clause, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, employed in violation of the provisions set forth in paragraph (a) of this clause, in the sum of \$10 for each calendar day for which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the provisions set forth in paragraph (a) of this clause.
- c. Withholding for unpaid wages and liquidated damages: The owner shall upon his or her own action or written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other contract with the same Prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph (b) of this clause.
- d. Payrolls and basic records:
- (1) The contractor or subcontractor shall maintain payrolls and basic payroll records during the course of contract work and shall preserve them for a period of 3 years from the completion of the contract for all laborers and mechanics working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Nothing in this paragraph shall require the duplication of records required to be maintained for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act.

- (2) The records to be maintained under paragraph (d)(1) of this clause shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the owner or the Department of Labor. The contractor or subcontractor shall permit such representatives to interview employees during working hours on the job.

- e. Subcontracts: The contractor or subcontractor shall insert in any subcontracts the provisions set forth in paragraphs (a) through (d) of this clause and also a clause requiring the subcontractors to include these provisions for any lower tier subcontracts. The Prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the provisions set forth in paragraphs (a) through (d) of this clause.

3. APPRENTICES AND TRAINEES

- a. Apprentices: Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the Program but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeyman on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringes in accordance with the provisions of the apprenticeship program. If the apprenticeship programs do not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe

benefits shall be paid in accordance with that determination.

In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- b. **Trainees:** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employee and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- c. **Equal Employment Opportunity:** The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
4. **PAYROLLS AND BASIC RECORDS**
- a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates or wages paid (including rates of

contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deduction made and actual wages paid. Whenever the Secretary of Labor has found under paragraph (d) of the clause entitled "Davis-Bacon Act" that the wages of any Laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the owner. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. The information may be submitted in any form desired. Optional Form WH-347 Federal stock number 029-005-00014-1 is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Prime contractor is responsible for the submission of copies of payrolls by all subcontractors.
- (2) Each payroll shall be accompanied by a "Statement of Compliance" signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
- (a) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause entitled "Payrolls and Basic Records" and that such information is correct and complete.
- (b) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deduction as set forth in Regulations, 29 CFR Part 3 and (iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as

specified in the applicable wage determination incorporated into the contract.

- (3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.
 - (4) The falsification of any of the certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 18 and Section 231 of Title 31 of the United States Code.
- c. The contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by authorized owner or representatives of the owner or the Department of Labor. The contractor or subcontractor shall permit the owner or representatives of the owner or the Department of Labor to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the owner may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.
5. COMPLIANCE WITH COPELAND ACT REQUIREMENTS
The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.
6. WITHHOLDING OF FUNDS
The owner shall upon his or her own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same Prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirement, which is held by the same Prime contractor, so much of the accrued payment or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the contract, the owner may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
7. SUBCONTRACTS (LABOR STANDARDS)
 - a. The contractor or subcontractor shall insert in any subcontracts the clauses entitled "Davis-Bacon Act", "Contract work Hours and Safety Standards

Act - Overtime Compensation", "Apprentice and Trainees", "Payrolls and Basic Records", "Compliance With Copeland Act Requirements", "Withholding of Funds", "Subcontracts (Labor Standards)", "Contract Termination: Debarment", "Disputes Concerning Labor Standards", "Compliance with Davis-Bacon and Related Act Requirements", and "Certification of Eligibility", and such other clauses as the owner may by appropriate instruction require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The Prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.

- b.
 - (1) Within 14 days after of the contract, the contractor shall deliver to the owner a completed Statement and Acknowledgment Form (SF-1413) for each subcontract, including the subcontractor's signed and dated acknowledgement that the clauses set forth in paragraph 7.1 of this clause have been included in the subcontract.
 - (2) Within 14 days after the award of any subsequently awarded subcontract the contractor shall deliver to the owner an updated completed SF 1413 for such additional subcontract.
8. CONTRACT TERMINATION: DEBARMENT
A breach of the contract clauses entitled "Davis-Bacon Act", "Contract work Hours and Safety Standards Act-Overtime Compensation", "Apprentices and Trainees", "Payrolls and Basic Records", "Compliance with Copeland Act Requirements", "Subcontracts", (Labor Standards) "Compliance with Davis-Bacon and Related Act Requirements", and "Certification of Eligibility" may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
9. DISPUTES CONCERNING LABOR STANDARDS
The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with the procedures and not the Disputes clause of this Contract. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the owner, the U.S. Department of Labor, or the employees or their representatives.
10. COMPLIANCE WITH THE DAVIS-BACON AND RELATED ACT REQUIREMENTS
All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
11. CERTIFICATION OF ELIGIBILITY
 - a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the

contractor's firm is a person or firm ineligible to be awarded Government assisted contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

- b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a

Government assisted contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

- c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

U.S. DEPARTMENT OF LABOR
WAGE AND HOUR DIVISION
INSTRUCTION FOR COMPLETING PAYROLL FORM, WH-347

GENERAL: The use of WH-347, payroll form, is not mandatory. This form has been made available for the convenience of Contractors and Sub-Contractors required by their federal or federally-aided construction type contracts and subcontracts to submit weekly payrolls. Properly filled out, this form will satisfy the requirements of Regulations, Parts 3 and 5 (29 CFR, Subtitle A), as to payrolls submitted in connection with contracts subject to Davis-Bacon and related Acts.

This form meets need resulting from the amendment of the Davis-Bacon Act to include fringe benefits provisions. Under this amended law, the Contractor is required to pay not less than the predetermined rates. The Contractor's obligation to pay fringe benefits may be met either by payment of the fringes to the various plans, funds, or programs, or by making these payments to the employees as cash in lieu of fringes.

This payroll provides for the Contractor's showing on the face of the payroll all monies paid to the employees, whether as basic rates or as cash in lieu of fringes and provides for the Contractor's representation in the statement of compliance and not paid as cash in lieu of fringes. Detailed instructions concerning the preparation of the payroll follow:

CONTRACTOR OR SUBCONTRACTOR: Fill in your firm's name and check appropriate box.

ADDRESS: Fill in your firm's address.

COLUMN 1 - NAME, ADDRESS, AND SOCIAL SECURITY NUMBER OF EMPLOYEE:

The employee's name must be shown on each weekly payroll submitted. The employee's address must also be shown on the payroll covering the first week in which the employee works on the project. The address need not be shown on subsequent weekly payrolls unless his address changes. Although not required by Regulations, Parts 3 and 5, space is available in the name and address section so that social security numbers may be listed.

COLUMN 2 - WITHHOLDING EXEMPTIONS: This column is merely inserted for the employer's convenience and is not a requirement of Regulations, Parts 3 and 5.

COLUMN 3 - WORK CLASSIFICATIONS: List classification descriptive of work actually performed by employees. Consult classifications and minimum wage schedule set forth in contract specifications. If additional classifications are deemed necessary, see contracting officer or agency representative. The employee may be shown as having worked in more than one classification, provided accurate breakdown of hours so worked is maintained and shown on submitted payroll by use of separate line entries.

COLUMN 4- HOURS WORKED: On all contracts subject to the Contract Work Hours Standards Act, enter as overtime hours all hours worked in excess of 40 hours a week.

COLUMN 5 - TOTAL: Self-explanatory.

COLUMN 6 - RATE OF PAY, INCLUDING FRINGE BENEFITS: In straight time box, list actual hourly rate paid the employee for straight time worked plus any cash in lieu of fringes paid the employee. When recording the straight time hourly rate, any cash paid in lieu of fringes may be shown separately from the basic rate. This is of assistance in correctly computing overtime (see "Fringe Benefits" below). In the overtime box, show overtime hourly rate paid, plus any cash in lieu of fringes paid the employee (see "Fringe Benefits" below). Payment of not less than time and one-half the basic or regular rate paid is required for not less than the predetermined rate for the classification in which the employee works, the Contractor shall pay to approved plans, funds, or programs or shall pay as cash in lieu of fringes, amounts predetermined as fringe benefits in the wage decision made part of the contract (see "Fringe Benefits" below).

FRINGE BENEFITS - Contractors WHO PAY ALL REQUIRED FRINGE BENEFITS: A Contractor who pays fringe benefits to approved plans, funds, or programs in amounts not less than were determined in the applicable wage decision of the Secretary of Labor shall continue to show on the face of the payroll the basic cash hourly rate and overtime rate paid to his employees just as he has always done. Such a Contractor shall check paragraph 4(a) of the statement on the reverse of the payroll to indicate that he is also paying to approved plans, funds, or programs not less than the amount predetermined as fringe benefits for each craft. Any exceptions shall be noted in Section 4(c).

Contractors WHO PAY NO FRINGE BENEFITS: A Contractor who pays no fringe benefits shall pay to the employee, and insert in the straight time hourly rate column of the payroll, an amount not less than the predetermined for each classification plus the amount of fringe benefits determined for each classification in the applicable wage decision. Inasmuch as it is not necessary to pay time and a half on the cash paid in lieu of fringes, the overtime rate shall be not less than the sum of the basic predetermined rate, plus the half-time premium on basic or regular rate, plus the required cash in lieu of fringes at the straight time rate. In addition, the Contractor shall check paragraph 4(b) of the statement on the reverse of the payroll to indicate that he is paying fringe benefits in cash directly to his employees. Any exceptions shall be noted in Section 4(c).

USE OF SECTION 4(C) EXCEPTIONS: Any Contractor who is making payment to approved plans, funds, or programs in amount less than the wage determination required, is obliged to pay the deficiency directly to the employees as cash in lieu of fringes. Any exceptions to Section 4(a) or 4(b), whichever the Contractor may check, shall be entered in Section 4(c). Enter in the Exception column the craft, and enter in the Explanation column the hourly amount paid the employee as cash in lieu of fringes

and the hourly amount paid to plans, funds, or programs as fringes. The Contractor shall pay and shall show that he is paying to each such employee for all hours (unless otherwise provided by applicable determination) worked on a federal or federally assisted project, an amount not less than the predetermined rate plus cash in lieu of fringes as shown in Section 4(c). The rate paid and amount of cash paid in lieu of fringe benefits per hours should be entered in column 6 on the payroll. See paragraph on "Contractors Who Pay No Fringe Benefits" for computation of overtime rate.

COLUMN 7 - GROSS AMOUNT EARNED: Enter the gross amount earned on this project. If part of the employee's weekly wage was earned on projects other than the project described on this payroll, enter in column 7 the amount earned on the federal or federally assisted project and then the gross amount earned during the week on all projects, plus \$63.00/120.00.

COLUMN 8 - DEDUCTIONS: Five columns are provided for showing deductions made. If more than five deductions should be involved, use the first four columns; show the balance of deductions under "other" column; show actual total under "Total Deductions" column; and in the attachment to the payroll, describe the deductions contained in the "Other" column. All deductions must be in accordance with the provisions of the Copeland Act Regulations, 29 CFR Part 3. If the employee worked on other jobs in addition to this project, show actual deductions from this weekly gross wage, but indicate that deductions are based on his gross wages.

COLUMN 9 - NET WAGES PAID FOR WEEK: Self-explanatory.

TOTAL: Space has been left at the bottom of the columns so that totals may be shown if the Contractor so desires.

STATEMENT REQUIRED BY REGULATIONS, PARTS 3 AND 5: While this form need not be notarized, the statement on the back of the payroll is subject to the penalties provided by 18 USC 1001, namely, possible imprisonment for five years, or a \$10,000 fine, or both. Accordingly, the party signing this required statement should have knowledge that the facts represented are true.

Space has been provided between items (1) and (20) of the statement for describing any deductions made. If all deductions made are adequately described in the "Deductions" column above, state "see Deductions column in this payroll." See paragraph entitled, "Fringe Benefits" above for instructions concerning filling out paragraph 4 of the statement.

ATTACHED: U.S. Department of Labor Form WH-347.

END OF DOCUMENT

(For Contractor's Optional Use; See Instructions, Form WH-347 Inst.)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

NAME OF CONTRACTOR <input type="checkbox"/>	OR SUBCONTRACTOR <input type="checkbox"/>	ADDRESS	OMB No.: 1215-0149 Expires: 03/31/2006
PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION	PROJECT OR CONTRACT NO.

[illegible]

We estimate that it will take an average of 56 minutes to complete this collection of information, including time for reviewing instructions searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection of information, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, ESA, U. S. Department of Labor, Room S5502, 200 Constitution Avenue, N. W., Washington, D. C. 20210.

Date _____

I, _____ (Name of Signatory Party) _____ (Title)
do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor or Subcontractor)

_____ ; that during the payroll period commencing on the _____
(Building or Work)

_____ day of _____, and ending the _____ day of _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have
been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly
from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part
3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948,
63 Stat. 108, 72 Stat. 967, 76 Stat. 357, 40 U.S.C. 276c), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are
correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the
applicable wage rates contained in any wage determination incorporated into the contract; that the
classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide
apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of
Apprenticeship and Training, United States Department of Labor, of if no such recognized agency exists in a
State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ — in addition to the basic hourly wage rates paid to each laborer or mechanic listed in
the above referenced payroll, payments of fringe benefits as listed in the contract
have been or will be made to appropriate programs for the benefit of such
employees, except as noted in Section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ — Each laborer or mechanic listed in the above referenced payroll has been paid,
as indicated on the payroll, an amount not less than the sum of the applicable
basic hourly wage rate plus the amount of the required fringe benefits as listed
in the contract, except as noted in Section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

--	--

NAME AND TITLE

SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR
SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE
31 OF THE UNITED STATES CODE.

DOCUMENT 090

ADDENDA

ADDENDUM NUMBER [_____]

DATE: [_____]

PROJECT: **Ke-nek Water Treatment Plant and Water Main**

PROJECT NUMBER: **CA 21-F05**

OWNER: **Yurok Tribe**

ENGINEER: [_____]

TO: Prospective Bidders

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated [_____], Addendum Number [1] [_____] issued [_____], and Addendum Number [2] [_____] issued [_____], with amendments and additions noted below. Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.

This Addendum consists of [_____] pages and the following Drawings:

No.	Drawing Title	Issue Date
[_____]	[_____]	[_____]
[_____]	[_____]	[_____]
[_____]	[_____]	[_____]
[_____]	[_____]	[_____]

CHANGES TO ADDENDUM NUMBER X - Issued DATE

1. _____

CHANGES TO THE PROJECT MANUAL

DOCUMENT XXXXX - TITLE

2. _____

DOCUMENT XXXXX – TITLE

3. _____

SECTION XXXXX – TITLE

4. _____

SECTION XXXXX – TITLE

5. _____

SECTION XXXXX – TITLE

6. _____

CHANGES TO THE DRAWINGS

DRAWING XX - TITLE

7. _____

8. _____

DRAWING XX - TITLE

9. _____

DRAWING XX - TITLE

10. _____

APPROVAL OF ADDITIONAL PRODUCTS/SYSTEMS

11. Include the following acceptable manufacturers in sections indicated:

Section - Acceptable Manufacturers

XXXXX _____
XXXXX _____

END OF DOCUMENT

DOCUMENT 091 CHANGE ORDER

ORDER NUMBER:

DATE:

AGREEMENT DATE:

NAME OF PROJECT: **Ke-nek Water Treatment Plant and Water Main**

OWNER: **Yurok Tribe**

CONTRACTOR:

PROJECT NUMBER: **CA 21-F05**

The following changes are hereby made to the CONTRACT DOCUMENTS:

Justification:

CHANGE TO CONTRACT PRICE:

Original CONTRACT PRICE: \$

Current CONTRACT PRICE

(Includes previous CHANGE ORDER(s)): \$

Amount of this CHANGE ORDER (increase) (decrease): \$

The new CONTRACT PRICE including this CHANGE ORDER is: \$

Change to CONTRACT TIME: The CONTRACT TIME will be [increased]
[decreased] by __ calendar days. The date for completion of all work will be _____.

Prepared by Engineer: _____

Approved by District Engineer: _____

Reviewed by Owner: _____

Accepted by Contractor: _____



Work Change Directive

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Ke-nek Water Treatment Plant and Water Main	Owner: Yurok Tribe	Owner's Contract No.:
Contract: Ke-nek Water Treatment Plant and Water Main		Date of Contract:
Contractor:		Engineer's Project No.: CA 21-F05

You are directed to proceed promptly with the following change(s):

Item No.	Description

Attachments (list documents supporting change):

Purpose for Work Change Directive:

- ☐ Authorization for Work described herein to proceed on the basis of Cost of the Work due to:
- ☐ Non-agreement on pricing of proposed change.
- ☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price \$ _____ (increase/decrease) Contract Time _____ (increase/decrease)
days

If the change involves an increase, the estimated amounts are not to be exceeded without further authorization.

Recommended for Approval by Engineer:	Date
Authorized for Owner by:	Date
Accepted for Contractor by:	Date
Approved by Funding Agency (if applicable):	Date:

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Ke-nek Water Treatment Plant and Water Main	Owner: Yurok Tribe	Owner's Contract No.:
Contract: Ke-nek Water Treatment Plant and Water Main		Date of Contract:
Contractor:		Engineer's Project No.: CA 21-F05

Attention:

You are hereby directed to promptly execute this Field Order issued for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: _____ (Specification Section(s)) _____ (Drawing(s) / Detail(s))

Description:

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Attachments:

<div style="border-right: 1px solid black; height: 100%;"></div>	Engineer:
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Receipt Acknowledged by (Contractor):	Date:
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Copy to Owner

TRIBAL EMPLOYMENT RIGHTS ORDINANCE



OF THE

YUROK TRIBE

YUROK TRIBAL EMPLOYMENT RIGHTS OFFICE ORDINANCE

Pursuant to its authority under Article IV, Section 5 of the Yurok Constitution, as certified on November 24, 1993, the Yurok Tribal Council hereby enacts the following ordinance establishing a Tribal Employment Rights Office to provide for the social and economic well-being of Yurok Tribal members:

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GENERAL PROVISIONS

SECTION 4001. Short Title

This ordinance shall be referred to as the “Yurok Tribal Employment Rights Office Ordinance” or “Yurok TERO Ordinance.”

SECTION 4002. Findings

Indians have unique and special employment rights, and are entitled to the protection of laws established by the federal government to combat employment discrimination on or near Indian reservations, including the following:

- (a) Title VII of the Civil Rights Act, including section 703(i), which makes Indian and Tribal member preference in employment possible.
- (b) Executive Order 11246, enforced by the Office of Federal Contract Compliance Programs and exempting from the general requirements contractors extending preference in employment for Indians living on or near an Indian Reservation, and which further prohibits discrimination among Indians as a group on the basis of religion, sex, or tribal affiliation. Executive Order 11246 applies only to employers working under federal contracts.

- (c) The Indian Self-Determination Act, Section 7(b) of Public Law 93-638, which provides for Indian preference in employment, training, and contracting or subcontracting on all contracts negotiated or let on behalf of an Indian Tribe.
- (d) The Indian Civil Rights Act of 1968, which prohibits Indian tribal governments from enacting or enforcing laws that violate certain individual rights similar to those individual rights guaranteed under the Bill of Rights of the United States Constitution.

SECTION 4003. Purpose

The Yurok Tribal Council is enacting this ordinance to build the workforce capacity of Yurok Tribal members and Indian people and to help provide for their health and economic well-being.

The Yurok Tribal Council operates under a constitutional mandate to protect the sovereignty of the Yurok Tribe and to provide for the cultural, social, and economic well-being of current and future Yurok tribal members. In fulfillment of its duty to guarantee the unique employment rights of all Yurok Tribal members and other Indians within its jurisdiction, the Yurok Tribal Council hereby reaffirms and reestablishes the TERO and establishes standards and procedural guidelines with the following purposes:

- (a) To prevent employment related discrimination against Indians;
- (b) To ensure compliance with the ordinance that is intended to give preference in employment, contracting and subcontracting, and training to Indians;
- (c) To maximize utilization of Indian workers in all employment opportunities on Yurok lands;
- (d) To ensure the Indians seeking employment on Yurok lands are trained and equipped to enter the workforce and maintain employment of their choosing;
- (e) To ensure due process for all individuals affected by the application of this ordinance's requirements; and
- (f) To provide clarity to Indian workers, covered employers, and contractors regarding TERO requirements and greater efficiency in the TERO process.

SECTION 4004. Amendments Adopted by Emergency Act

This Amendment to the TERO Ordinance was adopted by emergency legislative act, pursuant to Section 5009 of the Yurok Public Hearing Ordinance on March 20, 2025. The Yurok Tribal Council found that there was an immediate and urgent need for funding for elder's services.

SECTION 4005. Scope

This ordinance shall apply to all covered employers and contractors on Yurok lands. Additionally, this ordinance shall apply to all projects on or off the Yurok Reservation involving Tribal funds and initiated or taken over by the Yurok Tribe or a Tribal entity.

SECTION 4006. Sovereign Immunity Preserved

Except as judicial review is authorized in this ordinance, and in accordance with the Yurok Tribe's Supreme Ordinance, nothing in this ordinance shall be interpreted as a waiver of the Tribe's

sovereign immunity from unconsented lawsuit, or as authorization for a claim for monetary damages against the Tribe.

SECTION 4007. Effective Date

This ordinance shall take effect immediately after its adoption by Council. This ordinance is not intended to apply retroactively to contracts or contractors.

SECTION 4008. Repeal of Conflicting Ordinance Provisions

This Amended Yurok Tribal Employment Rights Ordinance enacted by the Tribal Council is the controlling ordinance- all previous conflicting versions are hereby repealed. If the provisions of this ordinance conflict with the provisions of any other previously enacted ordinance or resolution, the provisions of this ordinance shall control.

SECTION 4009. Severability

If any provision of this ordinance or its application to any person or circumstance is held invalid, the remainder of the ordinance or application of its provisions to other persons or circumstances shall not be affected, and to this end, the provisions of this ordinance are severable.

SECTION 4010. Definitions

- (a) *Annual Gross Revenue* means any revenue earned during the Tribe's fiscal year.
- (b) *Contractor* means either a Covered Employer that is a utility company performing work within Yurok Lands, or a Covered Employer who undertakes a contract or subcontract with the Tribe or a Tribal entity for supplies, services, labor, or materials where:
 - (1) The total contract amount exceeds:
 - (A) \$5,000 in the case of a construction contract, or
 - (B) \$2,000 in the case of a non-construction contract; and
 - (2) Either of the following two conditions are satisfied:
 - (A) The majority of the work under the contract or subcontract will occur on Yurok lands, or
 - (B) The work utilizes Tribal funds.
- (c) *Covered Employer* means:
 - (1) The Yurok Tribe and Tribal entities, including but not limited to Yurok Indian Housing Authority, the Yurok Economic Development Corporation, the Redwood Hotel Casino, and Kee-Cha-E-Nar for any project utilizing Tribal funds, regardless of whether the employment or contract activity is on Yurok lands;
 - (2) Any person, partnership, corporation, joint venture, government or governmental entity, or other entity that utilizes Tribal funds for a project or that voluntarily submits to Tribal jurisdiction under this ordinance;
 - (3) The California Department of Transportation for projects within Yurok

ancestral territory; and

- (4) Any person, partnership, corporation, joint venture, utility, government or governmental entity, or other entity that is located or engaged in commerce within the Yurok Reservation and that employs two or more employees.
 - (5) Any federal contractor, who, pursuant to Office of Federal Contract Compliance Program regulation 41 C.F.R. § 60 1.5(7) voluntarily submits to Tribal jurisdiction for projects on or near the reservation.
-
- (d) *Council* or *Tribal Council* means the Yurok Tribal Council.
 - (e) *Days* means regular business days - Monday through Friday - not including tribally recognized holidays.
 - (f) *Employee* means a person working for remuneration on Yurok lands in the service of another, including, but not limited to, independent contractors and regular and temporary employees.
 - (g) *Indian* means a person enrolled in a federally recognized Indian tribe.
 - (h) *Indian Firm* means an entity that has been certified as an Indian firm by the TERO Officer.
 - (i) *Indian Preference Plan* means a negotiated agreement between the TERO Officer and a covered employer detailing Indian preference goals and incorporated into the TERO Permit.
 - (j) *Key Employee* means an employee of a covered employer in a managerial or project supervisory position, or who performs an essential job function as identified on a case by case basis by TERO and prior to issuing a TERO Permit.
 - (k) *Reservation* or *Yurok Reservation* means all lands within the exterior boundaries of the Yurok Reservation.
 - (l) *TERO* means the Tribal Employment Rights Office.
 - (m) *TERO Officer* means the TERO Director and any other positions within the TERO office designated by the Yurok Tribal Council Chairperson.
 - (n) *TERO Permit* means a permit issued to and signed by a covered employer after negotiation with the TERO Officer of an acceptable Indian Preference Plan.
 - (o) *Tier* means the Indian preference priorities for eligible Indians as established by this ordinance.
 - (p) *Tribal Court* means the Yurok Tribal court, which was established by the Yurok Tribe Judicial Branch Ordinance.
 - (q) *Trust Lands* means all land the fee title to which is owned by the United States of America and held in trust for the benefit of the Tribe or a Tribal member.
 - (r) *Tribal Funds* means funds of the Yurok Tribe or a Tribal entity and includes grant funds received by the Tribe or a Tribal entity.
 - (s) *Tribal Entity* means the Tribe and any agency, entity, subdivision, instrumentality, or

non-profit or for-profit corporation that acts at the direction of Council and includes but is not limited to the Yurok Tribe, the Yurok Indian Housing Authority, the Yurok Economic Development Corporation, the Redwood Hotel Casino, and Kee-Cha-E-Nar.

- (t) *Tribal Member* means a duly enrolled member of the Yurok Tribe listed on the Yurok Tribal Membership Roll.
- (u) *Tribe* means the Yurok Tribe acting at the direction of Council.
- (v) *Yurok Ancestral Territory* means those ancestral lands described in the Yurok Constitution Article I, Section I.
- (w) *Yurok Household* means a family with at least one enrolled tribal member within the household.
- (x) *Yurok Lands* means all lands within the Reservation, trust lands, and lands owned by the Tribe or a Tribal entity.

CHAPTER 1. TRIBAL EMPLOYMENT RIGHTS OFFICE

SECTION 4101. Establishment and Organization of TERO

Tribal Council hereby reaffirms and reestablishes a TERO to enforce Yurok and Indian preference with all enterprises, businesses, and projects operated or undertaken on Yurok lands. TERO shall consist of a TERO Officer and such other staff as may be determined by the Tribe's Executive Office. The Executive Office is vested with full supervisory authority over TERO.

SECTION 4102. Duties of TERO Officer

The TERO Officer shall oversee implementation and enforcement of this ordinance and day-to-day operations of TERO. The TERO Officer shall have the following duties:

- (a) Identify skills training opportunities for Tribal members;
- (b) Maintain a list of certified Indian firms;
- (c) Assist covered employers in hiring qualified Yurok Tribal members and Indians;
- (d) Manage a Tribal Skills Bank of Indians seeking employment, which includes a preliminary screening of contact information and employment history,
- (e) Provide monthly reports to the Council outlining the number of projects, number of Yurok and Indian employees, number of non-Indian employees, and other information required by Council, and
- (f) Provide the Yurok Tribe Fiscal Department with monthly accountings of all TERO Permits then in effect.

SECTION 4103. Powers and Authorities of TERO Officer

The TERO Officer shall have the following powers and authorities:

- (a) Hire TERO staff;

- (b) Develop a TERO budget and expend funds in accordance with a Council-approved budget;
- (c) Issue guidelines and develop forms;
- (d) Conduct audits, investigations, and inspections upon its own initiative or allegation;
- (e) Issue notice of non-compliance, warnings, and citations;
- (f) Conduct hearings;
- (g) Petition the Tribal Court for such orders as are necessary and appropriate to enforce decisions and sanctions imposed under this ordinance;
- (h) Subpoena documents and witnesses;
- (i) Require covered employers to submit reports, including labor force and payroll reports;
- (j) Issue orders;
- (k) Impose fines;
- (l) Suspend or terminate a covered employer's operation;
- (m) Certify eligible Indians and Indian firms;
- (n) Revoke Indian firm certifications and permits;
- (o) Monitor employers for compliance;
- (p) Restrict or prevent hiring of non-Tribal members or non-Indians;
- (q) Develop numerical hiring goals and timetables for a covered employer;
- (r) Conduct or facilitate training programs and job fairs to meet the purposes of this ordinance;
- (s) Require Indians seeking employment and covered employers to participate in TERO training programs;
- (t) Require covered employers to pay back wages to an aggrieved employee;
- (u) Enforce this ordinance; and
- (v) Take any action necessary to achieve the purposes and goals of this ordinance.

SECTION 4104. Inspections

The TERO Officer shall have the authority to make on-site inspections during regular working hours and in accordance with job site safety standards in order to monitor compliance with this ordinance. The TERO Officer or authorized representative shall have the right to inspect and copy all relevant records of a covered employer, to interview or speak to workers, and otherwise conduct investigations on the job site. All information collected shall be kept confidential unless or until disclosure is required during a hearing or appeal under this ordinance or ordered as part of any federal or tribal judicial or administrative proceeding.

CHAPTER 2. OVERSIGHT BY TRIBAL COUNCIL

SECTION 4201. Powers and Authorities of Council

The Council shall have, but not be limited to, the following powers and authorities:

- (a) Review and approve TERO policies;
- (b) Develop amendments to this ordinance;
- (c) Receive and resolve complaints regarding TERO that are not resolved by the Executive Office;
- (d) Review and approve requests to waive Indian preference as otherwise required under this ordinance;
- (e) Waive TERO fees; and
- (f) Approve a TERO budget and annual work plan.

SECTION 4202. Complaints Against TERO

Any complaint against TERO is to be directed to the Executive Office. If the Executive Office is not able to resolve the complaint, the Executive Office may forward the complaint to Council. The Executive Office and Council retain exclusive jurisdiction and discretion to hear and decide complaints against TERO. Tribal Court is not authorized to hear civil complaints against TERO.

CHAPTER 3. INDIAN PREFERENCE IN EMPLOYMENT

SECTION 4301. Indian Preference in Employment

All covered employers shall give absolute preference to qualified Indians in all phases of employment and training, including recruitment, hiring, upgrade, promotion, transfer, rate of pay, retention, and selection for training or apprenticeship.

Indian preference in employment means that if a qualified Indian is available, that person will be given preference over a qualified non-Indian in any phase of employment. A covered employer may not refuse to employ an Indian on the basis that a non-Indian is more qualified, so long as the Indian satisfies the threshold requirements for that occupational classification.

SECTION 4401. Covered Positions

Indian preference shall apply to all occupational classifications, except for key employees of non-Tribal entities. Occupational classifications may be identified by the U.S. Department of Labor, Bureau of Labor Statistics, Standard Occupational Classification then in effect. The Yurok Tribe and Tribal entities are required to apply Indian preference to the hiring of key employees.

SECTION 4302. Qualified Indians

An Indian shall be deemed qualified for employment in a position if that person meets the minimum requirements for such position. No employer may utilize any employment criterion that is not legitimately related to the performance of the position.

SECTION 4303. Eligible Indians

- (a) Yurok Tribe, Tribal Entities, and Covered Employers. The Yurok Tribe, Tribal entities, and covered employers shall extend a preference to qualified Indians

according to the following tier priorities:

- (1) Yurok Tribal members;
 - (2) Members of Yurok Households; and
 - (3) Other Indians.
- (b) Contractors Working On or Near the Reservation and Using Federal Funds. Contractors working on or near the Yurok Reservation and using federal funds shall extend a preference to qualified Indians according to the following tier priorities:
- (1) Indians living on or near the Yurok Reservation; and
 - (2) Other Indians.
- (c) For purposes of subsection (b), the word *near* means all that area where a person seeking employment could reasonably be expected to commute to and from in the course of a work day.

SECTION 4304. Proof of Yurok or Indian Eligibility

- (a) Tribal Member. A person claiming that he or she is a Yurok Tribal member shall present an appropriate Yurok Tribal membership identification card.
- (b) Spouse of Tribal Member. A person claiming that he or she is a spouse of a Yurok Tribal member shall present the Yurok Tribe membership identification card of his or her spouse and proof of marriage.
- (c) Indian. A person claiming that he or she is an Indian shall have the burden to prove membership in a federally recognized tribe. To prove membership in a federally recognized tribe, TERO may require a person to submit the following:
 - (1) Certification or verification from a federally recognized tribe or the U.S. Bureau of Indian Affairs indicating that a person is a member of a federally recognized tribe,
 - (2) A tribal membership card, or
 - (3) Other documentation satisfactory to the TERO Officer.

SECTION 4305. Tribal Skills Bank

The TERO Officer shall manage a database of Yurok Tribal members and other Indians seeking employment. This database shall be known as the Tribal Skills Bank. Tribal Skills Bank records for such individuals may include name and contact information, membership in a federally recognized tribe, occupational classifications for which an individual meets minimum qualifications, training or additional qualifications, training or qualification needs, and such other information as necessary or useful to achieve the goals of this ordinance. It shall be the individual's responsibility to ensure that the Tribal Skills Bank contact information for that person is accurate and up-to-date.

SECTION 4306. TERO Card

In order to facilitate Indian employment, a Yurok Tribal member who has met Indian eligibility requirements may apply to TERO for a TERO Card. A TERO Card shall indicate the person's skilled labor occupational classifications. A TERO card constitutes presumptive evidence that a person is a Tribal member with the highest tier priority. A covered employer may hire such Tribal

member for an available position without being required to notify TERO prior to hiring as otherwise required by this ordinance. A TERO Card shall expire no later than two years after issuance, but may be renewed by the cardholder prior to its expiration for an additional two-year period.

CHAPTER 4. INDIAN PREFERENCE IN CONTRACTING

SECTION 4402. Indian Preference in Contracting

- (a) Indian Preference Required: Covered employers shall give preference to Indian firms in the award of contracts or subcontracts to the extent permitted by applicable law.
- (b) Indian Preference Defined: Indian preference in contracting means that if a qualified Indian firm is available, that Indian firm will be given preference over a qualified non-Indian entity in contracting.
- (c) Selection Based on Price. A contractor may not refuse to employ an Indian firm on the basis of price, so long as the Indian firm's price is within 5% of the lowest bid, calculated by multiplying the lowest bid by 105%, and the Indian firm agrees to match the lowest bid.
- (d) Selection Based on Qualification. A contractor may not refuse to employ an Indian firm on the basis that a non-Indian firm is more qualified, so long as the Indian firm satisfies the threshold requirements for technical qualifications. In a dispute regarding threshold technical qualifications, the TERO Officer shall determine the appropriate qualifications and whether they are met.

SECTION 4403. Indian Firm Eligibility Requirements

In order to receive certification as an Indian firm, an entity must meet the following eligibility requirements:

- (a) The entity must be a non-profit or for-profit entity where an Indian or Indians own at least a 51% interest and where such Indian or Indians have managerial and operational control of the business operations.
- (b) The Indian owner(s) must possess the power to direct or cause the direction to the management and policies of the entity and to make day-to-day, as well as long-term decisions on matters of management, policy and operations.
- (c) At least 51% of the profits must flow to the Indian owner(s).
- (d) The entity must not be tied to another firm in such a way as to compromise its independence and control.

SECTION 4404. Certification of an Indian Firm

- (a) Burden of Demonstrating Satisfaction of Eligibility Requirements. An entity claiming that it is an Indian firm and seeking certification shall have the burden to demonstrate to the TERO Officer, by a preponderance of the evidence, that it satisfies Indian firm eligibility requirements. Indian ownership must be real, substantial, and continuing, going beyond pro forma ownership of the entity as reflected in ownership documents.
- (b) Application for Certification. An entity shall submit an Indian Firm Certification

Application, in a form acceptable to TERO, and proof of the entity's Indian ownership, which shall include, but not be limited to:

- (1) Evidence that the entity is at least 51% owned by an Indian or at least 51% owned by a federally recognized tribe,
 - (2) Evidence that at least 51% of all profits will flow to the Indian owner during all portions of the contract or subcontract,
 - (3) Evidence that the Indian owner maintains management control, and
 - (4) The entity's name, address, and telephone number.
- (c) Documentation of Indian Ownership. To establish Indian ownership or maintain certification, the TERO Officer may require an entity to submit the following:
- (1) Current bank and tax records, incorporation documents, joint venture agreements, or partnership agreements documenting the share of Indian ownership,
 - (2) Certification that an Indian owner is a member of a federally recognized tribe, and
 - (3) Documents demonstrating that an Indian owner is an entity of a federally recognized tribe, such as articles of incorporation, a tribal ordinance or resolution establishing the entity, or certification by an appropriate authority of the federally recognized tribe that the entity is tribally owned.
 - (4) Such other documents as may be reasonably necessary to establish that Indian firm eligibility requirements are satisfied.
- (d) Certification. Upon satisfactory evidence that the requirements are met, the TERO Officer shall certify the entity as an Indian firm. The TERO Officer maintains sole authority to certify an entity as an Indian firm.
- (e) Certified Indian Firms. TERO shall maintain a list or database of certified Indian firms that classifies such Indian firms by major group using the North American Industry Classification System standard. TERO shall confirm certification of an Indian firm upon a contractor's request.
- (f) Ongoing Obligations. An Indian firm maintains ongoing obligations to ensure that Indian firm eligibility requirements are satisfied. The TERO Officer maintains discretion to revoke Indian firm certification upon finding that Indian firm eligibility requirements are not being met.
- (g) Expiration of Certification. An Indian firm must re-submit a certification application every two years to remain in good standing.

SECTION 4405. Eligible Indian Firms

- (a) Covered Employers' Preference for Indian Firms. Covered employers shall extend a preference to Indian firms according to the following priorities:
- (1) Indian firm that is at least 51% owned, operated, and controlled by a Yurok Tribal member or Yurok Tribal entity
 - (2) Indian firm that is less than 51% owned, operated, and controlled by a Yurok

- Tribal member or Yurok Tribal entity;
- (3) Indian firm without any ownership share held by a Yurok Tribal member or Yurok Tribal entity.
- (b) Contractors using Federal Funds. Notwithstanding the requirements of subsection (a), contractors using federal funds shall only be required to extend a preference to Indian firms according to the following tier priorities:
 - (1) Indian firm whose Indian owner is living on or near the Yurok Reservation; and
 - (2) Other Indian firms.
- (c) For purposes of subsection (b), the word *near* means all that area where a person seeking employment could reasonably be expected to commute to and from in the course of a work day.

SECTION 4406. Specific Indian Preference Obligations of Contractors

In addition to the requirements of all covered employers, contractors shall have the following obligations:

- (a) Indian Preference Plan. Upon being selected for a contract and prior to commencing work, a contractor shall negotiate an Indian Preference Plan with the TERO Officer. The Indian Preference Plan shall include key employees, anticipated project occupational classifications, and Indian preference goals for the general contract and any subcontracts. For subcontracts, the contractor shall indicate proposed subcontractors and, if the subcontractor is not an Indian firm, evidence of steps taken to identify Indian firms.
- (b) Labor Force Reports. Upon commencing work, to submit to TERO weekly Labor Force Reports, in a form acceptable to TERO, indicating the number of Indian and non-Indian employees, pay rates, fringe benefits paid, hires, terminations, layoffs, promotions, pay increases, reprimands, and results in achieving Indian preference goals. TERO maintains discretion to require such reports on a more or less frequent basis and to require additional information.
- (c) Payroll Reports. Upon request by TERO, to submit to TERO weekly Payroll Reporting Forms, in the format then in use by the California Department of Industrial Relations, for all employees. TERO may also require submission of cancelled payroll checks and check stubs.
- (d) Non-responsive Bidder. A contractor who fails to secure a TERO Permit within a reasonable amount of time as determined by the TERO Officer shall be considered a non-responsive bidder for the purpose of awarding the contract.
- (e) Primary Responsibility for TERO Compliance. A contractor shall have initial and primary responsibility for ensuring that it and all of its subcontractors comply with these requirements. A contractor may be held jointly and severally liable for violations of this ordinance by its subcontractors.

SECTION 4407. Subcontractors

The Indian preference requirements contained in this ordinance shall be binding on all subcontractors of covered employers, regardless of a subcontractor's size, and shall be deemed a part of all resulting subcontract specifications. A subcontractor may be held liable for violations of this ordinance.

- (a) For large construction projects, subcontractors should meet and negotiate their own Indian Preference Plan with the TERO Officer. The subcontractor is to be treated in the same manner as a contractor under this ordinance. Both the subcontractor and the contractor can be held jointly and severally liable for any violation of the subcontractor's TERO Permit or Indian Preference Plan and both may be subject to sanctions, including a stop work order or monetary civil penalty. Because the Tribe may not be the contracting entity with the subcontractor, the contractor is encouraged to work cooperatively with TERO to ensure the subcontractor meets compliance obligations.

SECTION 4408. Unions

Covered employers with collective bargaining agreements with a union are responsible for informing such unions of this ordinance, its rules and regulations, and their Indian Preference Plan. Unions will give absolute preference to Indians in job referrals regardless of which referral list they are on. Temporary work permits will be granted to Indians who do not wish to join a union. Nothing herein shall constitute official recognition of any union or tribal endorsement of any union activities on Yurok lands.

SECTION 4409. Tribal Prevailing Wage

The Tribal Prevailing Wage Ordinance provisions shall apply to all contractors and subcontractors and be incorporated in the terms of the TERO Permit.

CHAPTER 5. IMPLEMENTATION OF INDIAN PREFERENCE IN CONTRACTING

SECTION 4501. Indian Preference Plan

No contractor may commence work until the contractor has submitted to TERO an Indian Preference Plan, negotiated with and approved by the TERO Officer, setting forth how the contractor intends to meet the contractor's obligations under this ordinance. The Indian Preference Plan should list by occupational classification all key and non-key employee positions to be used by the contractor.

For multi-year contracts, the Indian Preference Plan shall be reviewed at least annually, or sooner at the request of a contractor or the discretion of the TERO Officer, and shall be revised to reflect changes in the number of Tribal members or Indians available or in the contractor's hiring plans and practices.

SECTION 4502. Indian Preference Goals for Indian Preference Plan

The TERO Officer shall negotiate with a contractor an Indian Preference Plan establishing the minimum number of qualified Tribal members and Indians to be employed by the contractor. The TERO Officer may negotiate with the contractor for trainee or apprentice positions not otherwise required under the contract, but such positions shall be funded by TERO or other Tribal resources.

Goals will be established for all non-key employee occupational classifications on a contract by contract basis to be used by the covered employer. The goals shall be expressed as:

- (a) Project hours of Tribal member employment as a percentage of the total hours of employment by the covered employer for the occupational classification involved; and
- (b) Numerical goals based on surveys of the available Tribal member and Indian labor forces and projections of employment opportunities for each occupational classification.

SECTION 4503. TERO Permit

No contractor may commence work until the contractor has received a TERO Permit. The TERO Officer shall issue a TERO Permit to contractors upon approval of a negotiated Indian Preference Plan. The TERO Permit shall incorporate the terms of the Indian Preference Plan and shall constitute a consensual contractual relationship between the Yurok Tribe and the contractor.

SECTION 4504. Ongoing TERO Compliance; Filling Available Positions

Once work has commenced under a valid TERO Permit and if a position becomes available, a contractor shall not hire a non-Indian unless the contractor makes reasonable efforts to hire a qualified Indian for that position.

- (a) TERO Card Hiring. A contractor may hire immediately a Tribal member who presents the contractor with a valid TERO Card. The contractor shall notify TERO that a Tribal member has been hired for the available position within 2 days of hiring and shall submit to TERO a copy of the TERO Card.
- (b) Reasonable Efforts to Hire Qualified Indian. A contractor is presumed to have made reasonable efforts if all of the following conditions are satisfied:
 - (1) The contractor notifies TERO in writing of the available position.
 - (2) The contractor requests a list from TERO of qualified Indians for that classification.
 - (3) The contractor is unable to identify a qualified Indian available for the position and:
 - (A) the contractor submits documents to TERO showing reasonable efforts to identify and contact qualified Indians for that classification, which may include call logs, job fair notices, public notices in local newspapers and tribal offices, online job postings, and evidence that TERO failed to respond to the list request within 5 business days or 2 business days for a construction contract; or
 - (B) TERO certifies in writing that no qualified Indian is available to fill that position.
 - (4) If no qualified Indian is available for the position, the contractor notifies TERO in writing of the non-Indian replacement and deviation from the Indian Preference Plan.

- (c) Ensuring Reasonable Efforts. The TERO Officer maintains discretion to seek additional documentation of reasonable efforts by a contractor, and to order an employee removed if a contractor does not substantially comply with this section.
- (d) Emergency Waiver. The TERO Officer may waive or modify the requirements of subsection (b) for a position if there is clear indication that:
 - (1) the process would impose an unreasonable burden on a contractor for a project, or
 - (2) time is of the essence in completing the work and it is unreasonable to request full compliance.

SECTION 4505. Final Payment; Compliance

For contracts with the Yurok Tribe, the Yurok Indian Housing Authority, or other Tribal entities, no Tribal entity shall make a final payment under a contract if notified by the TERO Officer that the contractor is subject to an ongoing TERO investigation.

SECTION 4506. Training

The TERO Officer may require a contractor to participate, or to assign interested Indians to participate, in training programs to assist Indians to become qualified in various occupation classifications used by the contractor. If such training programs are not included in a bid package, the TERO Officer shall give due consideration to the increase in cost, if any, for performing the program and compensate the contractor for actual costs. Actual costs shall include, but not be limited to, the cost of additional supervision to conduct on-site training.

SECTION 4507. Layoffs or Reductions in Workforce

In all layoffs and reductions in workforce for a contractor, no Yurok Tribal member or Indian shall be terminated if a non-Indian worker in the same occupational classification is still employed. A non-Indian shall be terminated first, and eligible Indians shall be terminated by tier.

SECTION 4508. Promotions

Each contractor shall give Yurok Tribal members and Indians preferential consideration for all promotion opportunities and shall encourage Indians to seek such opportunities. For each promotion, supervisory position, or managerial position filled by a non-Indian, the contractor shall file a report with the TERO Officer stating what efforts were made to inform Indian workers about the position, what Indians, if any, applied for the position, and if an Indian was not chosen, the reasons therefore.

SECTION 4509. Employment Procedures

The contractor may use whatever employment process it chooses, provided that it makes reasonable efforts to hire qualified Indians and a non-Indian person will not be hired if there is a qualified Indian available. The employer may obtain qualified Indian referrals from TERO and other sources. In all cases, the contractor is required to notify TERO of all jobs planned for a project. Except for key employees, which nevertheless must be identified in an Indian Preference Plan, all positions existing or planned to exist on the Reservation are subject to Indian preference requirements.

A contractor may not use job qualifications, criteria, or requirements which have a tendency to bar Indians from employment unless the same are required by business necessity. It is the employer's burden to prove business necessity.

SECTION 4510. Prohibition Against Retaliation

If a contractor fires, lays off, penalizes, attempts to intimidate, or otherwise retaliates in any manner toward a person who utilizes the individual complaint procedure or exercises any right provided in this ordinance, the contractor shall be subject to sanctions provided for in this ordinance.

CHAPTER 6. TERO FEE IN CONTRACTING

SECTION 4601. TERO Fee

- (a) TERO Fee Amount. A fee, to raise revenue for the operation of TERO and to provide essential elder assistance, is imposed on the following activities:
 - (1) Construction Contracts. Contractors with a construction contract exceeding \$5,000 shall pay a fee of 5% of the total contract amount.
 - (2) Non-construction Contracts. Contractors for all non-construction contracts exceeding \$2,000 shall pay a fee of 1% of the total contract amount.
 - (3) Gross Revenue by Tribal Department, Corporation, or Entity. Each Department or Entity shall pay a 3% fee on gross revenue to fund elders services. This shall be calculated annually at the time tribal budgets are approved.
- (b) Changes To Contract Amount. The contractor must notify TERO of any changes to the original contract amount by providing an approved change order or amended contract. The TERO fee assessed shall be increased or reduced in proportion to any increase or reduction of the original contract amount.
- (c) Inapplicable To Certain Agreements. The TERO fee does not apply to financing, loan and similar type agreements.
- (d) For purposes of this section, construction contract activities include, but are not limited to, the following: building, modifying, refurbishing, or outfitting structures; road construction, maintenance, or upgrading; and supplies and materials for a construction or road project. Contracts for the following activities are considered non-construction contracts: timber harvest activities, legal services, and architect and engineering services.

SECTION 4602. TERO Fee Collection

- (a) Payment and Use. Contractors shall pay the TERO fee to the Yurok Tribe or appropriate Tribal entity and such amount shall be credited to the TERO account. TERO fees shall be used to carry out the purposes of this ordinance, such as job training and preparedness.
- (b) Contractor Consent to Automatic Deduction. For all contracts awarded by the Tribe or a Tribal entity, a contractor shall consent to the Tribe or the Tribal entity deducting the TERO fee amount from the total amount due the contractor under the contract and to pay that amount directly to the Yurok Tribe.

- (c) Automatic Deduction of TERO Fee. The Yurok Tribe Fiscal Department, or corresponding department of a Tribal entity, shall automatically deduct the TERO fee from an invoiced amount due a contractor.
- (d) Authority To Invoice for TERO Fee. The Yurok Tribe Fiscal Department shall have the authority to invoice contractors for the TERO fee, if the TERO fee is not automatically deducted.

SECTION 4603. TERO Fee Exemption

The Tribal Council in its sole discretion and by resolution may waive the TERO fee for any contract or activity. In addition, the TERO fee is waived for the following activities:

- (a) Participation on a Tribal committee;
- (b) Yurok Tribe timber harvest contracts;
- (c) Contracts utilizing exclusively TERO funds for training or job preparedness;
- (d) Contracts for cultural education services;
- (e) Contracts for child care;
- (f) Construction contracts for homes for Yurok Tribal members, where the Tribal member is required to repay the home loan;
- (g) Contracts for cultural monitoring; and
- (h) Contracts for Yurok language services.

SECTION 4604. TERO Fee Reconciliation

TERO shall forward copies of all TERO Permits and monthly report all TERO Permits then in effect to the Yurok Tribe Fiscal Department. Tribal entities shall monthly report all TERO fees collected by that Tribal entity for each outstanding TERO Permit to the Yurok Tribe Fiscal Department. The Yurok Tribe Fiscal Department shall maintain an accounting to ensure that the Tribe collects the entire TERO fee due by a covered employer under a TERO Permit.

CHAPTER 7. HEARINGS AND APPEALS

SECTION 4701. Filing Procedure for Alleged Violation

Any person who believes that a covered employer has failed to comply with this ordinance, or who believes that they have been discriminated against by a covered employer because they are Indian, may file a written allegation of that violation with TERO. The filer shall be responsible for providing TERO with sufficient evidence of the alleged violation to allow for an appropriate investigation by TERO.

SECTION 4702. Investigation by TERO Officer

Upon the TERO Officer's own allegation or upon written allegation of a violation, including violation of an Indian Preference Plan, the TERO Officer shall ensure a prompt and thorough investigation of the alleged violation. The TERO Officer shall seek to achieve an informal settlement of the alleged violation. The TERO Officer shall monthly report all alleged violations and their settlement, if any, to the Executive Office.

SECTION 4703. Issuance of Citation

- (a) Notice of Non-Compliance. If the TERO Officer determines that a violation of the ordinance exists and an informal settlement cannot be achieved, the TERO Officer shall issue a notice of non-compliance to the covered employer. This notice shall specify the nature of the violation and direct that the violation be corrected within 3 days or sooner where warranted.
- (b) Citation. If the violation is not corrected within the time specified, the TERO Officer shall issue a written citation to the covered employer that includes the following:
 - (1) The name of the violator;
 - (2) The signature of the TERO Officer or an authorized representative;
 - (3) The name and section number of the ordinance provision violated;
 - (4) A brief summary of the facts constituting the violation; and
 - (5) A time and place the covered employer must appear to answer to the violation at a TERO Officer hearing.
- (c) Imposition of Immediate Sanctions. Once the time specified in the notice of non-compliance to correct a violation has expired and prior to a hearing, the TERO Officer may impose any sanction permitted under this ordinance.
- (d) Right To a Hearing. A covered employer that receives a citation shall be entitled to a hearing before the TERO Officer. A covered employer must request such hearing within 10 business days of the date of the TERO Officer's citation. The TERO Officer shall conduct a hearing no later than 10 business days after receipt of a citation, unless the covered employer and TERO Officer agree to a later date.

SECTION 4704. TERO Officer Hearing Procedures

Hearing procedures shall comply with the requirements of due process, but not necessarily formal rules of evidence. A covered employer shall be entitled to present evidence and call and question witnesses to demonstrate that it has complied with the requirements of this ordinance or that it has made best efforts to do so and therefore should not be subject to sanctions. On the basis of evidence presented at the hearing, and the information collected by TERO, the TERO Officer shall determine whether or not the covered employer complied with this ordinance.

Within 5 business days of concluding the hearing, the TERO Officer shall issue a written order. The written order shall:

- (a) Contain a brief summary of the investigation and hearing proceedings;
- (b) Include findings of fact;
- (c) Provide the TERO Officer's determination of whether the covered employer has complied with the ordinance;
- (d) Identify any defenses such as best efforts that may excuse the covered employer's non-compliance; and
- (e) Direct the covered employer to take corrective action as necessary to remedy any harm caused by the non-compliance.

If the TERO Officer determines that the covered employer is out of compliance and such non-compliance is not excused, the TERO Officer by written order shall impose one or more of the sanctions provided for in this ordinance. The TERO Officer shall forward a copy of any order to the Executive Office.

SECTION 4705. Emergency Relief

When the TERO Officer determines that a violation has occurred that is of a critical nature requiring immediate remedial action, the TERO Officer may issue a citation and impose emergency sanctions without meeting notice requirements. The covered employer maintains a right to a hearing before the TERO Officer in accordance with section 4704.

SECTION 4706. Administrative Appeals

Any person adversely affected by a decision of the TERO Officer shall have the right to appeal the decision to the Executive Office. Any such appeal must be made within 10 business days of the date of the TERO Officer's written order. The Executive Office may decide the appeal based on the evidence in the record, including the TERO Officer's written order, or conduct a hearing de novo in accordance with TERO Officer hearing procedures. Within 5 business days of concluding an appeal hearing, or within 15 business days from filing of an appeal, whichever is later, the Executive Office shall issue a written order.

SECTION 4707. Final Administrative Action

A TERO Officer's citation for which a covered employer does not request a hearing shall become a final action 10 business days after the date of the citation. A written order of the TERO Officer after a hearing that is not appealed to the Executive Office shall become a final action 10 business days after the written order is issued. A written order of the Executive Office shall become a final action upon issuance.

CHAPTER 8. ENFORCEMENT AND SANCTIONS

SECTION 4801. Sanctions

A covered employer who violates this ordinance shall be subject to sanctions including, but not limited to:

- (a) Denial of the right to commence or continue business or contracts on Yurok lands, with a Tribal entity, or involving Tribal funds;
- (b) Suspension of operations on Yurok lands, with a Tribal entity, or involving Tribal funds;
- (c) Debarment or prohibition from engaging in commerce or contracts on Yurok lands, with a Tribal entity, or involving Tribal funds;
- (d) Payment of back pay and damages to compensate an injured party;
- (e) Imposition of monetary civil penalties;
- (f) An order to stop work until the provisions of this ordinance are satisfied;
- (g) An order to remove any employee hired in violation of this ordinance;
- (h) An order requiring the employment, promotion, or training of Indians injured by the

violation;

- (i) An order mandating changes in procedure or policies necessary to eliminate or correct the violation; and
- (j) An order mandating any other provision deemed necessary by the Tribal Council or Tribal Court to alleviate, eliminate, or compensate for the violation.

SECTION 4802. TERO Applicant Responsibilities

In order for TERO to conduct its services efficiently and to meet its goal of obtaining jobs for eligible Indians, TERO applicants are required to follow the work guidelines and procedures set forth by their respective employers. Failure to follow an employer's work requirements may be cause for disciplinary actions by the employer, up to and including termination. Failed drug screenings, poor employee performance reviews, disciplinary action, or termination by a covered employer may result in the TERO applicant forfeiting future client services, training and education opportunities, and TERO assistance for employment. These actions will be noted in the TERO applicant's file.

SECTION 4803. Willful Violation of TERO Ordinance

Covered employers have an affirmative duty to inform the TERO Officer of all contracts that are not exempt from the TERO fee, and that are not exempt from TERO Indian preference requirements. A person commits the offense of Willful Violation of TERO Ordinance if the person:

- (a) Holds an executive position or is a governing board member with a covered employer, and
- (b) Knows, should know, or fails to appropriately investigate whether a contract is subject to this ordinance, and
- (c) Knowingly, willfully, or intentionally fails to inform the TERO Officer that the covered employer has entered into a contract subject to this ordinance or to collect TERO fees as directed by this ordinance.

Each contract for which the person fails to inform the TERO Officer shall constitute a separate offense. A person who violates this section shall be subject to a minimum fine of \$100 for each offense and shall be held jointly and severally liable for any TERO fees due to the Tribe that are not collected from the contractor.

SECTION 4804. Debarment

- (a) Council may debar a covered employer at its own initiative or upon the written recommendation of the TERO Officer or Executive Office. Debarment prohibits a covered employer from engaging in commerce, bidding on contracts, or having a bid considered for a contract on Yurok lands, with Tribal entities, or involving Tribal funds.
- (a) A covered employer may be debarred for the following reasons:
 - (1) If a covered employer is found to have intentionally misrepresented its or a subcontractor's status as an Indian firm to TERO, the covered employer may be debarred for up to 5 years after the finding of such misrepresentation.
 - (2) If a covered employer is found to have violated this ordinance twice within a

5 year period, the covered employer may be debarred for up to 5 years.

- (b) Notwithstanding any other provisions in this section, Council maintains discretion to debar a contractor indefinitely.

SECTION 4805. Monetary Civil Penalties

The maximum monetary civil penalty that may be imposed for a violation of this ordinance is the maximum permitted under the Indian Civil Rights Act of 1968, 25 U.S.C. § 1302, as amended. TERO may establish a fee schedule setting the standard monetary civil penalty amount for violations of this ordinance. Each day during which a violation exists shall constitute a separate occurrence.

SECTION 4806. Late Payment of Fees; Interest

A covered employer that fails to timely pay the TERO fee may be subject to a monetary civil penalty or other sanctions and an interest rate of 15% per annum, compounded daily on all amounts owed, may be applied.

SECTION 4807. Enforcement; Costs

The TERO Officer shall be entitled to pursue the enforcement of any order of the TERO Officer, the Executive Office, or Tribal Court when necessary to enforce sanctions or to ensure compliance with the terms and conditions of any such order.

Any cost associated with the enforcement of an order issued pursuant to this ordinance may be assessed by the TERO Officer against the covered employer that is out of compliance. This may include but is not limited to document reproduction costs, administrative fees, filing fees, and attorney fees and costs.

CHAPTER 9. TRIBAL COURT REVIEW AND ENFORCEMENT

SECTION 4901. Tribal Court Review of Decisions

Any party to an appeal to the Executive Office who is dissatisfied with the Executive Office's decision may appeal that decision to the Yurok Tribal Court. Such appeal must be filed in accordance with Tribal Court rules and procedures and within 10 business days of the earlier of the following:

- (a) Five days after the date the Executive Office mails its decision to the party, or
- (b) The date the party receives an electronic copy of the Executive Office's decision.

SECTION 4902. Standard of Judicial Review

The Yurok Tribal Court shall review an appeal of the Executive Office's determination of factual findings for clear and convincing evidence of an error. Clear and convincing evidence means that the Tribal Court has a definite and firm conviction that the Executive Office's decision contained an unquestionable mistake. The Tribal Court shall review legal findings de novo, without any deference to the Executive Office's determination.

SECTION 4903. Tribal Court Enforcement of Decisions

The Tribal Court shall have the authority to issue any order or take any action necessary to enforce any final action of the TERO Officer or Executive Office. To request such Tribal Court order, the TERO Officer shall file a petition with the Tribal Court that includes:

- (a) A copy of the decision to be enforced;
- (b) A brief summary of the proceedings leading to the decision;
- (c) A statement as to the finality of the decision and lapse of the appeal deadline;
- (d) Identification of the person or entity subject to the decision;
- (e) Identification of any specific assets for the collection of monetary civil penalties; and
- (f) Sufficient facts showing the person or entity is not complying with the decision.

SECTION 4904. Remedies

Ruling on matters arising under this ordinance, the Tribal Court shall have the authority to assess and collect civil penalties, to enjoin or mandate actions to enforce the provisions of this ordinance, and to provide any other relief the Tribal Court deems lawful and equitable. Nothing in this provision or ordinance shall be construed as a waiver of the Tribe's sovereign immunity or as authority for a claim for money damages against the Tribe.

C*E*R*T*I*F*I*C*A*T*I*O*N

THE FOREGOING ORDINANCE, ENTITLED THE AMENDED YUROK TERO ORDINANCE, WAS PASSED AT A REGULARLY SCHEDULED MEETING OF THE YUROK TRIBAL COUNCIL ON MARCH 20, 2025 AT WHICH A QUORUM WAS PRESENT, AND THIS ORDINANCE WAS ADOPTED BY A VOTE OF 7 FOR, 0 OPPOSED AND 0 ABSENTIONS IN ACCORANDANCE WITH ARTICLE IV, SECTION 5(j) OF THE CONSTITUTION OF THE YUROK TRIBE.

DATED THIS 20TH DAY OF 2025

Joseph James, Chairperson
Yurok Tribal Council

ATTEST:

Toby Vanlandingham, Secretary
Yurok Tribal Council

DOCUMENT 01 10 00 SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description.
- B. Work sequence.
- C. Specifications Conventions

1.2 CONTRACT DESCRIPTION

The Yurok Tribe has been awarded funding from the US Environmental Protection Agency through a Drinking Water Tribal Set Aside grant. The funding will be used by the Yurok Tribe to construct 8,500 LF of water mains, 750 LF of water service lines, and approximately 2000 LF of transmission main. Flow meters, hydrants, and assorted valving installation will accompany these water lines. In addition, a 60,000-gallon bolted steel water tank, a roughing filter, a slow sand filter building, a chemical treatment and monitoring building, and backup generator power for these facilities will be constructed for the community of Ke-nek within the Yurok Reservation (41.220° N, 123.773° W).

All work shall be completed in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated in the BID SCHEDULE.

CA 21-F05 Yurok Ke-nek Water System Supplemental Funding

Perform Work of Contract under unit fixed price contract with Owner in accordance with Conditions of Contract.

1.3 WORK SEQUENCE

- A. Work shall be sequenced to minimize system downtime.
- B. Install new water main. Disinfect and pressure test. Connect existing water tank into new water main.
- C. Excavate, clear, and prepare sites for roughing filter, equalization basin, slow sand filter, and water tank. Include all required soil stabilization techniques, retaining walls, and foundations.
- D. Construct roughing filter, equalization basin, slow sand filter, and water tank. Install interior components.
- E. Construct building over sand filter beds.
- F. Construct chlorine building.
- G. Connect treatment components. Disinfect and pressure test.

- H. Construct and connect electrical components and controls.
- I. Connect components into distribution. Disinfect and pressure test.

1.4 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 11 90

REVISIONS TO STANDARD SPECIFICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Revisions or amendments to standard specifications.
2. Changes to product requirements.
3. Changes to execution requirements.

B. Related Sections:

1. Section 03 10 00 – Concrete Forming and Accessories
2. Section 13 34 19 – Metal Building Systems
3. Section 26 05 19 – Electrical Conductors and Cables
4. Section 26 05 33 – Conduit and Boxes for Electrical Systems
5. Section 31 23 17 – Trenching
6. Section 33 05 17 – Precast Concrete Valve Vaults and Meter Boxes
7. Section 33 11 13 – Water Distribution Mains
8. Section 33 11 16 – Water Utility Distribution Valves and Hydrants
9. Section 33 12 13 – Water Service Connections
10. Section 33 16 20 – Bolted Steel Water Storage Tanks

1.2 Section 13 34 19 – Metal Building Systems – REMOVE SECTION ‘1.3 SYSTEM DESCRIPTION’ IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

A. Single span rigid frame

B. Primary Framing: Rigid frame of rafter beams and columns, intermediate columns (where required), braced end frames, end wall columns, and wind bracing.

C. Secondary Framing: Purlins, girts, eave struts, sill supports, clips and other items detailed.

D. Wall System: Preformed metal panels of vertical profile, liner sheets, and accessory components.

E. Roof system: Preformed metal panels of upslope profile, liner sheets, and accessory components.

F. Roof Slope: 6 inches in 12 inches’ slope.

1.3 Section 26 05 33 – Conduit and Boxes for Electrical Systems – ADD THE FOLLOWING: TO ‘1.1 SUMMARY’

A. All work to be completed in accordance to the Electric Service Requirements Manual, Pacific Power. This document is available at www.pacificpower.net

PART 2 PRODUCTS

2.1 Section 03 10 00 – Concrete Forming and Accessories – ADD SECTION ‘2.3 FASTENERS’

A. Wedge Type Expansion Anchor Bolt

1. Manufacturers: Red Head or approved equal
2. Description
 - a. Stainless Steel
 - b. Of size depicted on Drawings (SWW-3836)
 - 1) SWW-3836
 - 2) 3-3/4” Overall Length
 - 3) Fastens through up to 1-7/8” of material
 - 4) 3/8” anchor dia – 16 threads per inch, 2.5” Thread Length

2.2 Section 08 13 14 – Standard Steel Doors – REPLACE THE FOLLOWING SECTION “2.1 STANDARD STEEL DOORS” WITH

A. Manufacturers:

1. Mesker Door Model N-Series
2. Trudoor – Hollow Metal Door with Louver
3. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Description:

1. Metal Door – 18-Gauge Steel Face Sheets
2. 3068 or 3070 – as specified in Drawings
3. With 24” x 18” Louvered Vent
4. For Exterior Applications
5. “Reverse” or “Outswing” Orientation (Opens towards exterior)
6. Insulated, SDI 108, 1-3/4” Thick
7. Level 2 – Heavy Duty, Model 1, Full Flush Design

2.3 Section 08 71 00 – Door Hardware – ADD THE FOLLOWING TO SECTION “2.1 DOOR HARDWARE”

A. Manufacturers

1. Trudoor
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Accessories

1. Accessories shall conform to 08 71 00 Door Hardware
2. Rim Exit Device and Locking Lever Handle
 - a. Trudoor - TDE-2000R-KIL Rim Exit with Keyed Entry Level Rim
 - 1) Deadlocking Latchbolt, 5/8” projection
 - 2) Non-handed for interior side
 - 3) Locking lever doorknob for exterior side
 - 4) For 3’ wide door
3. Door Closer
 - a. Trudoor TDC-300 Grade-1 Door Closer
 - 1) ANSI 156.4 Grade 1 Standards

- 2) Adjustable Spring Power
- 3) Aluminum Finish

2.4 **Section 13 34 19** – Metal Building Systems – REPLACE SECTION ‘2.5 COMPONENTS – OVERHEAD DOORS’ IN ITS ENTIRETY WITH THE FOLLOWING:

A. Overhead Doors:

1. Manufacturers:

- a. Cookson Model ERD-10
- b. DBCI 2000 Series, Light Roll Up
- c. Substitutions Permitted: Section 01 60 00 - Product Requirements

2. Description:

- a. Steel overhead sectional door, manual operation, stock configuration and hardware
- b. Outer steel sheet of minimum 0.058 inches thick, flat profile
- c. 12’ Wide, 10’ Tall opening size
- d. Color by Tribe direction

B. Overhead Door Frame

- 1. Formed steel sections braced to building frame

2.5 **Section 13 34 19** – Metal Building Systems – REPLACE SECTION ‘2.9 FABRICATION – WALL AND ROOF SYSTEMS’ IN ITS ENTIRETY WITH THE FOLLOWING:

A. Siding: Minimum 26-gauge metal thickness, preformed ribbed steel profile, lapped edges fitted with continuous gaskets.

B. Roofing: Minimum 24-gauge metal thickness, ribbed profile, lapped or male/female edges fitted with continuous gaskets.

- 1. Roof Surfaces: ENERGY STAR compliant with minimum solar reflectance index (SRI) of 78 for 75 percent of roof area, calculated in accordance with ASTM E1980.

- a. Reflectance: Measured in accordance with ASTM E903, ASTM E1918, or ASTM C1549.
- b. Emittance: Measured in accordance with ASTM E408 or ASTM C1371.

C. Liner: Minimum 28-gauge metal thickness, V crimped profile, lapped V edges fitted with continuous gaskets.

D. Soffit Panels: Minimum 24-gauge metal thickness, V crimped profile, unperforated.

E. Girts/Purlins: Rolled formed structural shape to receive siding, roofing sheet.

F. Internal and External Corners: Same material thickness and finish as adjacent material, profile shop cut and factory mitered to required angles. Back brace mitered internal corners with 26-gauge thick sheet.

G. Flashings, Closure Pieces, Fascia, and Caps: Same material and finish as adjacent material, profile to suit system.

- H. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive finish.
 - I. Ventilator: Sheet steel, galvanized, rotary continuous ridge design.
 - J. Roof Ridge Vent
 - 1. Manufacturer:
 - a. LOMANCO – VUR-10 Aluminum Ridge Vent
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Type:
 - a. Ridge ventilation system
 - b. 10” Length
 - c. Fits roof pitches 3/12 to 8/12
 - d. With interlocking male/female connections
 - e. With V-PLUG Accessories for exposed ends
 - K. Gable Vents
 - 1. Manufacturer:
 - a. LOMANCO – A88B - Triangular Line Gable Vents
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Type:
 - a. Color: Best match for wall, by Tribe direction
 - b. All aluminum Louver
 - c. Adjustable pitch – match to building roof pitch (6/12)
 - L. Wall Vents
 - 1. Manufacturer:
 - a. McMaster-Carr – Fixed-Blade Wall Louver
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Type:
 - a. For 12” x 12” Opening
 - b. Overall 14.5” x 14.5”
 - c. Aluminum Construction
- 2.6 **Section 13 34 19 – Metal Building Systems – REMOVE SECTION ‘2.10 FABRICATION – GUTTERS AND DOWNSPOUTS’ AND REPLACE WITH:**
- A. Fabrication of gutters of downspouts shall be of aluminum
 - B. Form gutters and downspouts of profile and size to collect and remove water. Fabricate with connection pieces.
 - C. Form sections in maximum possible lengths. Hem exposed edges.
 - D. Fabricate support straps of same material and finish as roofing metal, color as selected.
 - E. Downspouts shall join into drainage pipe by drain box.

2.7 Section 22 40 00 – Plumbing Fixtures – REPLACE SECTION ‘2.1 UTILITY SINKS’ WITH

A. Sink

1. Manufacturers:
 - a. Global Industrial: Stainless Steel Utility Sink W/ Faucet
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
2. Description
 - a. 24” x 24” x 14” Deep, 1 Compartment Basin
 - b. Metal Construction
 - c. Two handle faucet
 - d. Labeled with “Non-potable” – to be added by contractor

2.8 Section 22 40 00 – Plumbing Fixtures – REPLACE SECTION “2.2 EMERGENCY COMBINATION SHOWER WITH EYE AND FACE WASH” WITH “RESERVOIR BASED EYE WASH STATION”

A. Reservoir-Based Eye Wash Station

1. Manufacturer:
 - a. Fendall Pure Flow 1000 Eyewash Station
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
2. Description:
 - a. Reservoir-based, Self-Contained, Eyewash Station
 - b. Capable of delivering 0.4 GPM for 15 minutes
3. Accessories
 - a. Fendall Refill Cartridges (Set of 2)
 - b. Fendall Universal Stand

2.9 Section 26 32 13 – Engine Generators – REPLACE SECTION “2.2 GENERATOR” WITH

A. Generator

1. Manufacturer:
 - a. Generac Guardian Series
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
2. Generator manufacturer shall have an authorized dealership within 125 miles of the installation location.
3. Product Description: DC Coupled Generator, to be used with Propane.
4. Rating: 10kW, nominal full load power generation
5. Enclosure: NEMA
 - a. Doors to be keyed and lockable.

2.10 Section 26 32 13 – Engine Generators – REPLACE SECTION “2.4 TRANSFER SWITCH” CONTENT WITH:

A. Automatic Transfer Switch

1. Manufacturers:
 - a. Generac – PWRcell Automatic Transfer Switch
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
2. Description
 - a. 200A Rated

- b. NEMA 3R Enclosure
- c. Service Entrance Rated
- d. Bi-Directional
- e. Automatic Bypass Switch

2.11 Section 26 32 13 – Engine Generators – ADD SECTION “2.7 PROPANE TANK”:

A. Propane Tank

1. Manufacturers:

- a. Kleen-Rite
- b. Substitutions Permitted: Section 01 60 00 – Product Requirements

2. Description

- a. Horizontal Cylinder shaped
- b. 500 Gallon Volume, to hold 400 gallons of propane at rated capacity
- c. Fitted with all valves and connections required for standard operation, all rated to handle 250 p.s.i.g.
- d. NFPA 58

2.12 Section 26 51 00 – Interior Lighting – REPLACE SECTION 2.1 IN ITS ENTIRETY AND REPLACE WITH ‘2.1 LUMINAIRES’:

A. Interior Lighting

1. T8 Interior Light

a. Manufacturers:

- 1) [McMaster-Carr – Wraparound-Lens Ceiling Light](#)
- 2) Substitution Permitted: Section 01 60 00

b. Description:

- 1) 48” Long
- 2) Two T8 4’ Bulbs
- 3) 32W per T8 bulb
- 4) Include bulbs with installation

2. UFO High Bay Light

a. Manufacturers:

- 1) [Aries High Bay Light, 100W – WareLight](#)
- 2) Substitutions Permitted: Section 01 60 00 – Product Requirements

b. Description:

- 1) LED
- 2) 100W, 150 lumens/Watt
- 3) 15000 Lumen
- 4) 4000K Color Temperature
- 5) Input Voltage: 120V – 277V

2.13 Section 26 56 00 – Exterior Lighting – REPLACE SECTION 2.1 IN ITS ENTIRETY AND REPLACE WITH ‘2.1 LUMINAIRES’:

A. Exterior Lighting

1. Motion Sensing Light

- a. Manufacturers:
 - 1) Lithonia Lighting – [HGX LED 2RH ALO SWW2 120 PIR DDB](#)
 - 2) Substitutions Permitted: Section 01 60 00 – Product Requirements
- b. Description
 - 1) Motion-activated
 - 2) For exterior application
 - 3) Mounts to recessed junction box (4x4 round, square, or octagonal)
 - 4) Adjustable light orientation, without tools required
 - 5) Adjustable light output

2. Floodlight

- a. Manufacturers:
 - 1) [Commercial Electric 46-Watt Bronze Outdoor Integrated LED Street Lamp](#)
 - 2) Substitution Permitted: Section 01 60 00
- b. Description:
 - 1) 5000 Lumens, 46-Watt
 - 2) Power: Hardwired
 - 3) IP65

2.14 **Section 31 25 13** – Erosion Controls – ADD THE FOLLOWING TO SECTION “2.1 ROCK MATERIALS”:

A. Drain Rock

- 1. Manufacturers:
 - a. Graniterock ¾” Drain Rock
 - b. Substitution Permitted: Section 01 60 00
- 2. Type:
 - a. ¾” Drain Rock, nominal size
 - b. Clean and washed, free of organics
 - c. With 100% of grain sizes smaller than 1” per sieve analysis
 - d. With 60% of grain sizes between ¾” and ½” per sieve analysis

2.15 **Section 31 37 00** – Rip Rap – ADD THE FOLLOWING TO SECTION “2.1 MATERIALS”:

A. Geotextile

- 1. Manufacturer: Tensar TriAx Geogrid or approved equal
- 2. Type: TX 130S

2.16 **Section 32 11 23** – ADD THE FOLLOWING TO SECTION 2.1 “AGGREGATE MATERIALS”

A. Class 3 Aggregate Base

- 1. Description:
 - a. With less than 4% organics
 - b. Adhering to 2018 CALTRANS Standard Specifications 26-1.02C
 - c. For 3/4-inch maximum aggregate gradation

Aggregate Gradation				
Sieve size	Percentage passing			
	1-1/2 inch maximum		3/4 inch maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	--	--
1-1/2"	90-100	87-100	--	--
1"	--	--	100	100
3/4"	50-90	45-95	90-100	87-100
No. 4	25-60	20-65	40-70	35-75
No. 30	10-35	6-39	12-40	7-45
No. 200	3-15	0-19	3-15	0-19

B. Imported Fill

1. Description:

- a. Sandy Loam
- b. With less than 4% organics
- c. With 85% of grain sizes smaller than 2-1/2"
- d. Adhering to the following texture analysis:

Imported Fill	
Texture Type	Percentage Makeup
Sand	65-75%
Silt	15-20%
Clay	10-15%

2.17 Section 33 05 17 – Precast Concrete Valve Vaults and Meter Boxes –REMOVE SECTION ‘2.1 A WATER METER BOX MANUFACTURERS’ IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

A. Water Meter Box Manufacturers:

1. Christy N36 water meter box and lid or approved equal
 - a. Size: 12 inch (H) x 30 inch (L) x 17 inch (W)
 - b. Material: Concrete
 - c. Utilize one box for water meter and one box for check valve and union as shown in drawings

2.18 Section 33 05 17 – Precast Concrete Valve Vaults and Meter Boxes – ADD THE FOLLOWING TO SECTION ‘2.1.C –VALVE VAULT AND METER BOX FRAMES AND COVERS’

A. Custom Vault Lid

1. Furnish and install single door access hatch with safety grate as shown on the Drawings. The access hatch shall be integrally cast into the concrete slab. The top of the access hatch shall be flush with the top of the concrete roof. The minimum cleat hatches opening dimensions shall be as shown on the Drawings the manufacturer shall warranty that the assembled

access hatch shall be free of defects in material and workmanship for a period of (5) five years from date of project acceptance.

2. The door shall be equipped with a hold open arm. Door shall lock open in the 90-degree position.
3. Hatch cover shall be ¼-inch aluminum diamond plate. The access hatch hardware shall be constructed of grade 316 stainless steel.
4. Hatch shall be supplied with a recessed slamlock, with keyway protected by a threaded plug. Plug shall be flush with the top of the diamond plate.
5. Safety grate shall be provided beneath the hatch cover for fall through protection when the covers are open. The safety grate shall be reinforced to support a minimum live load of 300 PSF with a maximum deflection of 1/150th of the span.
6. Safety grate shall be provided with a permanent hinging system that will lock the gates in the 90 degree position once opened. Grate openings shall be 5" by 5" to allow for visual inspection of the wet well while the grating is in place.

2.19 Section 33 11 13 – Water Distribution Mains – ADD THE FOLLOWING TO SECTION ‘2.1 WATER PIPING’

A. Plastic Tubing

1. Manufacturers:

- a. McMaster-Carr – Masterkleer PVC Tubing
- b. Substitutions Permitted: Section 01 60 00 – Product Requirements

2. Description:

- a. Size: As shown on Drawings
- b. NSF/ANSI 51

B. Plastic Tubing Fittings and Accessories

1. Barbed Check Valves for Tubing

a. Manufacturers:

- 1) McMaster-Carr – Nylon body spring-loaded piston check valve
- 2) Substitutions Permitted: Section 01 60 00 – Product Requirements

b. Description:

- 1) Size: as shown on Drawings
- 2) Male NPT Inlet, Male Barbed Outlet
- 3) Nylon body
- 4) Stainless Steel 316 Spring

2.20 Section 33 11 13 – Water Distribution Mains – ADD THE FOLLOWING AFTER SECTION ‘2.6 ACCESSORIES’:

A. Pipe Supports

1. Unistrut

a. Pipe Support: Model P1000, Model P1001

- 1) ST Finish – Stainless Steel Type 316

b. Pipe Clamps: Model P1119 for 3-inch pipe, P1117 for 2-inch pipe, P1113 for 1-inch pipe

- 1) ST Finish – Stainless Steel Type 316

2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Stainless Steel Splash Plate Assembly

1. Stainless Steel Pipe Support Flats

a. Type:

- 1) ¼" Thick, 1" Wide, for use in 2' lengths

2. Stainless Steel Splash Plate Square

a. Type:

- 1) ¼" Thick, 8" Square
2) Type 316 Stainless Steel

C. Hose Clamps

1. Manufacturers:

- a. McMaster-Carr - General Purpose Worm-Drive clamp with Nonslip Screw
b. Substitutions Permitted: Section 01 60 00 – Product Requirements

2. Type:

- a. Size: 2-3/4" to 3-3/4"
b. 301 Stainless Steel
c. Band Width: 9/16"
d. Band Thickness: 0.022"

D. Marker Posts

1. Manufacturers:

- a. Blackburn – Hybrid 1-Rail Post
b. Substitutions Permitted: Section 01 60 00 – Product Requirements

2. Type:

- a. 5' Height Minimum (Including buried height)
b. Supply with decal or engraved marking of specified appurtenance

E. Poly Tank Ring Wall

1. Description:

- a. 14 gauge galvanized steel, 6-inch width

2.21 **Section 33 11 16** - Water Distribution Valves and Hydrants – ADD THE FOLLOWING TO '2.11 ACCESSORIES':

A. Pressure Relief - 130 psi set pressure

1. Manufacturer:

- a. Kunkle (www.emerson.com)
1) Model: 171S
b. Cla-Val (www.cla-val.com)
1) Model: 55B-60: 40-200 psi range
c. Stra-Val (www.straval.com)
1) Model: RVL-21

2. Type:

- a. 2 inches and smaller: bronze or stainless steel body, teflon or silicone seat, steel stem and springs, automatic, direct pressure actuated.
b. Threaded Outlet

- c. Factory set to 75 psi for flow over 30 gpm
 - d. Size: As shown on Drawings
- B. Sample Tap – plain-end sampling valve
 - 1. Manufacturer: Legend Valve T-532 or approved equal
 - 2. Description:
 - a. Inlet Size: ½ or ¾ inch, as specified on Drawings
 - b. Model: T532NL
 - c. Material: bronze or brass
 - d. Outlet to be plain end, NOT threaded
- C. Pressure Gauge
 - 1. Manufacturer: McMaster-Carr PN: 4090K15 or approved equal
 - 2. Description:
 - a. Size: 2 ½ inch dial diameter, liquid type
 - b. ¼” NPT Connection
 - c. 0-100 PSI Reading Range
- D. Transition Coupler – HDPE to PVC compression fitting
 - 1. Manufacturer: ELOPRESS or approved equal
 - 2. Size: as sized on Drawings
 - 3. Description: Mechanical compression for use with high, medium, or low density polyethylene pipes. Gray side for PVC Sc. 40/80 connection, blue side for HDPE connection
- E. Reducing Transition Coupler – HDPE to PVC compression fitting
 - 1. Manufacturer:
 - a. CEPEX or approved equal
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Size: 1” HDPE end, ¾” PVC end
 - 3. Description: Mechanical compression for use with high, medium, or low density polyethylene pipes. Gray side for PVC Sc. 40/80 connection, blue side for HDPE connection.
- F. Tapping Saddles
 - 1. Manufacturers:
 - a. McMaster-Carr Thick-Wall Plastic Pipe Fittings Service Saddle
 - b. Mueller DR2S Ductile Iron Service Saddles
 - c. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Description:
 - a. 200+ psi maximum
 - b. 4.5” width or lesser for 6” x 2” size
 - c. Wraparound Design
 - d. Threaded tee connection
 - e. Size: As shown in drawings
- G. Lockable PVC Ball Valve
 - 1. Manufacturers:

- a. Hayward – TBH Series True Union Ball Valve
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
- 2. Details:
 - a. Size: as sized in Drawings
 - b. Connection: Socket
 - c. Pressure Rating: 150 PSI
 - d. Full-port Design
 - e. Standard Lock-Out Feature Securable to Body
 - f. Provide Lock and Key
- H. PVC Ball Valve
 - 1. Manufacturers:
 - a. GF Piping Systems – Ball Valve Type 375
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Details:
 - a. Size: as sized in Drawings
 - b. Connection: Socket
 - c. Pressure Rating: 150 PSI
 - d. Full-port Design
- I. PVC Check Valve
 - 1. Manufacturers:
 - a. Hayward Check Valve, Inline True Union
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Size: as sized on Drawings
 - 3. Description:
 - a. Union connection
 - b. For horizontal or vertical installation, as shown in drawings
- J. Iron Check Valve
 - 1. Manufacturers:
 - a. MILWAUKEE VALVE Swing Check Valve
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 - 2. Size: As sized on drawings
 - 3. Description
 - a. Flange x Flange connections
 - b. Rated for 200 psi
 - c. Cast-iron Construction
- K. Lockable Butterfly Valve
 - 1. Manufacturers:
 - a. [McMaster-Carr](#) – 316 Stainless Steel Flow-Adjustment Lug Valve
 - 2. Size: As sized on Drawings
 - 3. Description
 - a. Manual actuation, lockable butterfly valve
 - b. Flanged Connection
- L. Pressure Reducing Valve
 - 1. Manufacturers:

- a. Zurn-Wilkins – Model ZW209BP
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
- 2. Size: As sized on Drawings
- 3. Description:
 - a. Pressure Reducing Valve with Low-Flow Bypass, Pilot Controlled
 - b. To handle low flow ranges of 0-15 GPM
 - c. Ductile Iron Body
 - d. 150# Flange Ends
 - e. To be set to pressures shown on Drawings
 - f. 3” or 6” main body, as shown on Drawings

M. Altitude Valve

- 1. Manufacturer: CLA-VAL Altitude Valve for One-Way Flow or approved equal
 - a. E-210-01, Globe orientation
 - b. Size: 6”
 - c. Connection: 150# Flanged
 - d. Adjustment Range: 5-40 ft
 - e. Optional Features
 - 1) Check Valve with Isolation Valve
 - 2) Dry Drain
- 2. Sensing Line (for Altitude Valve)
 - a. ¾” Schedule 80 PVC
 - b. Aboveground PVC shall be coated with PVC primer followed by acrylic paint for UV protection
 - c. Install at minimum 2% slope

N. Strainer

- 1. Manufacturer:
 - a. Cla-Val X43H “H” Strainer or approved equal
 - 1) Body, Cover, & Support Frame: Ductile Iron – ASTM A536
 - 2) Size: As specified in Drawings
 - 3) Strainer: 316 Stainless Steel
 - 4) Strainer Mesh: 10 Mesh
 - 5) Pressure Rating: Class 150 lb
 - 6) Connection 150# Flanged
 - 7) Opens for maintenance from top

O. Air Relief Valve

- 1. Manufacturer:
 - a. VALMATIC
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
- 2. Connection Size: 1” or 2”, as sized on Drawings
- 3. Orifice Size: 1/32”
- 4. Certified Lead Free
- 5. NSF 61

P. Combination Air Valve

- 1. Manufacturer:

- a. VALMATIC
- b. Substitutions Permitted: Section 01 60 00 – Product Requirements
- 2. Description:
 - a. Combining the functions of an Air/Vacuum Valve and Air Release Valve
 - 1) Release air during fill
 - 2) Vacuum protection
 - 3) Release entrained air during operation
 - b. NPT Inlet Connection
 - c. NSF 61
 - d. AWWA C512

Q. Restrained Flange

- 1. Manufacturers:
 - a. EBAA Iron MEGAFLANGE
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
- 2. Description
 - a. Restrained Flange Connection
 - b. Size: As sized on drawings, where restrained joints specified

R. Galvanic Flange

- 1. Manufacturer:
 - a. McMaster-Carr PN: 9165K79 (<https://www.mcmaster.com/9165k79>)
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
- 2. Type:
 - a. Size: as specified on Drawings
 - b. Gasket kit with bolt holes for dissimilar metals. “Includes 4 full-length phenolic sleeves, 8 phenolic washers, 8 zinc-plated metal washers”.

2.22 **Section 33 12 13** – Water Service Connections –REMOVE SECTION ‘2.5 WATER METERS’ IN ITS ENTIRETY AND REPLACE WITH

“A. Manufacturer and Product List:

- 1. System Water Meter – Seametrics IMAG4700p-0400-F1-P-A1-X-01-015D – or approved equal
 - a. Magnetic meter with both ‘one pulse’ and ‘4-20mA’ outputs, 150-lb ANSI flanged, NSF gaskets, 60 Hz AC power
 - b. Size: 4 inch
 - c. Connection Type: Flanged, NSF Gaskets
 - d. Analog Output: 4-20 mA
 - e. With Data Logger
- 2. Residential Water Meter – Badger Meter – Recordall Disc Meter – Model 35 - ¾” – or approved equal
 - a. ¾” NPT Connections
 - b. Lead Free Bronze Alloy
 - c. ANSI/AWWA C700
 - d. Direct Magnetic Drive

- B. Where indicated, furnish materials in accordance with manufacturer and model indicated on drawings.”

2.23 Section 33 16 20 – Bolted Steel Water Storage Tanks – REMOVE SECTION ‘2.7 FLEXIBLE PIPE COUPLINGS’ AND REPLACE WITH:

A. Manufacturer List:

1. EBAA Iron Inc. FLEX-TEND Force Balanced Flexible Expansion Joint
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Description:

1. 4 or 6 inch, as specified in Drawings
2. Flanged #150 Connection
3. Ductile Iron
4. Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of 20°. The flexible expansion fitting shall not expand or exert an axial imparting thrust under internal water pressure with a total minimum linear travel of 8-inches.
5. Shall be installed vertically plumb and horizontally level

2.24 Section 33 16 20 – Bolted Steel Water Storage Tanks – ADD TO SECTION “2.8 TANK ACCESSORIES”

C. Tank Float Valve

1. Manufacturers:
 - a. [Grainger – Float Valve: Pipe Mount, 3 in size, NPT, 400 GPM Valve Flow](#)
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
2. Description:
 - a. FNPT Connections
 - b. Stainless Steel Rod, 3/8” NPT, 20” Length
 - c. 400 GPM at 60 psi, 125 GPM at 20 psi
 - d. 8” Float Size, Stainless Steel Float

D. Tank Float Switch

1. Manufacturers:
 - a. [SJE Rhombus – SJE SignalMaster – 15SGMWENC](#)
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
2. Description
 - a. Externally Weighted
 - b. Mechanically-activated, snap action contacts
 - c. High impact, corrosion resistant, polypropylene housing
 - d. Normally-closed model (low level), White Cap
 - e. 5 amp, 125/250 VAC, 50/60 Hz
 - f. 15-foot cable

2.25 Section 44 44 14 – Chemical Feed Pumps – REPLACE SECTION “2.1 CHEMICAL FEED PUMPS” IN ITS ENTIRETY AND REPLACE WITH:

A. Manufacturers:

1. Liquid Metronics (LMI)
 - a. Series C Chemical Metering Pump “C92-1-368SI”
 2. Substitutions permitted, unless otherwise specified in Drawings. Section 01 60 00 – Product Requirements
- B. Electronically controlled solenoid actuated diaphragm type
- C. Materials of Construction: PVC head and fittings, ceramic balls, fluorofilm diaphragm, PVDF/Polyprel check valve, or as appropriate for chemical being pumped.
- D. Controls:
1. Pump powered by plug and cord connected to 120 volts AC, 1 phase short stroke electronically controlled solenoid actuator.
 2. Pump stroke length manually adjustable over 10: 1 ratio.
 3. Stroke frequency adjustable over 100: 1 ratio.
- E. Pump shall have flow-responsive control via receiving a 4-20mA signal, with user scalable endpoints, to provide pump output proportional to signal input.
- F. Pump Accessories:
1. Furnish combination back pressure and pressure relief valve (four function valve) for each feed pump mounted on discharge end of pump creating back pressure on pump to creating accurate metering, preventing siphoning, relieving excess pressure by bypassing pumped liquid back to storage tank, and enabling depressurizing of pump discharge head and line without removal of discharge tubing or fittings. Valve constructed of PGC or PVDF.
 2. Furnish plastic wall mounting shelf for each pump.
 3. Furnish one graduated calibration column. Materials of construction compatible with chemicals being used.
- G. Capacity:
1. Location: as shown in Drawings.
 2. Chemical Pumped: Liquid sodium hypochlorite, unless otherwise shown in Drawings.
 3. Discharge Capacity: as shown in Drawings.
 4. Discharge Pressure: as shown in Drawings.
- 2.26 **Section 44 44 14** – Chemical Feed Pumps – ADD THE FOLLOWING SECTION TO “PART 2 PRODUCTS”
- A. Secondary Containment
1. Manufacturers:
 - a. [McMaster-Carr Plastic Spill-Control Pallet with Bladder](#) – 5148T23
 - 1) Include bladder accessory – McMaster-Carr 5148T85
 - b. Substitutions Permitted: Section 01 60 00 – Product Requirements
 2. Description:
 - a. Style C
 - b. For one 55-gallon drum, 75-gallon capacity
 - c. EPA 40, CFR 264.175
 - d. With bladder accessory

- B. Tank Mixer
 - 1. Manufacturers:
 - a. J.L. Wingert Mixers
 - b. Substitutions permitted: Section 01 60 00 – Product Requirements
 - 2. Description:
 - a. ¼ horsepower
 - b. 1725 rpm
 - c. With clamp
 - d. With 316 Stainless Steel Shaft and Impeller

PART 3 EXECUTION

- 3.12 **Section 06 10 00** – Rough Carpentry – ADD THE FOLLOWING SECTION AFTER ‘3.4 TOLERANCES’

3.5 APPLICABLE STANDARDS

- A. Structure shall adhere to UBC Standards

- 3.13 **Section 26 05 19** – Electrical Conductors and Cables – ADD THE FOLLOWING SECTION TO ‘3.4 BUILDING WIRE’:

- F. Install buried electrical cable in conduit
 - 1. Conductor: AWG size and length per plans
 - 2. Insulation Voltage Rating 600 volts
 - 3. Insulation Type USE-2, XHHW-2, or RHW-2

- 3.14 **Section 31 23 17** – ADD THE FOLLOWING TO SECTION ‘3.3 TRENCHING’:

- L. Cultural Monitor

Contractor shall hire Owner-approved cultural monitor to observe all earth disturbing activities. This individual will observe such activities for the presence of historic, cultural, or archaeological properties. The Tribal Cultural Monitor represents the Tribe's cultural knowledge and interests during construction.

- 3.15 **Section 33 11 13** – ADD THE FOLLOWING SECTION TO ‘PART 3 EXECUTION’:

- A. Marker Posts
 - 1. Place with Engineer or YPUD Direction
 - 2. Shall be installed with minimum 3 feet bury depth and minimum 2 feet aboveground.

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Schedule of values.
- B. Applications for payment.
- C. Change procedures.
- D. Defect assessment.
- E. Unit prices.
- F. Alternates.

1.2 SCHEDULE OF VALUES

- A. Submit printed schedule on standard form included in Contract. Contractor's standard form or electronic media printout will be considered if no such form is included in the Contract, or with permission from Engineer.
- B. Submit Schedule of Values in duplicate within 15 calendar days after date of Owner-Contractor Agreement.
- C. Include in each line item, amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for each item.
- D. Revise schedule to list approved Change Orders, with each Application For Payment.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit one copy of each application on standard form included in contract.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: Submit at intervals stipulated in the Agreement.
- D. Submit with transmittal letter as specified for Submittals in Section 01 33 00 - Submittal Procedures.

- E. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include Engineer requested items with Application for Payment. Some examples of the types of information that may be requested:
 - 1. Current construction photographs as specified.
 - 2. Partial release of liens from major subcontractors and vendors.
 - 3. Record documents as specified, for review by Owner which will be returned to Contractor.
 - 4. Affidavits attesting to off-site stored products.
 - 5. Construction progress schedules, revised and current as specified.

1.4 CHANGE PROCEDURES

- A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. The Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on standard form included in Contract.
- C. The Engineer may issue a Notice of Change including a detailed description of proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change and the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within number of days shown in Notice of Change document.
- D. Contractor may propose changes by submitting a request for change to Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation. Document requested substitutions in accordance with Section 01 60 00 - Product Requirements.
- E. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under Work Directive Change. Changes in Contract Sum/Price or Contract Time will be computed as specified for Change Order.
- F. Work Directive Change: Engineer may issue directive, on standard form included in Contract, signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
- G. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.
- H. Change Order Forms: as included in Contract.
- I. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- J. Correlation of Contractor Submittals:

1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
3. Promptly enter changes in Project Record Documents.

1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Owner will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.
- D. Defective Work will be partially repaired to instructions of Engineer, and unit sum/price will be adjusted to new sum/price at discretion of Owner.
- E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Owner to assess defects and identify payment adjustments, is final.
- G. Non-Payment for Rejected Products: Payment will not be made for rejected products for any of the following:
 1. Products wasted or disposed of in a manner that is not acceptable.
 2. Products determined as unacceptable before or after placement.
 3. Products not completely unloaded from transporting vehicle.
 4. Products placed beyond lines and levels of required Work.
 5. Products remaining on hand after completion of the Work.
 6. Loading, hauling, and disposing of rejected products.

1.6 UNIT PRICES

- A. Authority: Measurement methods are delineated in individual specification sections.
- B. Measurement methods are delineated in Section 012700, Measurement and Payment. In event of conflict, requirements of Section 012700 govern.
- C. Take measurements and compute quantities. Engineer, Owner, or a designated representative will verify measurements and quantities.
- D. Unit Quantities: Quantities and measurements indicated in Bid Form are for contract purposes only. Actual quantities provided and approved shall determine payment.
 1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at unit sum/prices contracted.
 2. When actual Work requires 25 percent or greater change in quantity than those quantities indicated, Owner or Contractor may claim for Contract Price adjustment.

- E. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of item of the Work; overhead and profit.
- F. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.
- G. Measurement Of Quantities:
 - 1. Weigh Scales: Inspected, tested and certified by applicable state Weights and Measures department within past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicle.
 - 3. Metering Devices: Inspected, tested and certified by applicable State department within past year.
 - 4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
 - 5. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
 - 6. Measurement by Area: Measured by square dimension using mean length and width or radius.
 - 7. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
 - 8. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.
- H. Unit Price Schedule: (See Agreement)

1.7 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work.
- C. Schedule of Alternates: (See Bid Form included in Contract)

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 27 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Summary.
- B. Estimated quantities.
- C. Survey and measurements.
- D. Payment for increased or decreased quantities.
- E. Omitted items.
- F. Partial payments.
- G. Payment for material delivered.
- H. Final payment.
- I. Incidental work.
- J. Description of pay items

1.2 SUMMARY

- A. Work covered by this section includes method of measurement and basis of payment for all divisions included.
- B. Payment for the various items of the Bid Schedules, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, materials, labor, supplies, manufactured articles, transportation, and temporary facilities required to complete the work in accordance with contract documents including incidentals.
- C. Respective prices and payment shall constitute full compensation for all work completed including incidentals.
- D. All items not expressly listed as being provided by others that are necessary for the completion of work shall be furnished and installed by the Contractor.
- E. No payment shall be made for mobilization and demobilization of equipment, unless it is explicitly included as a bid item.

- F. The Contractor, in case of unit-price items measured for payment, shall be paid for the actual amount of Work accepted and for the actual amount of materials in place, as shown by final measurement. Plan quantity items shall be paid for at the unit price for the quantities shown on the plans and tabulated in the bid form.
- G. The Contractor, in case of lump sum amounts, or by plan quantities, shall be paid for the percentage of the work item completed as determined by the Engineer.
- H. All units of measurement shall be standard United States convention as applied to the specific items of Work by tradition and as interpreted by the Engineer.

1.3 ESTIMATED QUANTITIES

- A. All quantities stipulated in the bid schedule or other contract documents are approximate and are to be used: (1) as a basis for estimating the probable cost of the work and (2) for the purpose of comparing the bids submitted.
- B. The Contractor shall be paid for actual quantities installed based on the quantities measured in the field. The actual amounts of work completed and materials furnished may differ from estimated quantities. The Contractor shall make no claim for damages, anticipated profits, or otherwise, on account of differences between the estimated amounts and the actual amount of work performed and materials furnished.
- C. The payment of any partial estimate or of any retained percentage in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.4 SURVEY AND MEASUREMENTS

- A. All quantity measurements shall be the responsibility of the Contractor and will be verified by the project Engineer.
- B. All measurements and subsequent payments will be based on completed and accepted work performed in strict accordance with the drawings, specifications, and other contract documents.

1.5 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

- A. When alterations in the quantities of work are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of Work done. No allowance will be made for anticipated profits.

1.6 OMITTED ITEMS

- A. Should any items contained in the Bid Form be found unnecessary for the proper completion of the Work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.7 PARTIAL PAYMENTS

- A. Partial payments shall be made monthly as the work progresses. All partial invoices and payments shall be subject to the provisions of the General and Supplementary Conditions.

1.8 PAYMENT FOR MATERIAL DELIVERED

- A. When requested by the Contractor and at the discretion of the Engineer, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into Bid Items, have not been used and have been delivered to the construction site, or placed in storage places acceptable to the Engineer. Payment shall require paid invoices and proof of insurance and be subject to the provisions of the General and Supplementary Conditions.
- B. No partial payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind that are not a permanent part of the Contract.

1.9 FINAL PAYMENT

- A. The Engineer will make, as soon as practicable after the entire completion of the project, a final quantity invoice of the amount of the Work performed and the value of such Work. The Contracting Officer shall make final payments of the sum found due less retainages subject to provisions of the General and Supplemental Conditions.

1.10 INCIDENTAL WORK

- A. Incidental work items for which separate payment will not be made includes the following items, unless explicitly included as a bid item. This is not a complete and comprehensive list – see other Technical Specifications for more information:
 - 1. Pre-Construction photographs.
 - 2. Project record documents
 - 3. Traffic control plan and traffic regulation.
 - 4. Signs.
 - 5. Clean up and restoration of property.
 - 6. Restoration of fences and other structures.
 - 7. Cooperation and coordination with other contractors and utility companies.
 - 8. Utility crossings and relocations, unless otherwise paid for.
 - 9. Temporary utility service to buildings, as required to maintain service during construction.
 - 10. Minor Items – such as relocation of sign posts, guard rails, rock wall, mail boxes, curbs, traffic loop detectors, pavement markings, etc., damaged as a result of construction activities.
 - 11. Trench boxes, steel and/or wood sheeting as required, including that left in place.
 - 12. Maintenance of all existing water flows and repair of existing water pipes.
 - 13. Dust control.
 - 14. Erosion control.
 - 15. Clearing, grubbing, and stripping.
 - 16. Loaming, seeding, grading, liming, fertilizing, mulching, and watering.
 - 17. Routine flagman services.
 - 18. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications, and other submittals required by the Contract Documents.

19. Repair and replacement of water lines, culverts, under-drains, rock lined drainage trenches in streets and other utilities damaged by construction activities and corresponding proper disposal of removed materials unless otherwise paid for.
20. Weather protection.
21. Permits not otherwise paid for or provided by the Owner.
22. Visits to the project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required.
23. Mobilization and demobilization, unless specifically listed in Bid Schedule.
24. Excavation including the test pits specifically shown or ordered by the Engineer to establish underground utility locations.
25. Contract administration and insurance.
26. Test pits to establish in place field soils density, groundwater conditions, or requirements for de-watering.
27. Pipe markings.
28. Construction Trailer.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.1 DESCRIPTION OF PAY ITEMS

- A. The following sections describe the measurement of and payment for the Work to be done under the respective items listed in the Bid Form.
- B. Each unit or lump sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the Work completed.

SECTION 01 27 00: MEASUREMENT AND PAYMENT

- A. Mobilization and Demobilization:
 1. Basis of Measurement: By lump sum. Unless specifically listed in Bid Schedule, mobilization and demobilization shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.
 2. Basis of Payment: Includes all labor, equipment and materials to mobilize to and demobilize from the project site to complete the work outlined in the contract documents and for temporary facilities and controls as required. NOTE: Mobilization and demobilization line item shall not exceed 10% of total bid amount.

SECTION 02 30 00: CUTTING AND PATCHING

- A. Hot Mix Asphalt
 1. Basis of Measurement: by Cubic Yard
 2. Basis of Payment: Includes all labor, equipment, material, cutting and patching, backfill and compaction, asphalt repair, and traffic control.

SECTION 03 30 00: CAST IN PLACE CONCRETE

- A. Concrete

1. Basis of Measurement: by Cubic Yard
2. Basis of Payment: Includes all labor, equipment, materials, excavation, form-setting, reinforcement, compaction, placement and curing, finishing, testing,

SECTION 06 10 00: ROUGH CARPENTRY

- A. Wood Frame Building – Water Treatment Building
 1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes all labor, parts, installation, excavation, backfill and compaction, foundation, door steps, walls, insulation, openings, penetrations, frames, finishes, insulation, grading, roofing, paneling, accessories, pipe supports, building wiring, painting, and finishes.

SECTION 07 71 23: MANUFACTURED GUTTERS AND DOWNSPOUTS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 08 13 14: STANDARD STEEL DOORS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 13 34 19: METAL BUILDING SYSTEMS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Metal Frame Building - Sand Filter Building
 1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes all labor, parts, installation, excavation, backfill and compaction, foundation, door step, walls, openings, penetrations, frames, finishes, grading, roofing, accessories, pipe supports, pipe accessories, building wiring, painting, and finishes.

SECTION 22 05 03: PLUMBING PIPING

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 22 11 00: FACILITY WATER DISTRIBUTION

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Magnetic Flow Meter
 1. Basis of Measurement: by Unit, noted with or without box housing

2. Basis of Payment: Includes all labor, parts, water connection, disinfection, testing, wiring and connection, vault and supports when specified, verification, and adjustment.
- C. Pressure Gauge
 1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, parts, connection, disinfection, testing, and installation.
- D. Booster Pump
 1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, parts, installation, disinfection, testing, accessories, water connection, electrical connection, pump controls, pump starter, pump saver, and control connection.
- E. 5000-Gallon Poly Equalization Tank
 1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, delivery, parts, 5,000-gallon polyethylene tank, float system, ringwall and stakes, installation, tank penetrations, connections, excavation, foundation, backfill, compaction, disinfection, and testing.
- F. Roughing Filter
 1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, parts, excavation, installation, backfill and compaction, foundation, connection, accessories, concrete backwash structure, butterfly valve, disinfection, and testing.
- G. Unistrut Pipe Support
 1. Basis of Measurement: by Linear Foot
 2. Basis of Payment: Includes all labor, parts, connections, fasteners, delivery, and accessories.

SECTION 22 44 00: PLUMBING FIXTURES

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 26 05 03: EQUIPMENT WIRING CONNECTIONS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 26 05 19: ELECTRICAL CONDUCTORS AND CABLES

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 26 05 33: CONDUIT AND BOXES FOR ELECTRICAL SYSTEMS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Buried Electrical Cable
 - 1. Basis of Measurement: By linear foot, for size as indicated
 - 2. Basis of Payment: Includes labor, cable, pull boxes, conduit, materials, connections, delivery, handling, installing, excavation, backfill, bedding, and compaction.

SECTION 26 32 13: ENGINE GENERATORS

- A. 18 kW Propane Generator and Pad
 - 1. Basis of Measurement: by Lump Sum
 - 2. Basis of Payment: Includes all labor, parts, assembly, excavation, foundation, compaction, protection posts, testing, and connection.
- B. Automatic Transfer Switch
 - 1. Basis of Measurement: by Lump Sum
 - 2. Basis of Payment: Includes all labor, parts, assembly, wall mounting, testing, and electrical connections.

SECTION 26 27 26: WIRING DEVICES

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 26 51 00: INTERIOR LIGHTING

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 26 56 00: EXTERIOR LIGHTING

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 31 10 00: SITE CLEARING

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 31 22 13: ROUGH GRADING

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Retaining Wall
 - 1. Basis of Measurement: by Lump Sum

2. Basis of Payment: Includes all labor, design, excavation, fill, drain rock, compaction, grading, perforated piping, materials, and accessories.
- C. Excavation and Grading
1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes all labor, staking of final grade, excavation, grading, backfill, compaction, transport of spoils, testing,

SECTION 31 23 17: TRENCHING

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Cultural Monitoring
1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes hiring of Owner approved Tribal cultural monitor, who shall be on site to observe all earth disturbing activities.

SECTION 31 25 13: EROSION CONTROLS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Drain Dissipater
1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all parts, labor, installation, excavation, backfill, grading, geotextile fabric, rip rap, flapper valve, and accessories.
- C. 6' Manhole Drain Collector
1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes all parts, labor, installation, excavation, backfill, grading, concrete curing, perforations, connections, grout, lid, and accessories.

SECTION 32 11 23: AGGREGATE BASE COURSES

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Aggregate Base Course
1. Basis of Measurement: by Cubic Yard, for Class of Base
 2. Basis of Payment: includes all labor, material, transportation, excavation, placement, levelling, compaction, and testing.
- C. Imported Fill
1. Basis of Measurement: by Cubic Yard

2. Basis of Payment: includes all labor, material, transportation, excavation, placement, levelling, compaction, and testing.

SECTION 32 92 19: SEEDING

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 33 05 17: PRECAST CONCRETE VALVE VAULTS AND METER BOXES

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 33 11 13: WATER DISTRIBUTION MAINS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Water Main
 1. Basis of Measurement: by Linear Foot, for material and size specified
 2. Basis of Payment: Includes hand trimming, excavation, backfill, compaction, piping and fittings, pipe embedment, pipe markers, concrete thrust restraints, installation, connections to public utility water source and piping, accessories, disinfection and testing, and seeding.
- C. Transmission Main
 1. Basis of Measurement: by Linear Foot, for material and size specified
 2. Basis of Payment: Includes hand trimming, excavation, backfill, compaction, piping and fittings, pipe bedding, pipe markers, concrete thrust restraints, installation, connections to public utility water source and piping, accessories, disinfection and testing, and seeding.
- D. Drain Line
 1. Basis of Measurement: by Linear Foot, for material and size specified
 2. Basis of Payment: Includes hand trimming, excavation, backfill, compaction, piping and fittings, pipe embedment, pipe markers, concrete thrust restraints, installation, and accessories.
- E. Culvert Crossing
 1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, excavation, backfill, compaction, restraints and thrust blocking, casing pipe and insulation, potholing, and other investigations.
- F. Connection at Intake
 1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes all labor, parts, installation, piping, accessories, connections, support blocking, hand trimming, and testing.

SECTION 33 11 16: WATER DISTRIBUTION VALVES AND HYDRANTS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Gate Valve and Riser
1. Basis of Measurement: By Unit, for size and type in Bid Schedule.
 2. Basis of Payment: Includes all labor, parts, excavation, installation, disinfection and testing, compaction, valve, riser where specified, (1) gate valve key, protection posts, concrete collar, thrust blocks or restraints, backfill, fittings and accessories, and other appurtenances.
- C. Check Valve and Box
1. Basis of Measurement: by Unit, for size and type
 2. Basis of Payment: Includes all labor, parts, excavation, installation, disinfection and testing, compaction, valve, box where specified, backfill, fittings and accessories, supports, and other appurtenances.
- D. Flush Hydrant
1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, parts, disinfection and testing, installation, connection, excavation, backfill, compaction, and fittings and accessories.
- E. Air Release Valve
1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, parts, disinfection and testing, installation, connection.
- F. Combination Air Valve
1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, excavation, compaction, concrete and forms, parts, disinfection and testing, installation, connection.
- G. Float Valve
1. Basis of Measurement: by Unit
 2. Basis of Payment: Includes all labor, installation, connection fittings, adjustment, accessories, disinfection, and testing.
- H. Pressure Reducing Valve and Box
1. Basis of Measurement: by Unit, for size specified
 2. Basis of Payment: Includes all labor, excavation, installation, backfill, compaction, enclosure, support, fittings, connection to main, adjustment, testing and disinfection, valving, accessories, and other appurtenances.
- I. Altitude Valve and Box
1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes all labor, excavation, backfill, compaction, box and housing, base, sensing line, strainer, supports, tank connection, PVC sensing line, adjustment, disinfection, and testing.

SECTION 33 12 13: WATER SERVICE CONNECTIONS:

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Residential Water Meter and Box
 - 1. Basis of Measurement: By the unit.
 - 2. Basis of Payment: Includes all labor, excavation, meter, concrete box, meter setting equipment, supports, backfilling, compaction, fittings, and accessories.
- C. Water Main Connection
 - 1. Basis of Measurement: Lump Sum
 - 2. Basis of payment: Pipe and fittings for domestic water service connections to buildings, pressure testing and disinfection, excavation, backfill, compaction, and labor.

SECTION 33 13 00: DISINFECTING OF WATER DISTRIBUTION

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

SECTION 33 16 20: BOLTED STEEL WATER STORAGE TANKS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. 60,000-Gallon Bolted Steel Storage Tank
 - 1. Basis of Measurement: Lump Sum
 - 2. Basis of payment: Pipe and fittings for domestic water service connections to buildings, pressure testing and disinfection, all labor and installation, drain gate valve, drain box, foundation, excavation, backfill and compaction, parts and delivery, float valve, pipe supports, and accessories.

SECTION 33 19 00: SLOW SAND FILTER

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Slow Sand Filter Media
 - 1. Basis of Measurement: Lump Sum
 - 2. Basis of Payment: Includes all labor, installation, each type and volume of media, level placement of layers, washing, and grading.
- C. Sand Filter Basins, Vault
 - 1. Basis of Measurement: Lump Sum

2. Basis of Payment: Includes all labor, installation, excavation, backfill, compaction, forms, reinforcement, penetrations, fastenings, underdrain and laterals, vault lid, vault, vault piping and accessories, level indicators, and support blocks.

SECTION 33 51 00: PROPANE GAS DISTRIBUTION

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Propane Tank and Foundation
 1. Basis of Measurement: by Lump Sum
 2. Basis of Payment: Includes all labor, parts, installation, foundation, excavation, backfill, compaction, propane connection, protection posts, service (shut off) valve, fill valve, relief valve, vapor return valve, withdrawal valve, fixed liquid level gauge, liquid level float valve, service valve, pigtails, regulator, tank dome, accessories, and connection to generator.

SECTION 44 10 15: WATER QUALITY MONITORING AND EQUIPMENT

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract. The following items are exceptions, provided they are listed in the Bid Schedule.
- B. Water Monitoring Equipment, Piping, Tubing, and Controls
 1. Basis of Measurement: Lump Sum
 2. Basis of Payment: Includes all labor, installation, supports and fastenings, Ductile Iron Piping and accessories, gate valves, sample taps, data collection and wiring connections, PVC inlets and accessories, tubing and tubing accessories, pressure gauge, air release valve, flow switch, module channel controller, turbidimeters, differential pH sensor, temperature sensor, chlorine pump, chlorine day tank, chlorine tank mixer, chlorine analyzer, pipe supports, monitoring integration into YPUD Cloud system with relevant coordination and coding, and housings.

SECTION 44 44 14: CHEMICAL FEED PUMPS

- A. Work described in this Section shall be merged with pay item(s) defined within the Measurement and Payment portion of other Sections of this Contract.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Pre-installation meetings.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.
- F. 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.

1.3 FIELD ENGINEERING

- A. Employ Land Surveyor registered in State of California and acceptable to Owner.

- B. Locate and protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- C. Control datum for survey is established by Owner provided survey and/or shown on Drawings.
- D. Verify set-backs and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Where required, submit copy of site drawing signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.
- G. Maintain complete and accurate log of control and survey work as Work progresses.
- H. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- I. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- J. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.4 PRECONSTRUCTION MEETING

- A. Owner will schedule meeting after Notice of Award.
- B. Attendance Required: Owner, Engineer, and Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of products, schedule of values, progress schedule, and other preconstruction requirements.
 - 5. Designation of personnel representing parties in Contract and Engineer.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Review of potential safety concerns and designation of OSHA Competent Person.
- D. Record minutes and distribute copies within three days after meeting to participants, with two copies to Engineer, Owner, and those affected by decisions made.

1.5 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

- B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to Work.
- E. Record minutes and distribute copies within three days after meeting to participants, with two copies to Engineer, Owner, and those affected by decisions made.

1.6 PRE-INSTALLATION MEETINGS

- A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Engineer four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within three days after meeting to participants, with two copies to Engineer, Owner, and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Product data.
- E. Shop drawings.
- F. Samples.
- G. Design data.
- H. Test reports.
- I. Certificates.
- J. Manufacturer's instructions.
- K. Manufacturer's field reports.
- L. Erection drawings.

1.2 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer accepted form.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project, and deliver to Engineer at address as shown in Invitation to Bid. Coordinate submission of related items.

- F. For each submittal for review, allow 7 calendar days excluding delivery time to and from Contractor.
- G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedules within 7 calendar days after date of Owner-Contractor Agreement. After review, resubmit required revised data within 10 calendar days.
- B. Submit revised Progress Schedules with every Application for Payment if schedule has deviated from previous version submitted. If Work remains on last submitted Progress Schedule, no revised schedule should be submitted.
- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at each submission.
- G. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Engineer. Indicate decision dates for selection of finishes.
- H. Indicate delivery dates for Owner furnished products and products identified under Allowances.
- I. Revisions to Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect, including effect of changes on schedules of separate contractors.

1.4 PROPOSED PRODUCTS LIST

- A. Within 15 calendar days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

- A. Product Data: Submit to Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus two copies Engineer will retain.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.6 SHOP DRAWINGS

- A. Shop Drawings: Submit to Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
 1. Include signed and sealed calculations to support design.
 2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit number of opaque reproductions Contractor requires, plus two copies Engineer will retain.

- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 SAMPLES

- A. Samples: Submit to Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Samples for Selection as Specified in Product Sections:
 - 1. Submit to Engineer for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns for Engineer selection.
 - 3. Color and finish samples shall be true samples, not photographs.
- C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample, with full Project information.
- E. Submit number of samples specified in individual specification sections; Engineer will retain one sample.
- F. Reviewed samples which may be used in the Work are indicated in individual specification sections.
- G. Samples will not be used for testing purposes unless specifically stated in specification section.
- H. After review, produce duplicates and distribute in accordance with Submittal Procedures article and for record documents purposes described in Section 01 70 00 - Execution and Closeout Requirements.

1.8 DESIGN DATA

- A. Submit for Engineer's knowledge as contract administrator or for Owner.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

- A. Submit for Engineer's knowledge as contract administrator or for Owner.
- B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Engineer's benefit as contract administrator or for Owner.
- B. Submit report within 48 hours of observation to Engineer for information.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 ERECTION DRAWINGS

- A. Submit drawings for Engineer's benefit as contract administrator or for Owner.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by Engineer or Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SUBMITTAL REVIEW FORM Ke-nek Water Treatment Plant and Water Main CA 16-E56 & 17-E65

Received by Proj. Engr. _____ Submittal No. _____
Date _____ Initial _____
Contract Name _____
Contract No. _____
Return to Contractor _____ Contractor _____
Date _____ Initial _____
Project No. CA 16-E56, 17-E65,
& 21-F05

Item No.	Section	Description (Type, Model No., Manufacturer, Etc.)	Action by Owner
<u>Preconstruction Submittals</u>			
1		Compaction Testing Lab Name and Contact	_____
2		Humboldt County Encroachment Permit	_____
3		Progress Schedule	_____
4		Schedule of Submittals	_____
5		Schedule of Values	_____
6		Traffic Control Plan	_____
7		Yurok Cultural Resources Monitoring Permit	_____
8		YTEP Water Quality Permit	_____
9	13 34 19	Metal Building System and Foundation	_____
10	22 11 00	Roughing Filter	_____
11	31 23 17	Cultural Monitor Contact	_____
12	31 25 13	Erosion Control Plan	_____
13	33 05 17	Sand Filter Vault Lid	_____
14	33 13 00	Bacteriological Testing Lab Name and Contact	_____
15	33 16 20	Bolted Steel Tank	_____
16	33 16 20	Tank Foundation Plan	_____
<u>Material Submittals Required</u>			
1	01 11 90	Float Valve	_____
2	01 11 90	Magnetic Flow Meter	_____
3	01 11 90	Pressure Gauge	_____
4	01 11 90	Residential Water Meter	_____
5	01 11 90	Ridge Vent	_____
6	01 11 90	Triangular Gable Vent	_____
7	01 11 90	Vent (12" x 12", 27" x 15")	_____

8	Concrete Materials	03 30 00		
9	Concrete Mix	03 30 00		
10	Concrete Reinforcement	03 30 00		
11	Steel Door 3068	08 71 00		
12	Steel Door 3070	08 71 00		
13	Door Hardware	13 34 19		
14	Metal Buidling Accessories	13 34 19		
15	Metal Building Roofing	13 34 19		
16	Metal Building Siding	13 34 19		
17	Polycarbonate Skylight	13 34 19		
18	Expansion Joint	22 05 03		
19	5000 Gallon Poly Tank	22 11 00		
20	Booster Pump	22 11 00		
21	Exhaust Fan	22 11 00		
22	Gallery Pump	22 11 00		
23	Laminate Countertop	22 11 00		
24	Eye Wash Station	22 40 00		
25	Sink	22 40 00		
26	Automatic Transfer Switch	26 32 13		
27	Generator 18 kW	26 32 13		
28	Interior T8 Light	26 51 00		
29	Interior UFO Light	26 51 00		
30	Exterior Floodlight	26 56 00		
31	Exterior Motion Sensing Light	26 56 00		
32	Sand Embedment	31 23 17		
33	Geotextile	31 37 00		
34	Rip Rap	31 37 00		
35	Aggregate Base, Class 2	32 13 23		
36	Aggregate Base, Class 3	32 13 23		
37	Engineered Fill	32 13 23		
38	Casing Pipe	33 11 13		
39	Ductile Iron Pipe	33 11 13		
40	HDPE Pipe	33 11 13		
41	PE Pipe	33 11 13		
42	PE Tubing	33 11 13		
43	Pipe Stand Support	33 11 13		
44	Piping Accessories	33 11 13		
45	PVC Pipe	33 11 13		
46	3/4" Sample Tap	33 11 16		
47	Air Release Valve	33 11 16		
48	Butterfly Valve (4")	33 11 16		
49	Check Valve (2", 3", 4", 6")	33 11 16		
50	Combination Air Valve	33 11 16		

51	Flush Hydrant	33 11 16	_____	_____
52	Gate Valve (2", 3", 4", 6")	33 11 16	_____	_____
53	Restrained Coupling (4", 6")	33 11 16	_____	_____
54	Union Ball Valve (2", 3", 4")	33 11 16	_____	_____
55	60,000 Gallon Bolted Steel Tank	33 16 20	_____	_____
56	Filter Level Indicator	33 19 00	_____	_____
57	Filter Media (Coarse Gravel)	33 19 00	_____	_____
58	Filter Media (Coarse Sand)	33 19 00	_____	_____
59	Filter Media (Fine Gravel)	33 19 00	_____	_____
60	Filter Media (Fine Sand)	33 19 00	_____	_____
61	Filter Media (Rock)	33 19 00	_____	_____
62	Chlorine Analyzer	44 10 15	_____	_____
63	Differential pH and Temperature Sensor	44 10 15	_____	_____
64	Flow Switch	44 10 15	_____	_____
65	Module Channel Controller // PLC	44 10 15	_____	_____
66	Turbidimeter	44 10 15	_____	_____
67	Chlorine Day Tank	44 44 14	_____	_____
68	Chlorine Pump	44 44 14	_____	_____
<u>Postconstruction Submittals</u>				
1	Warranty Documents		_____	_____
2	AC Paving Test Results		_____	_____
3	Pressure Test Results		_____	_____
4	Bacteriological Results		_____	_____
5	As-Built Drawings		_____	_____
6	O&M Manual		_____	_____

* If the item description for a material submittal is not the exact brand or model specified by the Owner, then 3 copies of the manufacturer's descriptive literature, catalog cut-sheets, etc. must be included with the submittal. For design submittals requiring design calculations, shop drawings, wiring and control diagrams, etc., 3 copies of each must also be included with this submittal. If item is exact brand or model, list brand, model and "as specified".

Submitted by: _____
Contractor's Signature Date

IHS Concurrence: _____
Project Engineer's Signature Date

SECTION 01340 CONTRACT PROGRESS SCHEDULE

NOTE: Check the Standard General Conditions for details of the Progress Schedule requirements.

INSTRUCTIONS TO CONTRACTOR

Prepare three copies of this "Contract Progress Schedule" form in accordance with these instructions and submit to the Contract Manager as required.

- Enter Contractor's name and address where required.
- Enter Project Name and number as shown on the Contract.
- Enter Contract Number, Starting Date, and Completion Date as shown on the contract.
- In the "Work Item" column, enter major items of work in logical sequence and sufficient detail to identify the element.
- Enter the calendar weeks (i.e., 12/15/04) for those weeks that work is scheduled.

The space above the broken line shall be used to chart the proposed progress schedule for each work element. The actual work progress shall be charted in the space below the broken line. The progress schedule shall be updated weekly and submitted to the Contract Manager.

In the event the contract is modified, changing the progress of the work, adding or deleting work, or changing the original completion date, a revised progress schedule will be prepared and submitted to the Contract Manager.

Care should be taken to plan the work in such a manner that it can be accomplished as stated in this schedule. If for any reason it becomes known that any part of the progress will be delayed, this fact should be reported to the Contract Manager.

CONTRACT PROGRESS SCHEDULE

Contractor: _____

Project Name: Ke-nek Water Treatment Plant and Water Main

Address: _____

Project No: CA 21-F05

CONTRACT NO.		COMPLETION DATE	PREPARED BY/DATE	APPROVED BY/DATE							
WORK ITEM											% COMPLETE
REPORT PERIOD		RECEIVED BY/DATE	CHANGES APPROVED								

SECTION 01400 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality control and control of installation.
- B. Tolerances
- C. References.
- D. Labeling
- E. Testing and inspection services.
- F. Manufacturer's field services.
- G. Examination.
- H. Preparation.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.6 TESTING AND INSPECTION SERVICES

- A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.
 - 1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time specialist and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- B. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Authority having jurisdiction.
 - 1. Laboratory: Authorized to operate at Project location.
 - 2. Laboratory Staff: Maintain full time specialist on staff to review services.

3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Engineer or Owner.
- D. Reports will be submitted by independent firm to Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
 1. Submit final report indicating correction of Work previously reported as non-compliant.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 1. Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- F. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- G. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- H. Independent Firm Responsibilities:
 1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or products.
 6. Perform additional tests required by Engineer.
 7. Attend preconstruction meetings and progress meetings.
- I. Independent Firm Reports: After each test, promptly submit two copies of report to Engineer and to Contractor. When requested by Engineer, provide interpretation of test results. Include the following:
 1. Date issued.
 2. Project title and number.
 3. Name of inspector.
 4. Date and time of sampling or inspection.
 5. Identification of product and specifications section.

6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits On Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require materials or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer thirty (30) days in advance of required observations. Observer subject to approval of Engineer.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 01330 - Submittal procedures, Manufacturers' Field Reports article.

PRODUCTS

Not Used.

PART 2 EXECUTION

2.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

2.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary cooling.
 - 5. Temporary ventilation.
 - 6. Temporary water service.
 - 7. Temporary sanitary facilities.
- B. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Traffic regulation.
 - 6. Fire prevention facilities.
- C. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.
 - 8. Pest control.
 - 9. Pollution control.
 - 10. Rodent control.
 - 11. Historic properties control.
- D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

- A. Where applicable, power service from local utility source is available from Owner as needed for construction operation. When no local power source is available, provide generator or other temporary means of power generation for electricity needs.

- B. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

- C. Permanent convenience receptacles may be utilized during construction.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. When approved by the Owner, provide and maintain lighting for construction operations.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
- C. Maintain lighting and provide routine repairs.
- D. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY HEATING

- A. Where available and with approval of Owner, existing facilities may be used.
- B. Where heating is unavailable and required, provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature as indicated in product sections.

1.5 TEMPORARY COOLING

- A. Where available and with approval of Owner, existing facilities may be used.
- B. Where cooling is unavailable and required, provide and pay for cooling devices and cool as needed to maintain specified conditions for construction operations.
- C. Maintain maximum ambient temperature as indicated in product sections.

1.6 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.7 TEMPORARY WATER SERVICE

- A. Owner will pay cost of temporary water. Exercise measures to conserve energy. Utilize Owner's water system, extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.

- B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.8 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted without explicit permission of Owner. Provide facilities at time of project mobilization.

1.9 FIELD OFFICES AND SHEDS

- A. Designated existing spaces may be used for field offices and for storage:
 - 1. On Project Site
- B. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 60 00 - Product Requirements.
- C. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.
- D. Removal: At completion of Work remove temporary structures and debris. Restore areas.

1.10 VEHICULAR ACCESS

- A. Construct temporary access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
- D. Location as indicated on Drawings, or to be approved by Owner.
- E. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.
- F. Provide and maintain access to fire hydrants and control valves free of obstructions.
- G. Provide means of removing mud from vehicle wheels before entering streets.
- H. Use Owner designated existing on-site roads for construction traffic.

1.11 PARKING

- A. Provide temporary surface parking areas to accommodate construction personnel.
- B. Locate as approved by Owner.

- C. When site space is not adequate, provide additional off-site parking.
- D. Use of Owner designated existing on-site streets and driveways used for construction traffic is not permitted. Tracked vehicles not allowed on paved areas.
- E. Use of Owner designated areas of existing parking facilities used by construction personnel is not permitted.
- F. Do not allow heavy vehicles or construction equipment in parking areas.
- G. Do not allow vehicle parking on existing pavement.
- H. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition.
 - 2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
- I. Removal, Repair:
 - 1. Remove temporary materials and construction at Substantial Completion.
 - 2. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
 - 3. Repair existing and permanent facilities damaged by use, to original condition.
- J. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.12 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.13 TRAFFIC REGULATION

- A. Signs, Signals, And Devices:
 - 1. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by authority having jurisdiction.

2. Traffic Control Signals: As approved by local jurisdictions.
 3. Traffic Cones and Drums, Flares and Lights: As approved by authority having jurisdiction.
 4. Flagperson Equipment: As required by authority having jurisdiction.
- B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
- C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- D. Haul Routes:
1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- E. Traffic Signs and Signals:
1. Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
 2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
 3. Relocate as Work progresses, to maintain effective traffic control.
- F. Removal:
1. Remove equipment and devices when no longer required.
 2. Repair damage caused by installation.
 3. Remove post settings to depth of 2 feet.

1.14 FIRE PREVENTION FACILITIES

- A. Prohibit smoking with buildings under construction. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
1. Provide one fire extinguisher at each stair on each floor of buildings under construction.
 2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
 3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

1.15 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.

- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.16 ENCLOSURES AND FENCING

- A. Construction: Where required, use commercial grade chain link fence, plastic construction netting, or other Owner approved method, or as specified, to limit or prevent public access to construction site.

1.17 SECURITY

- A. Security Program:
 - 1. Protect Work existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
 - 2. Initiate program at project mobilization.
 - 3. Maintain program throughout construction period until Owner acceptance precludes need for Contractor security.
- B. Entry Control:
 - 1. Restrict entrance of persons and vehicles into Project site and existing facilities.
 - 2. Allow entrance only to authorized persons with proper identification.
 - 3. Maintain log of workers and visitors, make available to Owner on request.
 - 4. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.18 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.19 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.20 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.

- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.21 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.22 PEST CONTROL

- A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work or entering facility.

1.23 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.24 RODENT CONTROL

- A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.25 HISTORIC PROPERTIES CONTROL

- A. If during the course of the Work, evidence of deposits of historic or archaeological properties is found, cease Work affecting the find and immediately notify Owner. Do not disturb the find until written notice from Owner is given to proceed.
- B. Contractor will be compensated for lost time or changes in the Work to avoid the historic properties based on procedures outlined in General Conditions.

1.26 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

- 3.1 Cultural Monitor to be present during all ground disturbing activities.

END OF SECTION

SECTION 01 56 00

STORMWATER CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Stormwater Controls

1.2 TEMPORARY STORMWATER CONTROLS

- A. Prepare a Stormwater Pollution Prevention Plan (SWPPP), which will incorporate Best Management Practices for erosion and sediment runoff control during construction and site restoration following construction. The Contractor prepared SWPPP shall meet or exceed the Owner prepared SWPPP, where available. The Contractor may adopt the Owner prepared SWPPP, where available.
- B. Provide three (3) copies of the Contractor prepared SWPPP to the Owner at least fourteen (14) calendar days prior to beginning construction.
- C. Submit a Notice of Intent (NOI) to the EPA per requirements of the EPA Construction General Permit (CGP) under the National Pollutant Discharge Elimination System (NPDES) program.
- D. Begin Work only once the NOI is shown as “Active” status on the EPA eNOI web site.
- E. Submit NOI on the EPA eNOI website <https://www.epa.gov/npdes/electronic-notice-intent-enoi>

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures.
- F. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. Engineer will consider requests for Substitutions only within 15 days after date of Owner-Contractor Agreement, provided no other time restrictions are specified in the Instructions to Bidders.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that Bidder:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for Substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.

- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
 - 1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 - 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 - 3. Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting and balancing.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance data.
- I. Manual for materials and finishes.
- J. Manual for equipment and systems.
- K. Spare parts and maintenance products.
- L. Product warranties and product bonds.
- M. Maintenance service.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.
- B. Provide submittals to Engineer and Owner required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.

- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- D. Clean filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer and Owner seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and/or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment and instruct all operators on Project equipment operation and maintenance, with instruction provided by qualified representative who is knowledgeable about the Project.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

- A. As required in Section 01 40 00, Owner and/or Contractor will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.
- B. Independent firm will perform services specified in Contract.
- C. Reports will be submitted by independent firm to Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.

- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish main floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.
- G. Submit documents to Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.

- f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
- 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten calendar days after acceptance.
- C. Submit one copy of completed volumes 15 calendar days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

- C. Submit one copy of completed volumes 15 calendar days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 calendar days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- G. Include color coded wiring diagrams as installed.
- H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.
- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.
- S. Additional Requirements: As specified in individual product specification sections.

- T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Contractor shall provide a one-year warranty, starting on date of Substantial Completion, for all work involved in the Contract, except as noted in specifications. Manufacturer supplied products or equipment shall be warranted for one year or duration of manufacturer warranty, whichever is longer.
- B. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- C. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- D. Verify documents are in proper form, contain full information, and are notarized.
- E. Co-execute submittals when required.
- F. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- G. Submit prior to final Application for Payment.
- H. Time Of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections from date of Substantial Completion.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

TECHNICAL SPECIFICATIONS

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- 44 10 15 Water Quality Monitoring Equipment and Control System
- 44 44 14 Chemical Feed Pumps

END OF SECTION

SECTION 02 30 00

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cutting and Patching
 - 2. Special Procedures
- B. Related Sections:
 - 1. Section 31 10 00 - Site Clearing: Clearing outside periphery of structures.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Contract specifications to full thickness of penetrated element.
- J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- K. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.2 SPECIAL PROCEDURES

- A. Materials: As specified in product sections: match existing with new products for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- E. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- F. Remove, cut, and patch Work in manner to minimize damage and to permit restoring products and finishes to original condition.
- G. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with neat transition to adjacent finishes.
- H. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- I. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Engineer for review.
- J. Where change of plane of ¼ inch or more occurs, submit recommendation for providing smooth transition to Engineer for review.
- K. Trim existing doors to clear new floor finish. Refinish trim to original condition.
- L. Finish surfaces as specified in individual product sections.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formwork for cast-in place concrete.
 - 2. Shoring, bracing, and anchorage.
 - 3. Form accessories.
 - 4. Form stripping.
- B. Related Sections:
 - 1. Section 03 20 00 - Concrete Reinforcing.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.
 - 3. Section 04 20 00 - Unit Masonry: Product requirements for masonry accessories for placement by this Section.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
 - 3. ACI 347 - Guide to Formwork for Concrete.

1.3 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 347, to conform to design and applicable code requirements to achieve concrete shape, line and dimension as indicated on Drawings.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings, if required in specifications:
 - 1. Submit formwork, shoring, and reshoring shop drawings.
 - 2. Indicate the following:
 - a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Products storage and handling requirements.
- B. Deliver void forms and installation instructions in manufacturer's packaging.
- C. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.7 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

- A. Form Materials: At discretion of Contractor.

2.2 FORMWORK ACCESSORIES

- A. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.
- B. Form Anchors and Hangers:
 - 1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.
 - 2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
 - 3. Penetration of structural steel members is not permitted.
- C. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture.
 - 1. Manufacturers:
 - a. Nox-Crete Company Nox-Crete Form Coating.
 - b. Substitutions Permitted: Section 01 60 00 - Product Requirements
- D. Vapor Retarder: Where indicated on Drawings, 8 mil thick polyethylene sheet.
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

- B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.
- C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Engineer.

3.2 INSTALLATION

- A. Earth Forms:
 - 1. Earth forms are not permitted, unless required to ensure native soil bearing on exposed concrete face.
- B. Formwork - General:
 - 1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 - 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
 - 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
 - 5. Complete wedging and bracing before placing concrete.
- C. Forms for Smooth Finish Concrete:
 - 1. Use steel, plywood or lined board forms.
 - 2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
 - 3. Install form lining with close-fitting square joints between separate sheets without springing into place.
 - 4. Use full size sheets of form lines and plywood wherever possible.
 - 5. Tape joints to prevent protrusions in concrete.
 - 6. Use care in forming and stripping wood forms to protect corners and edges.
 - 7. Level and continue horizontal joints.
 - 8. Keep wood forms wet until stripped.
- D. Framing, Studding and Bracing:
 - 1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.
 - 2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 3. Construct beam soffits of material minimum of 2 inches thick.
 - 4. Distribute bracing loads over base area on which bracing is erected.
 - 5. When placed on ground, protect against undermining, settlement or accidental impact.
- E. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- F. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

- G. Obtain Engineer's approval before framing openings in structural members not indicated on Drawings.
- H. Install void forms in accordance with manufacturer's recommendations.
- I. Do not reuse formwork more than three times for concrete surfaces to be exposed to view. Do not patch formwork.

3.3 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces are indicated to receive special finishes that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
- D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Install formed openings for items to be embedded in or passing through concrete work.
- B. Locate and set in place items required to be cast directly into concrete.
- C. Coordinate with Work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install water stops continuous without displacing reinforcement.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- H. Form Ties:
 - 1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
 - 2. Place ties at least 1 inch away from finished surface of concrete.
 - 3. Leave inner rods in concrete when forms are stripped.
 - 4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.

- I. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
- J. Construction Joints:
 - 1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
 - 2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
 - 3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
 - 4. Arrange joints in continuous line straight, true and sharp.
- K. Embedded Items:
 - 1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - 2. Do not embed wood or uncoated aluminum in concrete.
 - 3. Obtain installation and setting information for embedded items furnished under other Specification sections.
 - 4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
 - 5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.
- L. Openings for Items Passing Through Concrete:
 - 1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
 - 2. Coordinate work to avoid cutting and patching of concrete after placement.
 - 3. Perform cutting and repairing of concrete required as result of failure to provide required openings.
- M. Screeds:
 - 1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
 - 2. Slope slabs to drain where required or as shown on Drawings.
 - 3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
- N. Scream Supports:
 - 1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
 - 2. Staking through membrane is not be permitted.
- O. Cleanouts and Access Panels:
 - 1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
 - 2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Engineer.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Leave forms in place for minimum 7 days. Forms may be removed in fewer number of days as specified in ACI 347 with approval of Engineer.

3.7 ERECTION TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 301.

3.8 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- C. Notify Engineer after placement of reinforcing steel in forms, but prior to placing concrete. Refer to Section 03 20 00 for required minimum concrete cover over reinforcement.
- D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcing bars.
 - 2. Welded wire fabric.
 - 3. Reinforcement accessories.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
 - 3. ACI 530.1 - Specifications for Masonry Structures.
 - 4. ACI SP-66 - ACI Detailing Manual.
- B. ASTM International:
 - 1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 3. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 4. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
 - 5. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 6. ASTM A704 - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
 - 7. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 8. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 9. ASTM A884 - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
- C. American Welding Society:
 - 1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
- D. Concrete Reinforcing Steel Institute:
 - 1. CRSI - Manual of Standard Practice.

2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures.
- B. Shop Drawings, if required in specifications: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, and supporting and spacing devices.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI - Manual of Standard Practice and ACI 301.
- B. Prepare shop drawings in accordance with ACI SP-66.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade, plain or deformed billet bars, uncoated or epoxy coated finish.
- B. Plain Bar Mats: ASTM A704; fabricated from ASTM A615 or ASTM A706; 60 ksi yield strength, steel bars, unfinished or epoxy coated finish.
- C. Deformed Wire: ASTM A496; unfinished or epoxy coated finish.
- D. Plain Wire: ASTM A82; unfinished or epoxy coated finish.
- E. Welded Deformed Wire Fabric: ASTM A497; in flat sheets or coiled rolls; unfinished or epoxy coated finish.
- F. Welded Plain Wire Fabric: ASTM A185; in flat sheets or coiled rolls; unfinished or epoxy coated finish.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions. Must be manufactured products used as recommended by manufacturer. Stones, rebar pieces or other materials are not acceptable replacements.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic tipped steel type; size and shape to meet Project conditions.

- D. Reinforcing Splicing Devices (where required): Exothermic welding type; full tension and compression; sized to fit joined reinforcing.
- E. Epoxy Coating Patching Material: Type as recommended by coating manufacturer.

2.3 FABRICATION

- A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice.
- B. Form standard hooks for 180 degree bends, 90 degree bends, stirrup and tie hooks, and seismic hooks as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.
- E. Form spiral column reinforcement from minimum 3/8 inch diameter continuous plain or deformed bar or wire.
- F. Form ties and stirrups from the following:
 - 1. For bars No. 10 and Smaller: No. 3 deformed bars.
 - 2. For bars No. 11 and Larger: No. 4 deformed bars.
- G. Where required, weld reinforcement in accordance with AWS D1.4.
- H. Galvanized and Epoxy-Coated Reinforcement: Where required, clean surfaces, weld and re-protect welded joint in accordance with CRSI.
- I. Locate reinforcement splices not indicated on Drawings, at point of minimum stress.

2.4 SHOP FINISHING

- A. Epoxy Coated Finish for Steel Bars: ASTM A775.
- B. Epoxy Coated Finish for Steel Wire: ASTM A884; Class A using ASTM A775.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly.
- B. Do not displace or damage vapor retarder.
- C. Accommodate placement of formed openings.

- D. Space reinforcement bars with minimum clear spacing of one bar diameter, but not less than 1 inch.
1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.
- E. Maintain concrete cover around reinforcement in accordance with ACI 318 as follows:

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	1-1/2 inches
Supported Slabs, Walls, and Joists	No. 14 bars and larger	1-1/2 inches
	No. 11 bars and smaller	3/4 inches

- F. Splice reinforcing in accordance with splicing device manufacturer's instructions.

3.2 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

- C. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.

3.3 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Reinforcement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete for the following:
 - 1. Foundation walls.
 - 2. Supported slabs.
 - 3. Slabs on grade.
 - 4. Control, expansion and contraction joint devices.
 - 5. Equipment pads.
 - 6. Thrust blocks.
 - 7. Manholes.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories: Formwork and accessories.
 - 2. Section 03 20 00 - Concrete Reinforcing.
 - 3. Section 03 35 00 - Concrete Finishing.
 - 4. Section 03 39 00 - Concrete Curing.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 305 - Hot Weather Concreting.
 - 3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
 - 4. ACI 308.1 - Standard Specification for Curing Concrete.
 - 5. ACI 318 - Building Code Requirements for Structural Concrete.
 - 6. ACI 347 - Guide to Formwork for Concrete.
- B. ASTM International:
 - 1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 3. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 4. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
 - 5. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 6. ASTM A704 - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
 - 7. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

8. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
9. ASTM C33 - Standard Specification for Concrete Aggregates.
10. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
11. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
12. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
13. ASTM C150 - Standard Specification for Portland Cement.
14. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
15. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
16. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
17. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
18. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
19. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
20. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
21. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
22. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
23. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
24. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
25. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
26. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

C. Concrete Reinforcing Steel Institute:

1. CRSI - Manual of Standard Practice.
2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Design Data:

1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
 - a. Hot and cold weather concrete work.
 - b. Air entrained concrete work.
2. Identify mix ingredients and proportions, including admixtures.
3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
4. Identify minimum and maximum allowable slump for submitted concrete mix design.

- C. Product Data: Submit data on curing compounds, mats, paper, film, compatibilities, and limitations.
- D. Delivery Data: Submit delivery ticket for ready mixed concrete delivered for use in the work. Delivery ticket shall include the concrete mix, batch, volume delivered, admixtures used, batch time and amount of water that can be added within specifications.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301. Perform curing in accordance with ACI 318.
- B. Conform to ACI 305 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.
- E. Fire Rated Floor Construction: Rating as indicated on Drawings.
 - 1. Tested Rating: Determined in accordance with ASTM E119.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.
- C. Maintain high early strength concrete temperature after installation at minimum 50 degrees F for minimum 3 days.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I or IA – Normal or Type II or IIA – Moderate, unless otherwise specified in Drawings.
- B. Normal Weight Aggregates: ASTM C33.
 - 1. Coarse Aggregate Maximum Size: In accordance with ACI 318.
- C. Water: ACI 318; potable, without deleterious amounts of chloride ions.

2.2 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Chemical: ASTM C494.
 - 1. Type A - Water Reducing.
 - 2. Type B - Retarding.
 - 3. Type C - Accelerating. Chloride-based accelerators are not permitted.
 - 4. Type D - Water Reducing and Retarding.
 - 5. Type E - Water Reducing and Accelerating. Chloride-based accelerators are not permitted.
- C. Fly Ash or Calcined Pozzolan: ASTM C618. Must be used in quantities not to exceed those specified in ACI C318.
- D. Plasticizing: ASTM C1017.
- E. Integral Waterproofing Admixtures: ASTM C494, Type S; complex catalyzed hydrous silicate, water and vapor proofing liquid admixture.
 - 1. Basis of design product: Subject to compliance with requirements, provide Moxie International, Moxie Shield 1800 Admixture, or equal.
 - 2. Properties:
 - a. Water/Cement Ratio: Maximum 0.52.
 - b. Water Vapor Transmission: Less than 0.1 perms.

2.3 ACCESSORIES

- A. Bonding Agent: Two component modified epoxy resin, Non-solvent two component polysulfide epoxy, Mineral filled polysulfide polymer epoxy, or Mineral filled polysulfide polymer epoxy resin.
- B. Non-Shrink Grout: ASTM C1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, ¼ inch or ½ inch thick; tongue and groove profile.
- B. Expansion and Contraction Joint Devices: ASTM B221 alloy, extruded aluminum; resilient elastomeric filler strip with Shore A hardness of 35 to permit plus or minus 25 percent joint movement with full recovery.
- C. Sealant: ASTM D6690, Type I.

2.5 WOOD FORM MATERIALS

- A. Form Materials: At discretion of Contractor.

2.6 FORMWORK ACCESSORIES

- A. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.

2.7 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade, plain or deformed billet bars, uncoated.
- B. Plain Wire: ASTM A82; unfinished.
- C. Welded Plain Wire Fabric: ASTM A185; in flat sheets or coiled rolls; unfinished.

2.8 REINFORCEMENT ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions. Must be manufactured products used as recommended by manufacturer. Stones, rebar pieces or other materials are not acceptable replacements.

2.9 CONCRETE MIX

- A. Select proportions for concrete in accordance with ACI 318 trial mixtures.
- B. Provide concrete to the following criteria:

Material and Property	Measurement
Compressive Strength (7 day)	2,500 psi
Compressive Strength (28 day)	4,000 psi
Cement Type	ASTM C150
Aggregate Type	Normal weight
Aggregate Size (maximum)	1/5 of narrowest dimension between forms, or 2/3 of minimum clear spacing between reinforcing bars or between reinforcing bars and forms, whichever is smaller.
Air Content	4.0 percent plus or minus 2.0 percent

- C. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Engineer.

1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements.
2. Do not use calcium chloride nor admixtures containing calcium chloride.
3. Use set retarding admixtures during hot weather.
4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing.

D. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94.

E. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

2.10 CURING MATERIALS

A. Membrane Curing Compound Type A: ASTM C309, Type 1, Class A.

1. Manufacturers:

B. Non-Membrane Forming Curing Compound Type B: Liquid, penetrating silicate based type; combination curing, hardening and dustproofing compound.

C. Absorptive Mats Type C: ASTM C171, burlap-polyethylene, minimum 9 oz/sq yd bonded to prevent separation during handling and placing.

D. Waterproof Paper Type D: ASTM C171, curing paper treated to prevent separation during handling and placing.

E. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

3.3 FORMWORK

- A. Earth Forms:
 - 1. Earth forms are not permitted, unless required to ensure native soil bearing on exposed concrete face.
- B. Formwork - General:
 - 1. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 2. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
 - 3. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
 - 4. Complete wedging and bracing before placing concrete.
- C. Install formed openings for items to be embedded in or passing through concrete work.
- D. Locate and set in place items required to be cast directly into concrete.
- E. Coordinate with Work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- F. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- G. Embedded Items:
 - 1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - 2. Do not embed wood or uncoated aluminum in concrete.
 - 3. Obtain installation and setting information for embedded items furnished under other Specification sections.
 - 4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
 - 5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.
- H. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Engineer.
- I. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

3.4 REINFORCEMENT PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly.
- B. Accommodate placement of formed openings.

- C. Space reinforcement bars with minimum clear spacing of one bar diameter, but not less than 1 inch.
 - 1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.
- D. Maintain concrete cover around reinforcement in accordance with ACI 318 as follows:

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	1-1/2 inches

- E. Splice reinforcing in accordance with splicing device manufacturer's instructions.

3.5 PLACING CONCRETE

- A. Notify Engineer and testing laboratory minimum 48 hours prior to commencement of operations.
- B. For concrete thrust blocks, use solid, undisturbed earth at the sides and bottom of the trench excavation for bearing concrete thrust blocking. Shape blocking to avoid obstruction of weep holes or access to joints and pipe fittings.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Reinforcement bar supports and spacers shall be sized and shaped for strength and support of reinforcement during concrete placement. Must be manufactured products used as recommended by manufacturer. Stones, rebar pieces or other materials are not acceptable replacements.
- E. Separate slabs on grade from vertical surfaces with ½ inch thick joint filler.
- F. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- G. Extend joint filler from bottom of slab to within ¼ inch of finished slab surface.
- H. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- I. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor finish.
- J. Install joint covers in longest practical length, when adjacent construction activity is complete.
- K. Deposit concrete at final position. Prevent segregation of mix.

- L. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- M. Consolidate concrete.
- N. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- O. Place concrete continuously between predetermined expansion, control, and construction joints.
- P. Do not interrupt successive placement; do not permit cold joints to occur.
- Q. Screed floors and slabs on grade level, maintaining surface flatness of maximum ¼ inch in 10 ft.

3.6 CONCRETE FINISHING

- A. Finish concrete floor surfaces to requirements of Section 03 35 00.
- B. Steel trowel surfaces which are indicated to be exposed.
- C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at ¼ inch per foot nominal unless otherwise indicated on drawings.

3.7 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
 - 1. Protect concrete footings from freezing for minimum 5 days.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for 7 days.
- D. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
- E. Absorptive Mat: Spread cotton fabric over floor slab areas. Spray with water until mats are saturated, and maintain in saturated condition for 7 days.
- F. Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
- G. Membrane Curing Compound: Apply curing compound in one coat.
- H. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Scrub compound into surface. Maintain surface wet with curing compound, without ponding for time recommended by manufacturer.
- I. For curing vertical concrete surfaces:

1. Spraying: Spray water over surfaces and maintain wet for 7 days.
2. Membrane Curing Compound: Apply compound in two coats with second coat applied at right angles to first.
3. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Scrub compound into surface. Maintain surface wet with curing compound, without ponding for time recommended by manufacturer.

3.8 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. If total amount of concrete is less than 5 cubic yards, field and strength testing below may not be required, at the sole discretion of the Engineer.
- C. Submit proposed mix design of each class of concrete to testing firm for review prior to commencement of Work.
- D. Concrete Inspections:
 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- E. Strength Test Samples:
 1. Sampling Procedures: ASTM C172.
 2. Cylinder Molding and Curing Procedures: ASTM C31, cylinder specimens, standard cured.
 3. Sample concrete and make one set of three cylinders for every 150 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
 4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
 5. Make one additional cylinder during cold weather concreting, and field cure.
- F. Field Testing:
 1. Slump Test Method: ASTM C143.
 2. Air Content Test Method: ASTM C173.
 3. Temperature Test Method: ASTM C1064.
 4. Measure slump and temperature for each compressive strength concrete sample.
 5. Measure air content in air entrained concrete for each compressive strength concrete sample.
- G. Cylinder Compressive Strength Testing:
 1. Test Method: ASTM C39.
 2. Test Acceptance: In accordance with ACI 318.
 3. Test one cylinder at 7 days.
 4. Test one cylinder at 28 days.
 5. Retain one cylinder for 56 days for testing when requested by Engineer.
 6. Dispose remaining cylinders when testing is not required.
- H. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.9 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.
- C. Patch imperfections in accordance with ACI 301.

3.10 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.11 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished Work.
- B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 03 35 00
CONCRETE FINISHING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Finishing concrete floors.
 - 2. Floor surface treatment.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Prepared concrete floors ready to receive finish.
 - 2. Section 03 39 00 - Concrete Curing.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 302.1 - Guide for Concrete Floor and Slab Construction.
- B. ASTM International:
 - 1. ASTM E1155 - Standard Test Method for Determining Floor Flatness and of Levelness Using the F-number System.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on concrete hardener, sealer, curing compounds and slip resistant treatment, compatibilities, and limitations. Shall include instructions for installation and safe handling of product.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301 and ACI 302.1.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years' experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver materials in manufacturer's packaging including application instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Temporary Heat: Ambient temperature of 50 degrees F minimum.
- C. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with concrete floor placement and concrete floor curing.

PART 2 PRODUCTS

2.1 COMPOUNDS - HARDENERS AND SEALERS

- A. Metallic Hardener: Premixed, dry powder, non-oxidizing hardener.
 - 1. Manufacturers:
 - a. Euclid Chemical Model Diamond-Plate.
 - b. BASF Model MasterTop 210COR.
 - c. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Sealer: Penetrating type.
 - 1. Manufacturers:
 - a. Stone Technologies Corp. Model Concrete Sealer X-1.
 - b. V-Seal Model 102 Winter Guard.
 - c. Substitutions Permitted: Section 01 60 00 - Product Requirements.

2.2 SLIP RESISTANT TREATMENT

- A. Slip Resistant Finish: Silica sand or polymer type, bead or powder additive to sealer.
 - 1. Manufacturers:
 - a. Increte Systems Models Shur-Grip or Ultra-Grip.
 - b. Proline Concrete Tools Model Dura Grip.
 - c. Substitutions Permitted: Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify floor surfaces are acceptable to receive the Work of this section.

3.2 FLOOR FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1.
- B. Steel trowel surfaces which are indicated to be exposed.
- C. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at $\frac{1}{4}$ inch per foot nominal.

3.3 FLOOR SURFACE TREATMENT

- A. Apply dry powder hardener as scheduled on floor surfaces.
 - 1. Liquid hardeners are not acceptable for substitution.
- B. Apply slip resistant finish as scheduled on floor surfaces.
- C. Apply sealer as scheduled on floor surfaces.

3.4 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Surface Flatness For Exposed Concrete Floors: $\frac{1}{4}$ inch in 10 ft.
- C. Finish concrete to achieve the following tolerances:
 - 1. Exposed to View and Foot Traffic: F(F) 75 and F(L) 40.
 - 2. Correct slab surface when actual F(F) or F(L) number for floor installation measures less than required.
- D. Correct defects in defined traffic floor by grinding or removal and replacement of defective Work. Areas requiring corrective Work will be identified. Re-measure corrected areas by same process.

END OF SECTION

SECTION 03 39 00
CONCRETE CURING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes initial and final curing of horizontal and vertical concrete surfaces.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - 2. Section 03 35 00 - Concrete Finishing.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 308.1 - Standard Specification for Curing Concrete.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
 - 2. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on curing compounds, mats, paper, film, compatibilities, and limitations.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Membrane Curing Compound Type A: ASTM C309, Type 1, Class A.

- B. Non-Membrane Forming Curing Compound Type B: Liquid, penetrating silicate based type; combination curing, hardening and dustproofing compound.
- C. Absorptive Mats Type C: ASTM C171, burlap-polyethylene, minimum 9 oz/sq yd bonded to prevent separation during handling and placing.
- D. Waterproof Paper Type D: ASTM C171, curing paper treated to prevent separation during handling and placing.
- E. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces are ready to be cured.

3.2 INSTALLATION - HORIZONTAL SURFACES

- A. Cure concrete in accordance with ACI 308.1 using Engineer approved method.
- B. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
- C. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
- D. Absorptive Mat: Spread cotton fabric over floor slab areas. Spray with water until mats are saturated, and maintain in saturated condition for 7 days.
- E. Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
- F. Membrane Curing Compound: Apply curing compound in one coat.
- G. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Scrub compound into surface. Maintain surface wet with curing compound, without ponding for time recommended by manufacturer.

3.3 INSTALLATION - VERTICAL SURFACES

- A. Cure concrete in accordance with ACI 308.1 using Engineer approved method.
- B. Spraying: Spray water over surfaces and maintain wet for 7 days.
- C. Membrane Curing Compound: Apply compound in two coats with second coat applied at right angles to first.

- D. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Scrub compound into surface. Maintain surface wet with curing compound, without ponding for time recommended by manufacturer.

3.4 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished Work.
- B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 03 39 00
CONCRETE CURING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes initial and final curing of horizontal and vertical concrete surfaces.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - 2. Section 03 35 00 - Concrete Finishing.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 308.1 - Standard Specification for Curing Concrete.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
 - 2. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on curing compounds, mats, paper, film, compatibilities, and limitations.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Membrane Curing Compound Type A: ASTM C309, Type 1, Class A.

- B. Non-Membrane Forming Curing Compound Type B: Liquid, penetrating silicate based type; combination curing, hardening and dustproofing compound.
- C. Absorptive Mats Type C: ASTM C171, burlap-polyethylene, minimum 9 oz/sq yd bonded to prevent separation during handling and placing.
- D. Waterproof Paper Type D: ASTM C171, curing paper treated to prevent separation during handling and placing.
- E. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces are ready to be cured.

3.2 INSTALLATION - HORIZONTAL SURFACES

- A. Cure concrete in accordance with ACI 308.1 using Engineer approved method.
- B. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
- C. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
- D. Absorptive Mat: Spread cotton fabric over floor slab areas. Spray with water until mats are saturated, and maintain in saturated condition for 7 days.
- E. Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.
- F. Membrane Curing Compound: Apply curing compound in one coat.
- G. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Scrub compound into surface. Maintain surface wet with curing compound, without ponding for time recommended by manufacturer.

3.3 INSTALLATION - VERTICAL SURFACES

- A. Cure concrete in accordance with ACI 308.1 using Engineer approved method.
- B. Spraying: Spray water over surfaces and maintain wet for 7 days.
- C. Membrane Curing Compound: Apply compound in two coats with second coat applied at right angles to first.

- D. Non-Membrane Forming Curing Compound: Apply curing compound in one coat. Scrub compound into surface. Maintain surface wet with curing compound, without ponding for time recommended by manufacturer.

3.4 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished Work.
- B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 03 60 00

GROUTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Portland cement grout.
 - 2. Rapid curing epoxy grout.
 - 3. Non-shrink cementitious grout.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - 2. Section 03 39 00 - Concrete Curing.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
- B. American Society of Testing and Materials:
 - 1. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 2. ASTM C40 - Test Method for Organic Impurities in Fine Aggregates for Concrete.
 - 3. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).
 - 4. ASTM C150 - Standard Specification for Portland Cement.
 - 5. ASTM C191 - Test Method for Time of Setting of Hydraulic Cement by Vicat Needle.
 - 6. ASTM C266 - Standard Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles.
 - 7. ASTM C307 - Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
 - 8. ASTM C531 - Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - 9. ASTM C579 - Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, monolithic Surfacing and Polymer Concretes.
 - 10. ASTM C827 - Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
 - 11. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit product data on grout.

- C. Manufacturer's Installation Instructions: Submit manufacturer's instructions for mixing, handling, surface preparation and placing epoxy type and non-shrink type grouts.
- D. Submit proposed mix design testing firm for review prior to commencement of Work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver grout in manufacturer's unopened containers with proper labels intact.
- C. Store grout in a dry shelter, protect from moisture.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not perform grouting if temperatures exceed 95 degrees F.
- C. Maintain minimum temperature of 50 degrees F before, during, and after grouting, until grout has set.

PART 2 PRODUCTS

2.1 PORTLAND CEMENT GROUT MATERIALS

- A. Portland Cement: ASTM C150, Type I and II.
- B. Water:
 - 1. Potable; containing no impurities, suspended particles, algae or dissolved natural salts in quantities capable of causing:
 - a. Corrosion of steel.
 - b. Volume change increasing shrinkage cracking.
 - c. Efflorescence.
 - d. Excess air entraining.
- C. Fine Aggregate:
 - 1. Washed natural sand.
 - 2. Gradation in accordance with ASTM C33 and represented by smooth granulometric curve within required limits.
 - 3. Free from injurious amounts of organic impurities as determined by ASTM C40.
- D. Mix:
 - 1. Portland cement, sand and water. Do not use ferrous aggregate or staining ingredients in grout mixes.

2.2 RAPID CURING EPOXY GROUT

- A. Manufacturers:
1. Sika Model Sikadur 42 Grout Pak LE.
 2. L & M Construction Chemicals Inc. Model EpoGrout 758.
 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Rapid Curing Epoxy Grout: High strength, three component epoxy grout formulated with thermosetting resins and inert fillers. Rapid-curing, high adhesion, and resistant to ordinary chemicals, acids and alkalies.

Property	Test	Result
Compressive Strength	ASTM C579	12,000 psi at 7 days
Tensile Strength	ASTM C307	2,000 psi minimum
Coefficient of Expansion	ASTM C531	30x10 ⁻⁶ in per degree F
Shrinkage	ASTM C827	None

2.3 NON-SHRINK CEMENTITIOUS GROUT

- A. Manufacturers:
1. Sika Model SikaGrout 328.
 2. L & M Construction Chemicals, Inc. Model DuraGrout.
 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Non-shrink Cementitious Grout: Pre-mixed ready for use formulation requiring only addition of water; non-shrink, non-corrosive, non-metallic, non-gas forming, no chlorides.
- C. Properties: Certified to maintain initial placement volume or expand after set and meet the following minimum properties when tested in accordance with the standard tests referenced below:

Property	Test	Time	Result
Setting Time	ASTM C191 /ASTM C266	Initial	3 hours (Approx)
		Final	6 hours (Approx)
Expansion	ASTM C827		0.4% Maximum
Compressive Strength	ASTM C109	1 day	4,000 psi
		7 days	7,000 psi
		28 days	10,000 psi

2.4 FORMWORK

- A. Refer to Section 03 10 00 for formwork requirements.

2.5 CURING

- A. Prevent rapid loss of water from grout during first 48 hours by use of approved membrane curing compound or with use of wet burlap method.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify areas to receive grout.

3.2 PREPARATION

- A. Remove defective concrete, laitance, dirt, oil, grease and other foreign material from concrete surfaces by brushing, hammering, chipping or other similar means until sound, clean concrete surface is achieved.
- B. Rough concrete lightly, but not enough to interfere with placement of grout.
- C. Remove foreign materials from metal surfaces in contact with grout.
- D. Align, level and maintain final positioning of components to be grouted.
- E. Saturate concrete surfaces with clean water; remove excess water, leave none standing.

3.3 INSTALLATION - FORMWORK

- A. Per Section 03 10 00, construct leakproof forms anchored and shored to withstand grout pressures.
- B. Install formwork with clearances to permit proper placement of grout.

3.4 MIXING

- A. Portland Cement Grout:
 - 1. Use proportions of 2 parts sand and 1 part cement, measured by volume.
 - 2. Prepare grout with water to obtain consistency to permit placing and packing.
 - 3. Mix water and grout in two steps; pre-mix using approximately 2/3 of water; after partial mixing, add remaining water to bring mix to desired placement consistency and continue mixing 2 to 3 minutes.
 - 4. Mix only quantities of grout capable of being placed within 30 minutes after mixing.
 - 5. Do not add additional water after grout has been mixed.
 - 6. Capable of developing minimum compressive strength of 2400 psi in 48 hours and 7000 psi in 28 days.

- B. Mix and prepare rapid curing epoxy grout in accordance with manufacturer's instructions.
 - 1. Capable of developing minimum compressive strength of 2400 psi in 48 hours and 7000 psi in 28 days.
- C. Mix and prepare non-shrink cementitious grout in accordance with manufacturer's instructions.
 - 1. Capable of developing minimum compressive strength of 2400 psi in 48 hours and 7000 psi in 28 days.
- D. Mix grout components in proximity to work area and transport mixture quickly and in manner not permitting segregation of materials.

3.5 PLACING GROUT

- A. Place grout material quickly and continuously.
- B. Do not use pneumatic-pressure or dry-packing methods.
- C. Apply grout from one side only to avoid entrapping air.
- D. Do not vibrate placed grout mixture, or permit placement when area is being vibrated by nearby equipment.
- E. Thoroughly compact final installation and eliminate air pockets.
- F. Do not remove leveling shims for at least 48 hours after grout has been placed.

3.6 CURING

- A. Immediately after placement, protect grout from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. After grout has attained its initial set, keep damp for minimum of 3 days.

3.7 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Field inspection and testing will be performed in accordance with ACI 301 and under provisions of Section 01 40 00 - Quality Requirements.
- C. Tests of grout components may be performed to ensure conformance with specified requirements.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes structural floor, wall, and roof framing; built-up structural beams and columns; diaphragm trusses fabricated on site; floor, wall, and roof sheathing; fire retardant treatment of wood; miscellaneous framing and sheathing; electrical panel back boards; and concealed wood blocking for support of toilet and bath accessories and wall cabinets.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 2. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing.
 - 3. ASTM C1396 - Standard Specification for Gypsum Board.
 - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 5. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 6. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- B. The Redwood Inspection Service:
 - 1. RIS - Standard Specifications for Grades of California Redwood Lumber.
- C. U.S. Department of Commerce National Institute of Standards and Technology:
 - 1. DOC PS 1 - Construction and Industrial Plywood.
 - 2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
 - 3. DOC PS 20 - American Softwood Lumber Standard.
- D. West Coast Lumber Inspection Bureau:
 - 1. WCLIB - Standard Grading Rules for West Coast Lumber.
- E. Western Wood Products Association:
 - 1. WWPA G-5 - Western Lumber Grading Rules.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate dimensions, wood species and grades, component profiles, drilled holes, fasteners, connectors, erection details and sequence.
- C. Product Data: Submit technical data on insulated sheathing, wood preservative materials, and application instructions.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Lumber Grading Agency: Certified by DOC PS 20.
 - 2. Lumber: DOC PS 20.
 - 3. Wood Structural Panels: DOC PS 1 or DOC PS 2.
- B. Fire Rated Wall or Roof Construction: Rating as indicated on Drawings.
 - 1. Tested Rating: Determined in accordance with ASTM E119.
- C. Surface Burning Characteristics:
 - 1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Apply label from agency approved by authority having jurisdiction to identify each fire retardant treated material.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: WWPA G-5 or RIS.
- B. Lumber Type: Size classification per Drawings or shop drawings, 19 percent maximum moisture content.

2.2 SHEATHING MATERIALS

- A. Wood Structural Panel Wall Sheathing: EWA Rated Sheathing, Structural I, Plywood; Exposure Durability 1 Exterior; sanded.
- B. Gypsum Wall Sheathing: ASTM C1396; Type X fire resistant, 5/8 inch thick, square edges, water repellant paper faces.
- C. Electrical Panel Boards: Plywood.

2.3 FIREBLOCKING

- A. Fireblocking: Solid lumber, structural wood panel, or particleboard.
 - 1. Solid lumber nominal 2 inches thick.
 - 2. Two layers of solid lumber nominal 1 inch thick with broken lapped joints.
 - 3. Structural wood panel 23/32 inch thick with joints backed by structural wood panel.
 - 4. Particleboard 3/4 inch thick with joints backed by particleboard.

2.4 ACCESSORIES

- A. Fasteners and Anchors:

1. Fasteners: ASTM A153, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 3. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
- B. Structural Framing Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
- C. Sill Gasket on Top of Foundation Wall: ¼ inch thick, plate width, closed cell polyethylene foam from continuous rolls.

2.5 FACTORY WOOD TREATMENT

- A. Fire Retardant Treatment: Chemically treated and pressure impregnated, having flame spread of 25 or less when tested in accordance with ASTM E84 and showing no evidence of significant progressive combustion when test is continued for an additional 20 minute period, Interior Type.
- B. Moisture Content After Treatment: Kiln dried (KDAT).
1. Lumber: Maximum 19 percent.
 2. Structural Panels: Maximum 15 percent.

PART 3 EXECUTION

3.1 FRAMING

- A. Set structural members level and plumb, in correct position.
- B. Fasten framing in accordance with applicable code.
- C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- D. Place horizontal members, crown side up.
- E. Construct framing members full length without splices.
- F. Double members at openings over 12 inches wide. Space short studs over and under opening to stud spacing.
- G. Construct double joist headers at floor and ceiling openings and under wall stud partitions parallel to floor joists. Frame rigidly into joists.
- H. Bridge joists and framing in excess of 8 feet span at mid-span. Fit solid bridging at ends of members.

- I. Place sill gasket directly on cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.
- J. Coordinate installation of prefabricated wood trusses.
- K. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

3.2 SHEATHING

- A. Install gypsum sheathing in accordance with ASTM C1280.
- B. Fasten sheathing in accordance with applicable code.
- C. Secure roof sheathing with longer edge (strength axis) perpendicular to framing members and with ends staggered and sheet ends over bearing.
- D. Install solid edge blocking between sheets.
- E. Secure wall sheathing with long dimension parallel to wall studs, with ends over firm bearing.
- F. Install electrical panel back boards with wood structural panel sheathing material where required. Size back boards 12 inches beyond size of electrical panel.

3.3 FIREBLOCKING

- A. Install fireblocking to cut off concealed draft openings.
 - 1. Concealed Framed Wall and Furred Spaces: Install fireblocking vertically at floor and ceiling levels and horizontally at maximum 10 feet on center.
 - 2. Connections Between Horizontal and Vertical Spaces: Install fireblocking between vertical walls and partitions and the following:
 - a. Horizontal floor and roof framing.
 - b. Soffits, dropped ceilings, cove ceilings and other horizontal concealed spaces.

3.4 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Framing Members: ¼ inch from indicated position, maximum.
- C. Surface Flatness of Floor: ¼ inch in 10 feet maximum, and ½ inch in 30 feet maximum.

END OF SECTION

SECTION 06 17 53

WOOD TRUSSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes shop fabricated wood trusses for roof framing; bridging, bracing, and anchorage; and preservative treatment of wood.
- B. Related Sections:
 - 1. Section 06 10 00 - Rough Carpentry.

1.2 REFERENCES

- A. APA-The Engineered Wood Association:
 - 1. APA/EWA TB 200 - Fire Retardant Treated Plywood.
- B. ASTM International:
 - 1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- C. The Redwood Inspection Service:
 - 1. RIS - Standard Specifications for Grades of California Redwood Lumber.
- D. Truss Plate Institute:
 - 1. TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction.
- E. U. S Department of Commerce National Institute of Standards and Technology:
 - 1. DOC PS 1 - Construction and Industrial Plywood.
 - 2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
 - 3. DOC PS 20 - American Softwood Lumber Standard.
- F. West Coast Lumber Inspection Bureau:
 - 1. WCLIB - Standard Grading Rules for West Coast Lumber.
- G. Western Wood Products Association:
 - 1. WWPA G-5 - Western Lumber Grading Rules.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate sizes and spacing of trusses and associated components, web and chord sizes, plate sizes, fastener descriptions and spacings, loads and truss cambers, and framed openings.
- C. Product Data: Submit truss configurations, bearing and anchor details, and bridging and bracing.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Lumber Grading Agency: Certified by DOC PS 20.
 - 2. Plywood Grading Agency: Certified by APA/EWA.
 - 3. Lumber: DOC PS 20.
 - 4. Wood Structural Panels: DOC PS 1 or DOC PS 2.
- B. Truss Design, Fabrication, and Installation: In accordance with TPI 1.
- C. Fire Rated Roof Construction: Rating as indicated on Drawings.
 - 1. Tested Rating: Determined in accordance with ASTM E119.
- D. Surface Burning Characteristics:
 - 1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- E. Apply label from agency approved by authority having jurisdiction to identify each fire retardant treated material.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.
- B. Design trusses under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of California.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Store truss depth in vertical position resting on intermittent bearing pads.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Lumber Grading Rules: RIS or WWPA G-5.
- B. Wood Members: Single top and bottom chord, size classification per Drawings or shop drawings, 19 percent maximum and 7 percent minimum moisture content.

- C. Plywood Plate: APA/EWA Structural I, Grade C-D; Exposure Durability 1; sanded.
- D. Steel Plate Connectors: TPI 1, Section 6; galvanized; die stamped with integral teeth.
- E. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.2 ACCESSORIES

- A. Wood Blocking, Plating and Support Members: Construction grade, 19 percent maximum and 7 percent minimum moisture content.
- B. Fasteners and Anchors:
 - 1. Fasteners: ASTM A153, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
- C. Bearing Plates: Electro-galvanized or Hot dip galvanized steel.

2.3 FABRICATION

- A. Fabricate trusses to achieve structural requirements specified.
- B. Fabricate bottom and top chord extensions as indicated on Drawings.
- C. Frame special sized openings in web framing as indicated on Drawings.

2.4 WOOD TREATMENT

- A. Fire Retardant Treatment: Chemically treated and pressure impregnated, having flame spread of 25 or less when tested in accordance with ASTM E 84 and showing no evidence of significant progressive combustion when test is continued for an additional 20 minute period, Exterior Type.
- B. Moisture Content after Treatment: Kiln dried (KDAT).
 - 1. Lumber: Maximum 19 percent.
 - 2. Structural Panels: Maximum 15 percent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify supports and openings are ready to receive trusses.

3.2 PREPARATION

- A. Coordinate placement of bearing and support items.

3.3 ERECTION

- A. Set members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in alignment until completion of erection and installation of permanent bracing.
- C. Do not field cut or alter structural members without approval of Engineer.
- D. Place headers and supports to frame openings.
- E. Frame openings between trusses with lumber in accordance with Section 06 10 00.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Framing Members: ½ inch maximum, from indicated position.

END OF SECTION

SECTION 07 71 23

MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes galvanized steel gutters and downspouts.
 - 1. Provide precast concrete splash pads.
- B. Related Sections:
 - 1. Section 07 90 00 - Joint Protection.
 - 2. Section 09 90 00 - Painting and Coating: Field painting of metal surfaces.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
 - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. Sheet Metal and Air Conditioning Contractors:
 - 1. SMACNA - Architectural Sheet Metal Manual

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Product Data: Submit data on manufactured components, materials, and finishes.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope to drain.

- C. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 GUTTERS AND DOWNSPOUTS

- A. Product Description:
 - 1. Gutters: Sheet metal; SMACNA Rectangular style profile.
 - 2. Downspouts: Sheet metal; SMACNA Rectangular profile.
 - 3. Splash Pads: Precast concrete type, size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

2.2 COMPONENTS

- A. Pre-Finished Galvanized Steel Sheet: ASTM A653, G90 zinc coating; 24 gage core steel, shop pre-coated with modified silicone or acrylic coating; color to match building colors

2.3 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: Type recommended by fabricator.
 - 2. Gutter Supports: Straps or Spikes and ferrules.
 - 3. Downspout Supports: Straps.
- B. Fasteners: Same material and finish as gutters and downspouts.
- C. Primer: Galvanized iron type.
- D. Protective Backing Paint: Zinc molybdate alkyd.

2.4 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections to shape indicated on Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FACTORY FINISHING

- A. Modified silicone or Acrylic polyester coating: Baked enamel system conforming to AAMA 2603.

- B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces are ready to receive gutters and downspouts.

3.2 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Sheet Metal: Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- B. Slope gutters ½ inch per 10 feet minimum.
- C. Set splash pads under downspouts. Secure in place.

END OF SECTION

SECTION 08 12 14
STANDARD STEEL FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire rated thermally insulated steel frames.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Placement of anchors into masonry wall construction.
 - 2. Section 04 20 00 - Unit Masonry: Masonry grout fill of metal frames and placement of anchors into masonry wall construction.
 - 3. Section 08 13 14 - Standard Steel Doors.
 - 4. Section 08 71 00 - Door Hardware: Hardware and weatherstripping.
 - 5. Section 08 80 00 - Glazing.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. ASTM International:
 - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- D. Underwriters Laboratories Inc.:
 - 1. UL 10B - Fire Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.
- C. Product Data: Submit frame configuration and finishes.
- D. Manufacturer's Installation Instructions: Submit special installation instructions.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8.
- B. Fire Rated Frame Construction: Conform to NFPA 252.
- C. Installed Fire Rated Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept frames on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on-site to permit ventilation.

PART 2 PRODUCTS

2.1 STANDARD STEEL FRAMES

- A. Manufacturers:
 - 1. Mesker Door.
 - 2. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description: Standard shop fabricated steel frames, fire rated type.
 - 1. Frames: To suit ANSI A250.8 Grade and Model of door specified in Section 08 13 14.

2.2 ACCESSORIES

- A. Removable Stops: Rolled steel channel shape, mitered corners; prepared for countersink style screws.
- B. Bituminous Coating: Non-asbestos fibered asphalt emulsion.
- C. Primer: ANSI A250.10 rust inhibitive type.
- D. Silencers: Specified in Section 08 71 00.
- E. Weatherstripping: Specified in Section 08 71 00.

2.3 FABRICATION

- A. Fabricate frames for knock down field assembly.
- B. Mullions for Double Doors: Fixed type, of same profiles as jambs.
- C. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes.

- D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- E. Prepare frames for silencers. Provide three single silencers for single doors and mullions of double doors on strike side. Provide two single silencers on frame head at double doors without mullions.
- F. Attach fire rated label to each fire rated frame.
- G. Fabricate frames to suit masonry wall coursing with 4 inch head member.

2.4 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653 A40.
- B. Primer: Baked.
- C. Shop Finish: Baked enamel of color as selected.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install frames in accordance with ANSI A250.8.
- B. Coordinate with masonry wall construction for anchor placement.
- C. Coordinate installation of glass and glazing specified in Section 08 80 00.
- D. Coordinate installation of frames with installation of hardware specified in Section 08 71 00 and doors in Section 08 13 14.
- E. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/8 inch measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08 13 14

STANDARD STEEL DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire rated, thermally insulated steel doors.
- B. Related Sections:
 - 1. Section 08 12 14 - Standard Steel Frames.
 - 2. Section 08 71 00 - Door Hardware.
 - 3. Section 08 80 00 - Glazing: Glass for doors.
 - 4. Section 09 90 00 - Painting and Coating: Field painting of doors.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. ASTM International:
 - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM C1363 - Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
 - 3. ASTM E413 - Classification for Rating Sound Insulation.
- C. Hollow Metal Manufacturers Association:
 - 1. HMMA 810 - Hollow Metal Doors.
- D. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 105 - Standard for the Installation of Smoke Door Assemblies and other Opening Protectives.
 - 3. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- E. Steel Door Institute:
 - 1. SDI 108 - Recommended Selection and Usage Guide for Standard Steel Doors.
- F. Underwriters Laboratories Inc.:
 - 1. UL 10B - Fire Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, louvers, and finishes.
- C. Product Data: Submit door configurations, location of cut-outs for hardware reinforcement.
- D. Manufacturer's Installation Instructions: Submit special installation instructions.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI A250.8.
- B. Fire Rated Door Construction: Conform to NFPA 252, 3-hour fire rating.
- C. Installed Fire Rated Door Assembly: Conform to NFPA 80, 3-hour fire rating.
- D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on site to permit ventilation.

PART 2 PRODUCTS

2.1 STANDARD STEEL DOORS

- A. Manufacturers:
 - 1. Mesker Door Model N-Series
 - 2. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description:
 - 1. Exterior Doors (Insulated): SDI 108, 1-3/4 inch thick.
 - a. Level 2 - Heavy Duty, Model 1, full flush design.
 - 2. Interior Doors (Fire Rated): SDI 108, 1-3/4 inch thick.
 - a. Level 2 - Heavy Duty, Model 1, full flush design.

2.2 COMPONENTS

- A. Face: Steel sheet in accordance with SDI 108.
- B. End Closure: Channel, 0.04 inches thick, flush.
- C. Core: Polystyrene.

- D. Thermal Insulated Door: Total insulation R-Value of 4, measured in accordance with ASTM C1363.
- E. Sound Rated Door: STC of 32, measured in accordance with ASTM E413.

2.3 ACCESSORIES

- A. Louvers (where indicated on Drawings):
 - 1. Material and Finish: Roll formed steel; prime painted.
 - 2. Louver Blade: Inverted Y blade; fire rated to 3 hours with fusible link design to FM requirements.
- B. Removable Stops: Rolled steel, channel shape, mitered corners; prepared for countersink style screws.
- C. Primer: ANSI A250.10 rust inhibitive type.

2.4 FABRICATION

- A. Fabricate doors with hardware reinforcement welded in place.

2.5 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653 A40.
- B. Primer: Baked.
- C. Shop Finish: Baked enamel of color as selected.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install doors in accordance with ANSI A250.8.
- B. Install door louvers, plumb and level.
- C. Coordinate installation of glass and glazing specified in Section 08 80 00.
- D. Coordinate installation of doors with installation of frames specified in Section 08 12 14 and hardware specified in Section 08 71 00.

- E. Touch-up damaged shop finishes.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.4 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for adjusting.
- B. Adjust door for smooth and balanced door movement.

END OF SECTION

SECTION 08 36 13

SECTIONAL DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes manual overhead sectional door and operating hardware,
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Prepared opening in concrete. Execution requirements for placement of anchors in concrete wall construction.
 - 2. Section 04 20 00 - Unit Masonry: Prepared opening in masonry. Execution requirements for placement of anchors in masonry wall construction.
 - 3. Section 07 90 00 - Joint Protection: Perimeter sealant and backup materials.
 - 4. Section 08 71 00 - Door Hardware: Cylinder locks.
 - 5. Section 08 80 00 - Glazing: Glass for door lights.
 - 6. Section 09 90 00 - Painting and Coating: Field paint finish.
 - 7. Section 13 34 19 - Metal Building Systems.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Door and Access Systems Manufacturers Association International:
 - 1. DASMA 102 - Specifications for Sectional Overhead Type Doors.

1.3 SYSTEM DESCRIPTION

- A. Panels: Flush steel, insulated.
- B. Lift Type: Standard lift operating style with track and hardware.
- C. Operation: Chain hoist.
- D. Fire rating: Provide door with UL 3-hour fire rating.
- E. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with California Building Code.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Submit component construction, anchorage method, and hardware.
- D. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with DASMA 102, Application Type Industrial.
- B. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years' experience approved by manufacturer.

PART 2 PRODUCTS

2.1 SECTIONAL OVERHEAD DOORS

- A. Manufacturers:
 - 1. Cookson Model ERD-10.
 - 2. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description: Steel overhead sectional doors, manual operation, stock configuration and hardware.
 - 1. Flush Steel Panel Construction: Outer steel sheet of minimum 0.058 inch thick, flat profile; inner steel sheet of minimum 0.058 inch thick, flat profile; core reinforcement of sheet steel roll formed to Z- shape, rabbeted weather joints at meeting rails; insulated.

2.2 COMPONENTS

- A. Sheet Steel: ASTM A653 galvanized to G60, pre-coated with manufacturer's standard thermosetting finish, plain surface.
- B. Insulation: Fibrous glass batt, unfaced or Mineral Wool, nominal R-Value of 5, bonded to facing.
- C. Metal Primer Paint: Zinc chromate type.

2.3 ACCESSORIES

- A. Track: Galvanized steel angles, 0.094 inch thick; 2-5/16 x 4 inch size, continuous one piece for each side; galvanized steel mounting brackets minimum 1/4 inch thick.
- B. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
- C. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables. Manual operation to require maximum exertion of 25 lbs force.
- D. Sill Weatherstripping: Resilient and hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- E. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- F. Head Weatherstripping: EPDM rubber seal, one piece full length.
- G. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- H. Lock: Inside side mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior handle; lock keyed with Section 08 71 00.

2.4 FACTORY FINISHING

- A. Exterior Surfaces: Precoat of color as selected.
- B. Interior Surfaces: Precoat of color as selected.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

3.2 INSTALLATION

- A. Anchor assembly to wall construction and building framing without distortion or stress.
- B. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- C. Fit and align door assembly including hardware.
- D. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 90 00.

- E. Install perimeter weatherstripping.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inch.
- C. Maximum Variation from Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- E. Maintain dimensional tolerances and alignment with adjacent work.

3.4 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust door assembly to smooth operation and in full contact with weatherstripping.

3.5 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Clean doors and frames.
- C. Remove labels and visible markings.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes hardware for steel doors.
 - 1. Provide door gaskets, including weatherstripping and seals, and thresholds.
- B. Related Sections:
 - 1. Section 08 12 14 - Standard Steel Frames: Silencers integral with steel frames.
 - 2. Section 08 13 14 - Standard Steel Doors.
 - 3. Section 08 36 13 - Sectional Doors.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A156.1 - Butts and Hinges.
 - 2. ANSI A156.2 - Bored and Preassembled Locks and Latches.
 - 3. ANSI A156.4 - Door Controls - Closures.
 - 4. ANSI A156.5 - Auxiliary Locks and Associated Products.
 - 5. ANSI A156.6 - Architectural Door Trim.
 - 6. ANSI A156.8 - Door Controls - Overhead Holders.
 - 7. ANSI A156.18 - Materials and Finishes
 - 8. ANSI A156 - Complete Set of 24 BHMA Standards (A156 Series) with Binder.
- B. Builders Hardware Manufacturers Association:
 - 1. BHMA Directory of Certified Products.
- C. National Fire Protection Association:
 - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
 - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- D. Underwriters Laboratories Inc.:
 - 1. UL 10B - Fire Tests of Door Assemblies.
 - 2. UL - Building Materials Directory.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
 - 1. Indicate locations and mounting heights of each type of hardware, schedules, and catalog cuts.
 - 2. Submit manufacturer's parts lists.

- C. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- C. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements:
 - 1. ANSI A156 series.
 - 2. NFPA 80.
 - 3. UL 305.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.

1.7 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
 - 1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.
- C. Sequence installation to accommodate required utility connections.
- D. Coordinate Owner's keying requirements during course of Work.

1.8 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish two year manufacturer warranty for locksets.

PART 2 PRODUCTS

2.1 DOOR HARDWARE

- A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
 - 1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
 - 2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
 - 3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
 - a. Finish: Match hardware item being fastened.
 - 4. Fire Ratings: Provide hardware with UL listings for type of application involved.
- B. Hinges: ANSI A156.1, full mortise type complying with following general requirements unless otherwise scheduled.
 - 1. Widths: Sufficient to clear trim projection when door swings 180 degrees.
 - 2. Number: Furnish minimum three hinges, four hinges to 120 inches high for each door leaf.
 - 3. Size and Weight: 4-1/2 inch heavy weight typical for 1-3/4 inch doors.
 - a. Doors Over 40 inches Wide: Extra heavy weight ball or oilite bearing hinges.
 - 4. Pins: Furnish nonferrous hinges with non-removable pins (NRP) at exterior and locked outswinging doors, non-rising pins at interior doors.
 - 5. Tips: Flat button tips with matching plug.
- C. Pivots: ANSI A156.1 and A156.4, center pivots.
 - 1. Size: As recommended by pivot manufacturer for size and weight of door.
- D. Locksets: Furnish locksets compatible with specified cylinders. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt.
 - 1. Bored (Cylindrical) Locksets: ANSI A156.2, Series 4000, Grade 1 unless otherwise indicated.
- E. Latch Sets: Match locksets. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt.
 - 1. Bored (Cylindrical) Latch Sets: ANSI A156.2, Series 4000, Grade 1 unless otherwise indicated.
- F. Cylinders: ANSI A156.5, Grade 1, 6 pin type.
 - 1. Keying: Master keyed.
 - 2. Include construction keying.
 - 3. Keys: Nickel silver. Stamp keys with "DO NOT DUPLICATE".
 - 4. Supply keys in the following minimum quantities:
 - a. 5 master keys.
- G. Closers: ANSI A156.4 modern type with cover, surface mounted closers; full rack and pinion type with steel spring and non-freezing hydraulic fluid; closers required for fire rated doors unless otherwise indicated.

1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
 2. Arms: Type to suit individual condition; parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.
 3. Location: Mount closers on inside of exterior doors, room side of interior doors typical; mount on pull side of other doors.
 4. Operating Pressure: Maximum operating pressure as follows.
 - a. Interior Doors: Maximum 5 pounds.
 - b. Exterior Doors: Maximum 10 pound.
 - c. Fire Rated Doors: As required for fire rating, maximum 15 pounds.
- H. Door Controls and Overhead Holders: Furnish with accessories as required for complete operational installation.
1. Manual Door Holders and Overhead Stops: ANSI A156.8, Grade 1 types as specified.
- I. Protection Plates, Gaskets, Thresholds, and Trim: Furnish as indicated in Schedule, with accessories as required for complete operational door installations.
1. Kickplates: ANSI A156.6, metal; height indicated in Schedule by 1 inch less than door width; minimum 0.050 inch thick stainless steel.
 2. Weatherstripping: Furnish continuous weatherstripping at top and sides of exterior doors.
 3. Fire Rated Gaskets: Furnish continuous fire rated gaskets at top and sides of fire rated doors.
 4. Thresholds: Maximum ½ inch height.
 5. Wall Stops: ANSI A156.1, Grade 1, 3 inch convex pad wall stop.
 6. Floor Stops: ANSI A156.1 Grade 1 standard floor type; furnish with accessories as required for applications indicated.

2.2 FINISHING

- A. Finishes: ANSI A156.18; furnish following finishes except where otherwise indicated in Schedule at end of section.
1. Hinges:
 - a. BHMA 629 and 625, bright (polished) finish.
 2. Typical Exterior Exposed and High Use Interior Door Hardware:
 - a. BHMA 629, bright (polished) stainless steel.
 3. Closers: Finish appearance to match door hardware on same face of door.
 - a. BHMA 628, satin aluminum, clear anodized.
 - b. BHMA 600, primed for painting.
 4. Thresholds: Finish appearance to match door hardware on exterior face of door.
 5. Other Items: Furnish manufacturer's standard finishes to match similar hardware types on same door, and maintain acceptable finish considering anticipated use and BHMA category of finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

- B. Verify doors and frames are ready to receive door hardware and dimensions are as instructed by manufacturer.

3.2 INSTALLATION

- A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.
- B. Mounting Heights From Finished Floor to Center Line of Hardware Item: Comply with manufacturer recommendations and applicable codes where not otherwise indicated.
 - 1. Locksets: 38 inch.
 - 2. Top Hinge: Jamb manufacturer's standard, but not greater than 10 inches from head of frame to center line of hinge.
 - 3. Bottom Hinge: Jamb manufacturer's standard, but not greater than 12-1/2 inches from floor to center line of hinge.
 - 4. Intermediate Hinges: Equally spaced between top and bottom hinges and from each other.
 - 5. Hinge Mortise on Door Leaf: 1/4 inch to 5/16 inch from stop side of door.

3.3 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust hardware for smooth operation.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Do not permit adjacent work to damage hardware or hardware finish.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints and other coatings.
- B. Related Sections:
 - 1. Section 05 50 00 - Metal Fabrications: Shop primed items.
 - 2. Section 09 96 00 - High-Performance Coatings.
 - 3. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
 - 4. Section 26 05 53 - Identification for Electrical Systems.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Painting and Decorating Contractors of America:
 - 1. PDCA - Architectural Painting Specification Manual.
- C. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on paints and other finishing products.
- C. Samples:
 - 1. Submit two paper chip samples, minimum 2 inch x 2 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
 - 2. Alternately, submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on tempered hardboard.

- D. Manufacturer's Installation Instructions: Submit special surface preparation procedures and substrate conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Surface Burning Characteristics (only when required for Fire Retardant Finishes):
 - 1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish and other Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

1.9 SEQUENCING

- A. Section 01 10 00 - Summary: Work sequence.

- B. Sequence application to the following:
 - 1. Do not apply finish coats until paintable sealant is applied.
 - 2. Back prime wood trim before installation of trim.

1.10 EXTRA MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Supply 1 gallon of each color, type, and surface texture; store where directed.
- C. Label each container with color, type, texture and room locations in addition to manufacturer's label.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers: Paint, Transparent Finishes, Primer Sealers, and Block Fillers.
 - 1. Coronado Paints.
 - 2. Devoe Paint Co.
 - 3. PPG Architectural Finishes.
 - 4. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
 - 1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
- D. Patching Materials: Latex filler.
- E. Fastener Head Cover Materials: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.

- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 5. Concrete Floors: 8 percent.

3.2 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- J. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- K. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- L. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by

washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

- M. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- N. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- O. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- P. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior paintable caulking compound after prime coat has been applied.
- Q. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.
- R. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces.

3.3 EXISTING WORK

- A. Extend existing paint and coatings installations using materials and methods compatible with existing installations and as specified.

3.4 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. Sand surfaces lightly between coats to achieve required finish.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.
- F. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.

H. Finishing Mechanical And Electrical Equipment:

1. Refer to Section 22 05 53 and Section 26 05 53 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.
2. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
3. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
4. Paint exposed conduit and electrical equipment occurring in finished areas.
5. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
6. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows and names.
7. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.6 SCHEDULE - EXTERIOR SURFACES

- A. Wood - Painted (Opaque):
1. One coat of latex primer sealer.
 2. Two coats of latex enamel, semi-gloss.
- B. Glue-Laminated Wood and Wood Timber Members:
1. One coat of sealer.
 2. Two coats of varnish, semi-gloss.
- C. Pavement Markings:
1. One coat of fast-dry liquid marking paint, yellow.
- D. Concrete, Concrete Block, Restored Masonry, and Cement Plaster:
1. One coat of block primer.
 2. Two coats of latex, semi-gloss.
- E. Gypsum Board Soffits:
1. One coat of primer sealer latex.
 2. Two coats of latex, flat.
- F. Steel - Unprimed:
1. One coat of alkyd primer.
 2. Two coats of alkyd enamel, gloss.
- G. Steel - Shop Primed:
1. Touch-up with zinc chromate primer.

2. Two coats of alkyd enamel, gloss.

H. Steel - Galvanized:

1. One coat galvanize primer.
2. Two coats of alkyd enamel, gloss.

I. Aluminum - Mill Finish:

1. One coat etching primer.
2. Two coats of alkyd enamel, gloss.

3.7 SCHEDULE - INTERIOR SURFACES

A. Wood - Painted:

1. One coat of latex prime sealer.
2. Two coats of latex enamel, semi-gloss.

B. Wood - Intumescent Coating:

1. One coat of prime sealer.
2. Two coats of intumescent coating.

C. Wood - Transparent:

1. Filler coat (for open grained wood only).
2. One coat sealer.
3. Two coats of varnish flat.

D. Glue-Laminated Wood and Wood Timber Members:

1. One coat of sealer.
2. Two coats of varnish, flat.

E. Concrete, Concrete Block, Restored Masonry and Cement Plaster:

1. One coat of block filler.
2. Two coats of latex, semi-gloss.

F. Steel - Unprimed:

1. One coat of alkyd primer.
2. Two coats of alkyd enamel, gloss.

G. Steel - Primed:

1. Touch-up with alkyd primer.
2. Two coats of alkyd enamel, gloss.

H. Steel - Galvanized:

1. One coat galvanize primer.
2. Two coats of alkyd enamel, gloss.

I. Aluminum - Mill Finish:

1. One coat etching primer.
2. Two coats of alkyd enamel, gloss.

- J. Concrete Floors:
 - 1. One coat of alkali resistant primer.
 - 2. Two coats of alkyd floor enamel, gloss.
- K. Gypsum Board and Plaster Walls:
 - 1. One coat of alkyd primer sealer.
 - 2. Two coats of alkyd enamel, eggshell.
- L. Gypsum Board and Plaster Ceilings:
 - 1. One coat of alkyd primer sealer.
 - 2. Two coats of alkyd enamel, eggshell.
- M. Wall Surfaces Under Vinyl Wall Covering:
 - 1. One coat of alkyd primer sealer.
- N. Fire Retardant Finish:
 - 1. One coat of fire retardant primer.
 - 2. Two coats of fire retardant finish, gloss.

END OF SECTION

SECTION 13 34 19
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes pre-engineered, shop fabricated structural steel building frame; metal wall and sloped roof system including soffits, gutters and downspouts, and exterior doors.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories: Execution requirements for placement of anchor bolts and base plates specified in this section in concrete.
 - 2. Section 07 90 00 - Joint Protection.
 - 3. Section 09 90 00 - Painting and Coating: Finish painting.

1.2 REFERENCES

- A. American Institute of Steel Construction:
 - 1. AISC S335 - Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
- B. ASTM International:
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 3. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - 4. ASTM A490 - Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
 - 5. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 6. ASTM A529 - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
 - 7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 8. ASTM C991 - Standard Specification for Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings.
 - 9. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
 - 10. ASTM C1371[-2004a] - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
 - 11. ASTM C1549[-2004] - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
 - 12. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

13. ASTM E408[-1971(1996)e1] - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
14. ASTM E903[-1996] - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
15. ASTM E1918[-1997] - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
16. ASTM E1980[-2001] - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

C. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.

D. Metal Building Manufacturers Association:

1. MBMA - Low Rise Building Systems Manual.

E. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.
2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

F. Underwriters Laboratories Inc.:

1. UL - Building Materials Directory.

G. U.S. Environmental Protection Agency:

1. ENERGY STAR - ENERGY STAR Voluntary Labeling Program.

1.3 SYSTEM DESCRIPTION

- A. Single span rigid frame.
- B. Primary Framing: Rigid frame of rafter beams and columns, intermediate columns (where required), braced end frames, end wall columns, and wind bracing.
- C. Secondary Framing: Purlins, girts, eave struts, sill supports, clips, and other items detailed.
- D. Wall System: Preformed metal panels of vertical profile, liner sheets, and accessory components.
- E. Roof System: Preformed metal panels of upslope profile, liner sheets, and accessory components.
- F. Roof Slope: 2 inches in 12 inches slope.

1.4 DESIGN REQUIREMENTS

- A. Design members to withstand dead load, vertical and horizontal seismic loads, and design loads due to pressure and suction of wind calculated in accordance with California Building Code.
- B. Maximum allowable deflection: 1/90 of span with imposed loads for exterior wall and roof system.

- C. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
- D. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 20 to 120 degrees F.
- E. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections, attachments, openings, cambers, and loads; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, method of installation; framing anchor bolt settings, sizes, and locations from datum, and foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.
- C. Product Data: Submit data on profiles, component dimensions, fasteners, and performance characteristics.
- D. Manufacturer's Instructions: Submit preparation requirements and anchor bolt placement.
- E. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with AISC S335 and MBMA Low Rise Building Systems Manual.
- B. Insulation Installed in Exposed Locations Surface Burning Characteristics: 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Erector: Company specializing in performing Work of this section approved by manufacturer.
- C. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State of California.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

- B. Convene minimum one week prior to commencing work of this section.

1.9 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.
- B. Furnish five-year manufacturer warranty for pre-engineered building systems and components.
- C. Furnish five-year warranty to include coverage for exterior pre-finished surfaces color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

PART 2 PRODUCTS

2.1 PRE-ENGINEERED BUILDINGS

- A. Manufacturers:
 - 1. Butler Manufacturing Co. Classic II Building System.
 - 2. Varco-Pruden Buildings Rigid Beam Systems.
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS - FRAMING

- A. Structural Steel Members: ASTM A36.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Plate or Bar Stock: ASTM A529 Grade 50.
- D. Anchor Bolts: ASTM A307 Grade A, unfinished.
- E. Bolts, Nuts, and Washers: ASTM A490, unfinished.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Primer: SSPC Paint 20, Red Oxide.
- H. Non-Shrink Grout: ASTM C1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 in 28 days.

2.3 COMPONENTS - WALL AND ROOF SYSTEM

- A. Sheet Steel: ASTM A653; 26-gauge metal thickness.
- B. Insulation: ASTM C991 Type I or II; sized for climate zone in which Project is located.
- C. Joint Seal Gaskets: Manufacturer's standard type.

- D. Fasteners: Manufacturer's standard type, finish to match adjacent surfaces when exterior exposed.
- E. Bituminous Paint: Asphaltic type.
- F. Sealant: Manufacturer's standard type, as specified in Section 07 90 00, non-staining, elastomeric, skinning.
- G. Metal Mesh: Galvanized steel wire, woven.
- H. Roof Curbs: Insulated metal same as roofing, designed for imposed equipment loads, anchor fasteners to equipment, counterflashed to metal roof system.
- I. Trim, Closure Pieces, Caps, Flashings, Rain Water Diverter, and Facias: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

2.4 COMPONENTS - METAL DOORS AND FRAMES

- A. Doors: Specified in Section 08 13 15.
- B. Frames: Specified in Section 08 12 15.

2.5 COMPONENTS - OVERHEAD DOORS

- A. Overhead Doors: Specified in Section 08 36 13.
- B. Overhead Door Frame: Formed steel sections braced to building frame.

2.6 COMPONENTS - WINDOWS

- A. Windows: Manufacturer's standard.
- B. Glass and Glazing: Specified in Section 08 80 00.

2.7 PLASTIC SKYLIGHTS

- A. Plastic Skylight: Manufacturer's standard.
- B. Single Dome: Acrylic plastic, ¼ inch thick; white translucent.
- C. Double Dome (where specified): Acrylic plastic, ¼ inch thick; air seal space:
 - 1. Outer Dome: white translucent.
 - 2. Inner Dome: white translucent.
- D. Nominal Size: As shown in Drawings.
- E. Unit Frame: Extruded aluminum integral curb frame with integral condensation drainage gutter.

2.8 FABRICATION - FRAMING

- A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.
- B. Anchor Bolts: Formed with straight shank, assembled with template for casting into concrete.
- C. Provide framing for door, window, louver, skylight, and ventilator openings.

2.9 FABRICATION - WALL AND ROOF SYSTEMS

- A. Siding: Minimum 26-gauge metal thickness, preformed ribbed steel profile, lapped edges fitted with continuous gaskets.
- B. Roofing: Minimum 24-gauge metal thickness, ribbed profile, lapped or male/female edges fitted with continuous gaskets.
 - 1. Roof Surfaces: ENERGY STAR compliant with minimum solar reflectance index (SRI) of 78 for 75 percent of roof area, calculated in accordance with ASTM E1980.
 - a. Reflectance: Measured in accordance with ASTM E903, ASTM E1918, or ASTM C1549.
 - b. Emittance: Measured in accordance with ASTM E408 or ASTM C1371.
- C. Liner: Minimum 28-gauge metal thickness, V crimped profile, lapped V edges fitted with continuous gaskets.
- D. Soffit Panels: Minimum 24-gauge metal thickness, V crimped profile, unperforated.
- E. Girts/Purlins: Rolled formed structural shape to receive siding, roofing sheet.
- F. Internal and External Corners: Same material thickness and finish as adjacent material, profile shop cut and factory mitered to required angles. Back brace mitered internal corners with 26-gauge thick sheet.
- G. Flashings, Closure Pieces, Fascia, and Caps: Same material and finish as adjacent material, profile to suit system.
- H. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive finish.
- I. Ventilator: Sheet steel, galvanized, rotary continuous ridge design.
- J. Wall Louvers: Z blade design, same finish as adjacent material, with steel mesh insect screen and frame, blank sheet metal at unused portions.

2.10 FABRICATION - GUTTERS AND DOWNSPOUTS

- A. Fabricate of same material and finish as roofing metal.

- B. Form gutters and downspouts of profile and size to collect and remove water. Fabricate with connection pieces.
- C. Form sections in maximum possible lengths. Hem exposed edges.
- D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.11 FACTORY FINISHING

- A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.
- B. Galvanizing for Nuts, Bolts and Washers: ASTM A153.
- C. Interior Surfaces of Wall and Roof Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.
- D. Exterior Surfaces of Wall and Roof Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.
- E. Vapor Retarder at Interior Face of Insulation: Sheet vinyl, 2-mil thickness, white.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

3.2 ERECTION - FRAMING

- A. Erect framing in accordance with AISC Specification.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated on Drawings.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval of Engineer.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.3 ERECTION - WALL AND ROOFING SYSTEMS

- A. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

- B. Fasten cladding system to structural supports, aligned level and plumb.
- C. Locate end laps over supports. End laps minimum 2 inches or as recommended by manufacturer. Place side laps over bearing.
- D. Install expansion joints where indicated on Drawings.
- E. Use concealed fasteners.
- F. Install insulation and vapor retarder utilizing manufacturer approved method for attachment. Place wire mesh under vapor retarder for support between framing members.
- G. Install sealant and gaskets to prevent weather penetration.

3.4 ERECTION - GUTTER AND DOWNSPOUTS

- A. Rigidly support and secure components. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Apply bituminous paint on surfaces in contact with cementitious materials.
- C. Slope gutters minimum ½ inch per 10 feet.
- D. Install splash pads under each downspout.

3.5 ERECTION - SKYLIGHTS

- A. Coordinate with installation of roofing system and related flashings.
- B. Apply bituminous paint on aluminum surfaces of units in contact with dissimilar metals.
- C. Provide weather tight installation.

3.6 ERECTION - ACCESSORIES

- A. Install door frame, door, overhead door, window and glass, skylight, louvers, and ventilators.
- B. Seal wall and roof accessories watertight and weather tight with sealant in accordance with Section 07 90 00.

3.7 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Framing Members: ¼ inch from level; 1/8 inch from plumb.
- C. Siding and Roofing: 1/8 inch from indicated position.

END OF SECTION

SECTION 22 05 03

PLUMBING PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Pipe and pipe fittings for the following systems:

1. Domestic water piping, within 5 feet of building.
2. Equipment drains and over flows.
3. Unions and flanges.

B. Related Sections:

- ~~1.~~ Section 22 05 23 - Valves for Plumbing Piping
2. Section 31 23 16 - Excavation
- ~~3.~~ Section 31 23 17 - Trenching
4. Section 33 12 13 - Water Service Connections

1.2 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B31.9 - Building Services Piping.

B. ASTM International:

1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
3. ASTM A234 - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
4. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
5. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
6. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
7. ASTM D2241 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Inside Diameter.
8. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
9. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
10. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
11. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
12. ASTM D2665 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.

13. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
14. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
15. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
16. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
17. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
18. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
19. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
20. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

C. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

D. American Water Works Association:

1. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., for Water Distribution.
2. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in., for Water Service.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate layout of piping systems, including equipment, critical dimensions, and sizes.
- C. Product Data: Submit data on pipe materials and fittings. Submit manufacturers catalog information.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ASME B31.9 code for installation of piping systems.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Furnish temporary end caps and closures on piping and fittings. Maintain in place until installation.

- C. Protect piping from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install underground piping when bedding is wet or frozen.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Polyvinyl Chloride (PVC) Pipe: AWWA C900 and AWWA C905, Class 165 or as indicated on Drawing, polyvinyl chloride (PVC) material.
 - 1. Fittings: AWWA C110, ductile iron, standard thickness.
 - 2. Joints: ASTM D3139, PVC flexible elastomeric seals. Solvent-cement couplings are not permitted.
- B. Polyethylene Pipe: AWWA C901 and AWWA C906:
 - 1. Fittings: AWWA C901 and AWWA C906, molded or fabricated.
 - 2. Joints: Butt fusion.
- C. PVC Pipe: ASTM D1785 Schedule 40 or 80 as indicated in Drawings, polyvinyl chloride (PVC) material.
 - 1. Fittings: ASTM D2467, Schedule 80, PVC.
 - 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 EQUIPMENT DRAINS AND OVERFLOWS

- A. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26, polyvinyl chloride (PVC) material.
 - 1. Fittings: ASTM D2466, Schedule 40, PVC or ASTM D2464 PVC, threaded.
 - 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.3 UNIONS AND FLANGES

- A. Unions for Pipe 2 inches and Smaller:
 - 1. Ferrous Piping: Class 250, malleable iron, threaded.
 - 2. Copper Piping: Class 150, bronze unions with brazed joints.
 - 3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
 - 4. PVC Piping: PVC.

- B. Flanges for Pipe 2-1/2 inches and Larger:
 - 1. Ferrous Piping: Class 250, forged steel, slip-on flanges.
 - 2. Copper Piping: Class 150, slip-on bronze flanges.
 - 3. PVC Piping: PVC flanges.
 - 4. Gaskets: 1/16 inch thick preformed neoprene gaskets.
- C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify excavations are to required grade, dry, and not over-excavated.
- C. Verify trenches are ready to receive piping.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - BURIED PIPING SYSTEMS

- A. Verify connection to existing piping system, size, location, and invert are as indicated on Drawings.
- B. Establish elevations of buried piping with not less than 2.5 ft of cover.
- C. Establish minimum separation of water piping from sanitary sewer piping in accordance with California Plumbing Code.
- D. Excavate pipe trench in accordance with Section 31 23 17.
- E. Install pipe to elevation as indicated on Drawings.
- F. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 6 inches compacted depth; compact to 95 percent maximum density.

- G. Install pipe on prepared bedding.
- H. Route pipe in straight line.
- I. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- J. Install shutoff and drain valves at locations indicated on Drawings in accordance with Section 22 05 23.
- K. Pipe Cover and Backfilling:
 - 1. Backfill trench in accordance with Section 31 23 17.
 - 2. Maintain optimum moisture content of fill material to attain required compaction density.
 - 3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 12 inches minimum cover over top of jacket. Compact to 95 percent maximum density.
 - 4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
 - 5. Do not use wheeled or tracked vehicles for tamping.

3.4 INSTALLATION - ABOVE GROUND PIPING

- A. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- B. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.
- C. Group piping whenever practical at common elevations.
- D. Sleeve pipe passing through partitions, walls and floors. Refer to Section 22 11 00.
- E. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- F. Install non-conducting dielectric connections wherever jointing dissimilar metals.
- G. Establish invert elevations, slopes for drainage to ¼ inch per foot minimum. Maintain gradients.
- H. Slope piping and arrange systems to drain at low points.
- I. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.
- J. Install piping penetrating roofed areas to maintain integrity of roof assembly.
- K. Install valves in accordance with Section 22 11 00.
- L. Install pipe identification in accordance with Section 22 05 53.

3.5 INSTALLATION - DOMESTIC WATER PIPING SYSTEMS

- A. Install domestic water piping system in accordance with Section 22 11 00.

3.6 INSTALLATION - SANITARY WASTE AND VENT PIPING SYSTEMS

- A. Install bell and spigot pipe with bell end upstream.

3.7 INSTALLATION - STORM DRAINAGE PIPING SYSTEMS

- A. Install storm drainage piping systems piping in accordance with ASME B31.9.
- B. Install bell and spigot pipe with bell end upstream.
- C. Support cast iron drainage piping at every joint.

3.8 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Test domestic water piping system in accordance with California Plumbing Code.
- C. Test sanitary waste and vent piping system in accordance with California Plumbing Code.
- D. Test for Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ASME B31.9.

3.9 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Clean and disinfect domestic water distribution system in accordance with Section 33 13 00.

END OF SECTION

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nameplates.
 - 2. Tags.
 - 3. Stencils.
 - 4. Lockout devices.
- B. Related Sections:
 - 1. Section 09 90 00 - Painting and Coating: Execution requirements for painting specified by this section.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturers catalog literature for each product required.
- C. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.2 TAGS

- A. Plastic Tags:
 - 1. Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches square.

- B. Metal Tags:
 - 1. Aluminum with stamped letters; tag size minimum 1-1/2 inches square with finished edges.
- C. Information Tags:
 - 1. Clear plastic with printed "Danger," "Caution," or "Warning" and message; size 3-1/4 x 5-5/8 inches with grommet and self-locking nylon ties.
- D. Tag Chart: Typewritten letter size list of applied tags and location plastic laminated.

2.3 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
 - 1. Piping less than 2 inches Outside Diameter: Use tags rather than stenciling.
 - 2. 2 inches Outside Diameter of Insulation or Pipe: 1/2 inch high letters.
 - 3. 2-1/2 to 6 inches Outside Diameter of Insulation or Pipe: 1-inch high letters.
 - 4. Over 6 inches Outside Diameter of Insulation or Pipe: 1-3/4 inches high letters.
 - 5. Ductwork and Equipment: 1-3/4 inches high letters.
- B. Stencil Paint: As specified in Section 09 90 00, semi-gloss enamel, colors and lettering size conforming to ASME A13.1.

2.4 LOCKOUT DEVICES

- A. Lockout Hasps:
 - 1. Anodized aluminum hasp with erasable label surface; size minimum 7-1/4 x 3 inches.
- B. Valve Lockout Devices:
 - 1. Steel or Plastic device preventing access to valve operator, accepting lock shackle.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 09 90 00 for stencil painting.

3.2 INSTALLATION

- A. Apply stencil painting in accordance with Section 09 90 00.
- B. Install identifying devices after completion of coverings and painting.
- C. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.
- D. Install tags using corrosion resistant chain. Number tags consecutively by location.

- E. Identify pumps, tanks and water treatment devices with plastic nameplates. Identify in-line pumps and other small devices with tags.
- F. Identify control panels and major control components outside panels with plastic nameplates.
- G. Identify valves in main and branch piping with tags.
- H. Identify piping, concealed or exposed, with stenciled painting. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

3.3 SCHEDULES

- A. Stencils:
 - 1. Indicate direction of flow on all piping.
 - 2. Raw Water.
 - a. Background Color: Green.
 - b. Lettering Color: White.
 - 3. Water Under Treatment
 - a. Background Color: Light Blue.
 - b. Lettering Color: White.
 - 4. Fully Treated Potable Water.
 - a. Background Color: Dark Blue.
 - b. Lettering Color: White.
 - 5. Backwash Waste.
 - a. Background Color: Brown.
 - b. Lettering Color: White.
 - 6. Sewer.
 - a. Background Color: Dark Gray.
 - b. Lettering Color: White.
- B. Piping Tags:
 - 1. Raw Water.
 - 2. Potable Water.
 - 3. Chlorine.
 - 4. Other chemicals as required.
- C. Valve and other Component Tags:
 - 1. Indicate if each Valve is Normally Open (NO) or Normally Closed (NC).
 - 2. Indicate type of Valve and sequential numbering (e.g. GV-1 for first gate valve).
 - 3. Use numbering system to match valves with associated components (e.g. filters, other treatment processes).
 - 4. Tag Material: Metal or Plastic. Mount with corrosion resistant chain.
 - 5. Wall Mount Tag Chart with Schematic View of all valves in building.

END OF SECTION

SECTION 22 11 00

FACILITY WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Piping
2. Valves
3. Water Meters
4. Pipe hangers and supports
5. Pressure gages
6. Flow control valves
7. Relief valves
8. Hose bibs and Sample Taps
9. Exhaust Fans
10. Countertop
11. Window
12. Chemical Pumps
13. Booster Pumps

B. Related Sections:

1. Section 03 30 00 - Cast-In-Place Concrete
2. Section 08 71 00 - Door Hardware
3. Section 22 05 03 - Plumbing Piping
4. Section 22 05 53 - Identification for Plumbing Piping and Equipment
5. Section 26 05 03 - Equipment Wiring Connections
6. Section 26 05 19 - Electrical conductors and Cables
7. Section 26 05 26 - Grounding for Electrical Systems
8. Section 26 05 33 - Conduit and Boxes for Electrical Systems
9. Section 33 13 00 - Disinfecting of Water Utility Distribution
10. Section 33 21 13 - Community Supply Wells

1.2 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.

B. American Society of Sanitary Engineering:

1. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers.

C. ASTM International:

1. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

D. American Water Works Association:

1. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.

2. AWWA C702 - Cold-Water Meters - Compound Type.
 3. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.
- E. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
 2. MSS SP 85 - Cast Iron Globe & Angle Valves, Flanged and Threaded.
 3. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- F. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings (pressure booster systems): Indicate layout, general assembly, components, dimensions, weights, clearances, and methods of assembly.
- C. Product Data:
1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturer's catalog information.
 2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
 3. Hangers and Supports: Submit manufacturers catalog information including load capacity.
 4. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
 5. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
- D. Manufacturer's Installation Instructions: Submit installation instructions for pumps, valves and accessories.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of valves and equipment.
- C. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.5 QUALITY ASSURANCE

- A. For drinking water service, provide valves complying with NSF 61.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.8 EXTRA MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- 1.9 Furnish one packing kit for each size valve, two hose end vacuum breakers for hose bibs and two pump seals for each pump model.

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Refer to Section 22 05 03.

2.2 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Refer to Section 22 05 03.

2.3 UNIONS AND FLANGES

- A. Refer to Section 22 05 03.

2.4 WATER METERS

- A. Refer to Section 01 11 90.

2.5 PIPE HANGERS AND SUPPORTS

- A. Manufacturers:
 - 1. Unistrut
 - a. Pipe Support: Model P1000

- 1) ST Finish – Stainless Steel Type 316
 - b. Pipe Clamps: Model P1117 for 2-inch pipe, P1113 for 1-inch pipe
 - 1) ST Finish – Stainless Steel Type 316
2. Grainger
 - a. Pipe Straps / Routing Clamps: Galvanized, for pipe or conduit size as specified in drawings
3. Substitutions Permitted: Section 01 60 00 - Product Requirements.

2.6 PIPE WALL BOOT

A. Manufacturer:

1. CSI Designs Pipetite Standard, PT4-000
2. Substitutions Permitted: Section 01 60 00 - Product Requirements

B. Type:

1. Flexible seal that allows pipeline movement without damage
2. Silicone construction
3. Self-sealing, no sealant required
4. For 4" Ductile Iron pipe

2.7 PRESSURE GAUGES

1. Refer to Section 01 11 90

2.8 SAMPLE TAPS

1. Refer to Section 01 11 90

2.9 PIPE LABELS

A. Manufacturer:

1. Seton
2. Substitutions Permitted: Section 01 60 00 - Product Requirements

B. Description:

1. Indicate flow direction
2. Indicate treated water vs non-treated water
3. Self-adhesive

2.10 EXHAUST FAN

A. Manufacturer:

1. McMaster-Carr: Dust-resistant direct drive wall-mount exhaust fan
 - a. [Dust-Resistant Direct-Drive Wall-Mount Exhaust Fan, with 10" Diameter Blade, 120V AC, 1000 CFM Airflow | McMaster-Carr](#)
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Description:

1. Airflow: 1000 cfm

2. Electrical connection: Hardwire, 120V single phase
3. Power: ¼ hp
4. Totally enclosed motor, steel frame

2.11 FLOOR DRAIN

A. Manufacturers

1. OATEY ABS Area Floor Drain with 4-inch Stainless Steel Cover
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Description

1. Stainless Steel or Noncorrosive Plastic Construction
2. Connects to 4" PVC
3. NSF 61 Compliant

2.12 LAMINATE COUNTERS

A. Manufacturers:

1. LABTech Supply Company
2. LOC Scientific
3. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Description

1. Epoxy resin sheets
2. Minimum 1" Thickness
3. Of dimensions as specified on Drawings
4. All edges with slight radius
5. With drip groove on underside
6. Black color – or other with engineer approval
7. Joints bonded by method of manufacturers recommendation

2.13 SAFETY WINDOW

A. Manufacturers:

1. PGT Windows – Picture Window PW5520
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Description:

1. Picture window – does not open
2. With laminated impact resistant glass or approved safety glass alternative
3. Without grid or partitions

2.14 CHEMICAL TANK

- A. Refer to Section 44 44 14 Chemical Feed Pumps

2.15 CHEMICAL FEED PUMP

- A. Refer to Section 44 44 14 Chemical Feed Pumps

2.16 BOOSTER PUMP

A. Manufacturer:

1. [Goulds 7GB10 WaterGun Booster Pump](#)
 - a. 16 Stage, 1hp

B. Description:

1. Delivers 10+ GPM at 300 ft of head
 - a. Operates within 85% of peak efficiency at this duty point
2. To operate at 3500 rpm
3. Single Phase, 60 hz, 115 V, 1 horsepower
4. 1" NPT ports for suction and discharge

2.17 ROUGHING FILTER

A. Manufacturer: Evoqua AVGF-6 (Automatic Valveless Gravity Filter)

B. Description:

1. 6' Filter Diameter Model
2. 3 GPM per square foot - Service Flow Option
3. With 0.45mm-0.55mm sand
 - a. "187-00665" as internally recognized by Evoqua/Xylem

2.18 EQUALIZATION TANK

A. Manufacturer: Norwesco Vertical Water Tank – Black or Dark Green – 5000 Gallon

B. Description:

1. 5000 Gallon Nominal Storage
2. 141" Diameter x 86" Height
3. NSF Approved

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.

3.3 INSTALLATION - METERS

- A. Install positive displacement meters in accordance with AWWA M6 and as shown on the plans.

3.4 INSTALLATION - GAGES

- A. Install gages as shown on the drawings. Install one pressure gage for each pump, locate taps and on suction and discharge of pump; pipe to gage.
- B. Install gage taps in piping where needed.
- C. Install pressure gages with pulsation dampers. Provide needle valve or ball valve to isolate each gage.
- D. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- E. Install gages in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- F. Adjust gages to final angle, clean windows and lenses, and calibrate to zero.

3.5 INSTALLATION - ABOVE GROUND PIPING

- A. Install valves with stems upright or horizontal, not inverted.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Provide spring loaded check valves on discharge of water pumps.
- E. Provide flow controls in water circulating systems as indicated on Drawings.
- F. Install potable water protection devices on plumbing lines where contamination of domestic water may occur; on flush valves, interior and exterior hose bibs.
- G. Pipe relief from valves to exterior of building as shown in the Drawings.
- H. Pipe back-flow preventers and drains to nearest floor drain.

3.6 INSTALLATION - PUMPS

- A. Provide pumps to operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- B. Install long radius reducing elbows or reducers between pump and piping. Support piping adjacent to pump with concrete block so no weight is carried on pump casings.
- C. Provide air cock and drain connection on horizontal pump casings.

D. Provide drains for bases and seals.

E. Check, align, and certify alignment of base mounted pumps prior to start-up.

F. Install base mounted pumps on concrete housekeeping base, with anchor bolts, set and level, and grout in place. Refer to Section 03 30 00.

G. Lubricate pumps before start-up.

3.7 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Disinfect water distribution system in accordance with Section 33 13 00.

END OF SECTION

SECTION 22 40 00
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Utility sinks.
 - 2. Emergency Eye Wash.
- B. Related Sections:
 - 1. Section 07 90 00 - Joint Protection: Product requirements for calking between fixtures and building components for placement by this section.
 - 2. Section 22 11 00 - Facility Water Distribution: Supply connections to plumbing fixtures.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ANSI Z358.1 - Emergency Eyewash and Shower Equipment.
- B. American Society of Mechanical Engineers:
 - 1. ASME A112.18.1 - Plumbing Fixture Fittings.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit fixture, trim, exploded view and replacement parts lists.

1.4 QUALITY ASSURANCE

- A. Provide plumbing fixture fittings in accordance with ASME A112.18.1 that prevent backflow from fixture into water distribution system.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Accept fixtures on site in factory packaging. Inspect for damage.
- C. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 PRODUCTS

2.1 UTILITY SINKS

- A. Sink:
 - 1. Manufacturer: Florestone Products, Co, www.florestone.com , ((559) 661-4171, Model 20 FM or approved equal.
 - 2. 20-gallon capacity with p-trap, heavy duty molded legs
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Faucet
 - 1. Two handle faucet
 - 2. Swivel spout
 - 3. McMaster Carr or equal (www.mcmastercarr.com)
 - 4. Model 2976K11

2.2 EMERGENCY COMBINATION SHOWER WITH EYE AND FACE WASH

- A. Wall mount with 3/8 inch hose.
- B. Manufacturers: McMaster Carr Model 5623T31
- C. The CONTRACTOR shall install an eyewash station and connect it to the wall over the utility sink

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify walls and floor finishes are prepared and ready for installation of fixtures.

3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with screwdriver stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall supports or wall carriers and bolts.

3.4 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.5 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Clean plumbing fixtures and equipment.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.
- B. Do not permit use of fixtures before final acceptance.

END OF SECTION

SECTION 26 05 03

EQUIPMENT WIRING CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes electrical connections to equipment.
- B. Related Sections:
 - 1. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
 - 2. Section 26 05 33 - Raceway and Boxes for Electrical Systems.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA WD 1 - General Requirements for Wiring Devices.
 - 2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
- C. Manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Submittal procedures.
- B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.5 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- C. Determine connection locations and requirements.
- D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 PRODUCTS

2.1 CORD AND PLUGS

- A. Attachment Plug Construction: Conform to NEMA WD 1.
- B. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.
- C. Cord Construction: Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 EXISTING WORK

- A. Ensure all wire is de-energized prior to work.
- B. Remove exposed abandoned equipment wiring connections.
- C. Disconnect abandoned utilization equipment and remove wiring connections. Remove abandoned components when connected raceway is abandoned and removed. Install blank cover for abandoned boxes and enclosures not removed.
- D. Extend existing equipment connections using materials and methods compatible with existing electrical installations, or as specified.

3.3 INSTALLATION

- A. Make electrical connections.
- B. Make conduit connections to equipment using liquidtight flexible conduit with watertight connectors.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Install receptacle outlet to accommodate connection with attachment plug.
- E. Install cord and cap for field-supplied attachment plug.

- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

3.4 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

END OF SECTION

SECTION 26 05 19

ELECTRICAL CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes building wire and cable; direct burial cable; service entrance cable; armored cable; metal clad cable; and wiring connectors and connections.
- B. Related Sections:
 - 1. Section 26 05 03 - Equipment Wiring Connections.
 - 2. Section 26 05 33 - Conduit and Boxes for Electrical Systems.
 - 3. Section 26 05 53 - Identification for Electrical Systems: Product requirements for wire identification.
 - 4. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.
 - 5. Section 31 23 23 - Fill: Requirements for backfill to be placed by this section.

1.2 REFERENCES

- A. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
 - 2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
- C. Underwriters Laboratories, Inc.:
 - 1. UL 1277 - Standard for Safety for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.

1.3 SYSTEM DESCRIPTION

- A. Product Requirements: Provide products as follows:
 - 1. Stranded conductor for feeders and branch circuits 10 AWG and smaller.
 - 2. Stranded conductors for control circuits.
 - 3. Conductor not smaller than 12 AWG for power and lighting circuits.
 - 4. Conductor not smaller than 16 AWG for control circuits.
 - 5. Increase wire size in branch circuits to limit voltage drop to a maximum of 5 percent.
- B. Wiring Methods: Provide the following wiring methods:
 - 1. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN or Type XHHW-2 insulation, in raceway.
 - 2. Exterior Locations: Use only building wire, Type XHHW-2 insulation, in raceway.
 - 3. Underground Locations: Use only building wire, Type XHHW-2 insulation, in raceway.

1.4 DESIGN REQUIREMENTS

- A. Conductor sizes are based on copper unless indicated as aluminum or "AL".
- B. When aluminum conductor is substituted for copper conductor, size to match circuit requirements, terminations, conductor ampacity and voltage drop.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit for building wire and all buried or submersible cable.
- C. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors.
- D. Test Reports: Indicate procedures and values obtained.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of components and circuits.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with NFPA 70.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on Drawings.

1.10 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

PART 2 PRODUCTS

2.1 BUILDING WIRE

- A. Product Description: Single conductor insulated wire.

- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation Temperature Rating: 90 degrees C.

2.2 SERVICE ENTRANCE CABLE

- A. Conductor: Copper.
- B. Insulation Voltage Rating: 600 volts.
- C. Insulation: Type USE-2, XHHW-2, or RHW-2.

2.3 TERMINATIONS

- A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.
- B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify interior of building has been protected from weather.
- C. Verify mechanical work likely to damage wire and cable has been completed.
- D. Verify raceway installation is complete and supported.

3.2 EXISTING WORK

- A. Ensure all wire is de-energized prior to work.
- B. Remove exposed abandoned wire and cable. Patch surfaces where removed cables pass through building finishes.
- C. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.
- D. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.
- E. Extend existing circuits using materials and methods compatible with existing electrical installations, or as specified.

- F. Clean and repair existing wire and cable remaining or wire and cable to be reinstalled.

3.3 INSTALLATION

- A. Route wire and cable to meet Project conditions.
- B. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- C. Special Techniques--Building Wire in Raceway:
 - 1. Pull conductors into raceway at same time.
 - 2. Install building wire 4 AWG and larger with pulling equipment.
- D. Special Techniques - Cable:
 - 1. Protect exposed cable from damage.
 - 2. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure. Do not rest cable on ceiling panels.
 - 3. Use suitable cable fittings and connectors.
- E. Special Techniques - Wiring Connections:
 - 1. Clean conductor surfaces before installing lugs and connectors.
 - 2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - 3. Make all splices, taps, terminations and connections in accessible junction boxes or accessible equipment. No connections are to be made, then covered up or pulled into raceways.
 - 4. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
 - 5. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
 - 6. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
 - 7. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- F. Install stranded conductors for branch circuits 10 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.
- G. Install terminal lugs on ends of 600 volt wires unless lugs are furnished on connected device, such as circuit breakers.
- H. Size lugs in accordance with manufacturer's recommendations terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.
- I. For terminal lugs fastened together such as on motors, transformers, and other apparatus, or when space between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength of 2-1/2 times normal potential of circuit.

3.4 WIRE COLOR

- A. General:
 - 1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:

- a. Black and red for single phase circuits at 120/240 volts.
 - b. Black, red, and blue for circuits at 120/208 volts single or three phase.
 - c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:
 - a. Black and red for single phase circuits at 120/240 volts.
 - b. Black, red, and blue for circuits at 120/208 volts single or three phase.
 - c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
- B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.
- C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.
- D. Feeder Circuit Conductors: Uniquely color code each phase.
- E. Ground Conductors:
 1. For 6 AWG and smaller: Green.
 2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.5 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 26 05 26

GROUNDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rod electrodes.
 - 2. Active electrodes.
 - 3. Wire.
 - 4. Grounding well components.
 - 5. Mechanical connectors.
- B. Related Sections:
 - 1. Section 26 41 00 - Facility Lightning Protection: Grounding of lightning protection system.

1.2 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
 - 1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - 2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.
- B. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.

1.3 SYSTEM DESCRIPTION

- A. Grounding systems use the following elements as grounding electrodes:
 - 1. Metal building frame.
 - 2. Concrete-encased electrode.
 - 3. Rod electrode.
 - 4. Plate electrode.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on grounding electrodes and connections.

1.5 QUALITY ASSURANCE

- A. Provide grounding materials conforming to requirements of NEC and IEEE 142 with UL label.

1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Complete grounding of building reinforcing steel prior to concrete placement.

PART 2 PRODUCTS

2.1 ROD ELECTRODES

- A. Manufacturers:
 - 1. Erico, Inc.
 - 2. Thomas & Betts, Electrical.
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description:
 - 1. Material: Copper-clad steel or Copper.
 - 2. Diameter: 1/2 inch.
 - 3. Length: 10 feet.
- C. Connector: U-bolt clamp, brass construction.

2.2 ACTIVE ELECTRODES

- A. Manufacturers:
 - 1. Erico, Inc.
 - 2. Thomas & Betts, Electrical.
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description:
 - 1. Material: Metallic-salt-filled copper-tube electrode.
 - 2. Shape: L-shaped.
 - 3. Length: 10 feet.
- C. Connector: U-bolt clamp, steel construction.

2.3 WIRE

- A. Material: Stranded copper.
- B. Foundation Electrodes: 4 AWG.
- C. Grounding Electrode Conductor: Copper conductor bare.
- D. Bonding Conductor: Copper conductor bare.

2.4 GROUNDING WELL COMPONENTS

- A. Well Pipe: 8 inches NPS by 24 inches long concrete pipe with belled end.
- B. Well Cover: Cast iron with legend "GROUND" embossed on cover.

2.5 MECHANICAL CONNECTORS

- A. Manufacturers:
 - 1. Erico, Inc.
 - 2. Thomas & Betts, Electrical.
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

- A. Remove paint, rust, mill oils, and surface contaminants at connection points.

3.3 EXISTING WORK

- A. Modify existing grounding system to maintain continuity to accommodate renovations.
- B. Extend existing grounding system using materials and methods compatible with existing electrical installations, or as specified.

3.4 INSTALLATION

- A. Install in accordance with IEEE 142.
- B. Install additional rod electrodes to achieve specified resistance to ground.
- C. Install grounding and bonding conductors concealed from view.
- D. Install grounding well pipe with cover at each rod location. Install well pipe top flush with finished grade.
- E. Install 4 AWG bare copper wire in foundation footing.

- F. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- G. Bond to lightning protection system. Refer to Section 26 41 00.
- H. Install continuous grounding using underground cold water system and building steel as grounding electrode. Where water piping is not available, install artificial station ground by means of driven rods or buried electrodes.
- I. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.
- J. Install branch circuits feeding isolated ground receptacles with separate insulated grounding conductor, connected only at isolated ground receptacle, ground terminals, and at ground bus of serving panel.
- K. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits.
- L. Size grounding conductors in accordance with NEC.
- M. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment.
- N. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.
- O. Grounding electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC.
- P. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.5 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform continuity testing in accordance with IEEE 142.
- C. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION

SECTION 26 05 33

CONDUIT AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes, and handholes.
- B. Related Sections:
 - 1. Section 26 05 03 - Equipment Wiring Connections.
 - 2. Section 26 05 19 - Electrical Conductors and Cables.
 - 3. Section 26 05 26 - Grounding for Electrical Systems.
 - 4. Section 26 05 29 - Hangers and Supports for Electrical Systems.
 - 5. Section 26 05 53 - Identification for Electrical Systems.
 - 6. Section 26 27 16 - Electrical Cabinets and Enclosures.
 - 7. Section 26 27 26 - Wiring Devices.
 - 8. Section 33 71 19 - Electrical Underground Ducts and Manholes.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
- B. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 5. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - 6. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- C. Underwriter's Laboratories:
 - 1. UL 6 - Rigid Metal Conduit

1.3 SYSTEM DESCRIPTION

- A. Conduit and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Conduit and boxes are shown in approximate locations unless dimensioned. Provide conduit to complete wiring system.
- B. Underground: Provide rigid steel conduit or thickwall nonmetallic conduit. Provide cast metal boxes or nonmetallic handhole.

- C. In or Under Slab on Grade: Provide thickwall nonmetallic conduit encased in concrete. Provide rigid steel factory bends greater than 22.5 degrees and for stub-ups through concrete slabs. Provide cast metal or nonmetallic boxes.
- D. In Slab Above Grade: Provide galvanized rigid steel conduit. Provide cast metal or nonmetallic boxes.
- E. Wet and Damp Locations: Provide PVC-coated, galvanized rigid steel conduit or liquidtight metallic tubing. Provide PVC-coated cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.
- F. Concealed Dry Locations: Provide electrical metallic tubing for sizes less than 2-inches. Provide galvanized rigid steel or thickwall nonmetallic conduit for sizes 2-inches and larger. Provide cast or sheet-metal boxes.
- G. Exposed Dry Locations: Provide galvanized rigid steel conduit. Provide cast metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.4 DESIGN REQUIREMENTS

- A. Minimum Conduit Size: $\frac{3}{4}$ inch unless otherwise specified.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit for the following:
 - 1. Rigid steel conduit.
 - 2. PVC coated galvanized rigid steel conduit.
 - 3. Electrical Metallic Tubing (EMT).
 - 4. Liquidtight flexible metal conduit.
 - 5. Nonmetallic conduit.
 - 6. Flexible nonmetallic conduit.
 - 7. Nonmetallic tubing.
 - 8. Raceway fittings.
 - 9. Conduit bodies.
 - 10. Surface raceway.
 - 11. Wireway.
 - 12. Pull and junction boxes.
 - 13. Handholes.
- C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

- B. Project Record Documents:
 - 1. Record actual routing of all underground electrical conduits and other electrical conduits greater than 2-inch diameter.
 - 2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate installation of outlet boxes for equipment connected under Section 26 05 03.
- C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 PRODUCTS

2.1 METAL CONDUIT

- A. Galvanized Rigid Steel Conduit: ANSI C80.1 and UL 6.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Fittings and Conduit Bodies: NEMA FB 1; all steel fittings, unless otherwise specified.

2.2 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers:
 - 1. Thomas & Betts Corp. Model Adaptasteel Type SPL.
 - 2. Southwire Model Titan2 Type UL.
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description: Interlocked steel construction with PVC jacket.
- C. Fittings: NEMA FB 1.

2.3 ELECTRICAL METALLIC TUBING (EMT)

- A. Product Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron, compression type.

2.4 NONMETALLIC CONDUIT

- A. Manufacturers:
 - 1. Carlon Electrical Products Model RNC Schedule 80.
 - 2. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description: NEMA TC 2; Schedule 80 PVC.
- C. Fittings and Conduit Bodies: NEMA TC 3.

2.5 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
 - 2. Concrete Ceiling Boxes: Concrete type.
- B. Nonmetallic Outlet Boxes: NEMA OS 2.
- C. Cast Boxes: NEMA FB 1, Type FD, cast ferrous alloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.
- D. Wall Plates for Finished Areas: As specified in Section 26 27 26.
- E. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.6 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Section 26 27 16.
- C. Surface Mounted Cast Metal Box: NEMA 250, Type 4X; flat-flanged, surface mounted junction box:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
- D. In-Ground Cast Metal Box: NEMA 250, Type 6, inside flanged, recessed cover box for flush mounting:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
 - 3. Cover Legend: "ELECTRIC".

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

- B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 EXISTING WORK

- A. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.
- B. Extend existing raceway and box installations using materials and methods compatible with existing electrical installations, or as specified.
- C. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.3 INSTALLATION

- A. Ground and bond raceway and boxes in accordance with Section 26 05 26.
- B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.
- C. Identify raceway and boxes in accordance with Section 26 05 53.
- D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.4 INSTALLATION - RACEWAY

- A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.
- B. Arrange raceway supports to prevent misalignment during wiring installation.
- C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- D. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports
- E. Do not attach raceway to ceiling support wires or other piping systems.
- F. Route exposed raceway parallel and perpendicular to walls.
- G. Route raceway installed above accessible ceilings parallel and perpendicular to walls.
- H. Route conduit in and under slab from point-to-point.
- I. Maintain clearance between raceway and piping for maintenance purposes.
- J. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.
- K. Cut conduit square using saw or pipe cutter; de-burr cut ends.

- L. Bring conduit to shoulder of fittings; fasten securely.
- M. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.
- N. Install conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- O. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbows for bends in metal conduit larger than 2 inch size.
- P. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.
- Q. Install fittings to accommodate expansion and deflection where raceway crosses expansion joints.
- R. Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- S. Install suitable caps to protect installed conduit against entrance of dirt and moisture.
- T. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.
- U. Close ends and unused openings in wireway.

3.5 INSTALLATION - BOXES

- A. Install wall mounted boxes per Code or as indicated on Drawings, or as specified in section for outlet device.
- B. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.
- C. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.
- D. Fasten flush mounting outlet box between studs.
- E. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- F. Install adjustable steel channel fasteners for hung ceiling outlet box.
- G. Do not fasten boxes to ceiling support wires or other piping systems.
- H. Support boxes independently of conduit.
- I. Install gang box where more than one device is mounted together. Do not use sectional box.
- J. Install gang box with plaster ring for single device outlets.

3.6 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods in accordance with this Contract.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation specified in this Contract.
- C. Locate outlet boxes to allow luminaires positioned as indicated on Drawings.
- D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

3.7 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused openings in boxes.

3.8 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Clean interior of boxes to remove dust, debris, and other material.
- C. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nameplates.
 - 2. Labels.
 - 3. Wire markers.
 - 4. Conduit markers.
 - 5. Underground Warning Tape.
 - 6. Lockout Devices.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data:
 - 1. Submit manufacturer's catalog literature for each product required.
 - 2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

1.3 POST CONSTRUCTION SUBMITTALS

- A. Ladder diagram for all electrical control panels built or installed.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Product Description: Laminated three-layer plastic with engraved white letters on black contrasting background color.
- B. Letter Size:
 - 1. 1/8 inch high letters for identifying individual equipment and loads.
 - 2. 1/4 inch high letters for identifying grouped equipment and loads.

- C. Minimum nameplate thickness: 1/8 inch.

2.2 LABELS

- A. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background.

2.3 WIRE MARKERS

- A. Description: Cloth or vinyl tape, split sleeve, or tubing type wire markers.
- B. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number.
 - 2. Control Circuits: Control wire number as indicated on shop drawings.
- C. Ladder Diagram: Full ladder diagram of all wiring in each control panel, plastic laminated and affixed to inside back panel of cover or door.
 - 1. If Ladder Diagram is too large to be laminated and posted, fold and place in plastic dust cover affixed to inside back panel of cover or door.
 - 2. Naming and numbering system on wire labels shall match that shown in Ladder Diagram.

2.4 CONDUIT AND RACEWAY MARKERS

- A. Description: Nameplate fastened with straps or adhesive.
- B. Color:
 - 1. Medium Voltage System: Black lettering on white background.
 - 2. 480 Volt System: Black lettering on white background.
 - 3. 208 Volt System: Black lettering on white background.
- C. Legend:
 - 1. Medium Voltage System: HIGH VOLTAGE.
 - 2. 480 Volt System: 480 VOLTS.
 - 3. 208 Volt System: 208 VOLTS.

2.5 UNDERGROUND WARNING TAPE

- A. Description: 4 inch wide plastic tape, detectable type, colored red with suitable warning legend describing buried electrical lines.

2.6 LOCKOUT DEVICES

- A. Reinforced nylon hasp with erasable label surface; size minimum 7-1/4 x 3 inches.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 EXISTING WORK

- A. Install identification on existing equipment to remain in accordance with this section.
- B. Install identification on unmarked existing equipment.
- C. Replace lost nameplates, labels, and markers.

3.3 INSTALLATION

- A. Install identifying devices after completion of painting.
- B. Nameplate Installation:
 - 1. Install nameplate parallel to equipment lines.
 - 2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
 - 3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.
 - 4. Secure nameplate to equipment front using rivets or adhesive.
 - 5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
 - 6. Install nameplates for the following:
 - a. Switchboards.
 - b. Panelboards.
 - c. Transformers.
 - d. Service Disconnects.
- C. Label Installation:
 - 1. Install label parallel to equipment lines.
 - 2. Install label for identification of individual control device stations.
 - 3. Install labels for permanent adhesion and seal with clear lacquer.
- D. Wire Marker Installation:
 - 1. Install wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.
 - 2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.
 - 3. Install labels at data outlets identifying patch panel and port designation.
- E. Conduit and Raceway Marker Installation:
 - 1. Install conduit or raceway marker for each conduit raceway longer than 6 feet.
 - 2. Conduit and Raceway Marker Spacing: 20 feet on center.
- F. Underground Warning Tape Installation:
 - 1. Install underground warning tape along length of each underground conduit, raceway, or cable 6 to 8 inches below finished grade, directly above buried conduit, raceway, or cable.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Distribution and branch circuit panelboards.
 - 2. Load centers.
- B. Related Requirements:
 - 1. Section 26 05 26 - Grounding for Electrical Systems.
 - 2. Section 26 05 53 - Identification for Electrical Systems.

1.2 REFERENCE STANDARDS

- A. National Electrical Manufacturers Association:
 - 1. NEMA FU 1 - Low Voltage Cartridge Fuses.
 - 2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
 - 3. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
 - 4. NEMA PB 1 - Panelboards.
 - 5. NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
- B. National Fire Protection Association:
 - 1. NFPA 70 - National Electrical Code.
- C. Underwriters Laboratories Inc.:
 - 1. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Submit spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

PART 2 PRODUCTS

2.1 LOAD CENTERS

- A. Manufacturer List:
 - 1. Siemens Model P2, as basis of design.

- 2. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Description: Circuit breaker load center, with bus ratings as indicated on Drawings.
- C. Performance:
 - 1. Minimum Integrated Short Circuit Rating: 10,000 amperes rms symmetrical.
- D. Materials:
 - 1. Molded Case Circuit Breakers: UL 489, plug-on type thermal magnetic trip circuit breakers, with common trip handle for poles, listed as Type SWD for lighting circuits, Class A ground fault interrupter circuit breakers. Do not use tandem circuit breakers.
 - 2. Enclosure: Rainproof.
- E. Box: Surface type with door, and pull ring and latch on door.
- F. Finishes: Manufacturer's standard gray enamel.

PART 3 EXECUTION

3.1 DEMOLITION

- A. N/A

3.2 INSTALLATION

- A. Install panelboards and load centers in accordance with NEMA PB 1.1.
- B. Install panelboards and load centers plumb.
- C. Install recessed panelboards and load centers flush with wall finishes.
- D. Height: 6 feet to top of panelboard and load center; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
- E. Install filler plates for unused spaces in panelboards.
- F. Provide typed circuit directory for each branch circuit panelboard and load center. Revise directory to reflect circuiting changes to balance phase loads. Identify each circuit as to its clear, evident and specific purpose of use.
- G. Install engraved plastic nameplates in accordance with Section 26 05 53.
- H. Install spare conduits out of each recessed panelboard to accessible location. Minimum spare conduits: 2 empty 1 inch. Identify each as SPARE.
- I. Ground and bond panelboard enclosure according to Section 26 05 26. Connect equipment ground bars of panels in accordance with NFPA 70.

3.3 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.
- B. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes wall switches; wall dimmers; receptacles; multioutlet assembly; and device plates and decorative box covers.
- B. Related Sections:
 - 1. Section 26 05 33 - Raceway and Boxes for Electrical Systems: Outlet boxes for wiring devices.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA WD 1 - General Requirements for Wiring Devices.
 - 2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.

PART 2 PRODUCTS

2.1 WALL SWITCHES

- A. Manufacturers:
 - 1. Cooper Wiring Devices.
 - 2. Harvey Hubbell, Inc.
 - 3. Leviton Manufacturing Company.
 - 4. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Product Description:
 - 1. NEMA WD 1, Heavy-Duty, AC only general-use snap switch.
 - 2. Toggle, quiet action with grounding terminal
 - 3. Back and side wired
 - 4. Solid Silver cadmium oxide contacts
 - 5. One-piece switch arm
 - 6. Rated 20 A, 120 V AC
 - 7. UL Listed
 - 8. Color: Ivory

9. Wall Plate: Type 304 stainless steel
10. SPST unless otherwise indicated on the Drawings

C. Ratings: Match branch circuit and load characteristics.

2.2 RECEPTACLES

A. Manufacturers:

1. Cooper Wiring Devices.
2. Harvey Hubbell, Inc.
3. Leviton Manufacturing Company.
4. Substitutions Permitted: Section 01 60 00 - Product Requirements.

B. Product Description:

1. NEMA WD 1, Heavy-duty general use receptacle.
2. Straight blade, grounding type, Standard Specification grade
3. Rated 20 A, 125 V AC
4. UL listed
5. Test and reset buttons
6. Feed-thru type

C. Configuration: NEMA WD 6, type as indicated on Drawings.

D. Convenience Receptacle: Type 5-15.

E. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.3 WALL PLATES

A. Manufacturers:

1. Cooper Wiring Devices.
2. Harvey Hubbell, Inc.
3. Leviton Manufacturing Company.
4. Substitutions Permitted: Section 01 60 00 - Product Requirements.

B. Decorative or Jumbo Cover Plate: 302/304 stainless steel.

C. Weatherproof Cover Plate: Stainless steel plate with hinged and gasketed device cover.

2.4 MULTIOUTLET ASSEMBLY

A. Manufacturers:

1. Cooper Wiring Devices.
2. Harvey Hubbell, Inc.
3. Leviton Manufacturing Company.
4. Substitutions Permitted: Section 01 60 00 - Product Requirements.

- B. Multi-outlet Assembly: Sheet metal channel with fitted cover, with pre-wired receptacles, suitable for use as multi-outlet assembly.
- C. Size: As indicated on Drawings.
- D. Receptacles: Furnish covers and accessories to accept receptacles specified in this Section.
- E. Receptacle Spacing: 6 inches on center.
- F. Channel Finish: Stainless steel.
- G. Fittings: Furnish manufacturer's standard couplings, elbows, outlet and device boxes, and connectors

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify outlet boxes are installed at proper height.
- C. Verify wall openings are neatly cut and completely covered by wall plates.
- D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Clean debris from outlet boxes.

3.3 EXISTING WORK

- A. Disconnect and remove abandoned wiring devices.
- B. Modify installation to maintain access to existing wiring devices to remain active.
- C. Clean and repair existing wiring devices to remain or to be reinstalled.

3.4 INSTALLATION

- A. Mount devices where indicated on the Drawings.
- B. Install devices plumb and level.
- C. Where more than one receptacle is installed in a room, they shall be symmetrically arranged.

- D. Install switches with OFF position down.
- E. Install receptacles with grounding pole on bottom.
- F. Connect wiring device grounding terminal to outlet box with bonding jumper.
- G. Install wall plates on flush mounted switches, receptacles, and blank outlets.
- H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- I. Use jumbo size plates for outlets installed in masonry walls.
- J. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.5 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 26 05 33 to obtain mounting heights as indicated on drawings.
- B. Install wall switch 48 inches above finished floor.
- C. Install convenience receptacle 24 inches above finished floor.
- D. Install convenience receptacle 6 inches above counter or shelf.

3.6 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect each wiring device for defects.
- C. Operate each wall switch with circuit energized and verify proper operation.
- D. Verify each receptacle device is energized.
- E. Test each receptacle device for proper polarity.
- F. Test each GFCI receptacle device for proper operation.

3.7 ADJUSTING

- A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust devices and wall plates to be flush and level.

3.8 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Clean exposed surfaces to remove splatters and restore finish.

3.9 CHEMICAL FEED PUMP PLUG AND RECEPTACLES:

- A. One receptacle for each of the chemical feed apparatus will be provided and installed where shown on the drawings and wired to energize when:
 - 1. There is sufficient flow and to interrupt power to the chemical feed pumps upon a low flow or no flow condition.
 - 2. The pump mag starter is energized (the pump is “on”) and de-energized when the pump is “off.”
- B. The chemical feed outlets shall be clearly marked with a laminated engraved Bakelite tag labeled “Feed Pump” as appropriate.

END OF SECTION

SECTION 26 28 13

FUSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fuses.

1.2 REFERENCE STANDARDS

- A. National Electrical Manufacturers Association:
 - 1. NEMA FU 1 - Low Voltage Cartridge Fuses.

1.3 MAINTENANCE MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance materials
- B. Spare Parts:
 - 1. Furnish two fuse pullers.
- C. Extra Materials:
 - 1. Furnish three spare fuses of each Class, size, and rating installed.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. Select fuses to provide appropriate levels of short circuit and overcurrent protection for the following components: wire, cable, bus structures, and other equipment. Design system to maintain component damage within acceptable levels during faults.
- B. Select fuses to coordinate with time current characteristics of other overcurrent protective elements, including other fuses, circuit breakers, and protective relays. Design system to maintain operation of device closest to fault operates.

2.2 FUSES

- A. Dimensions and Performance: NEMA FU 1, Class as specified or as indicated on Drawings.
- B. Voltage: Rating suitable for circuit phase-to-phase voltage.

PART 3 EXECUTION

3.1 DEMOLITION

- A. Remove fuses from abandoned circuits.
- B. Maintain access to existing fuses and other installations remaining active and requiring access. Modify installation or provide access panel.

3.2 INSTALLATION

- A. Install fuse with label oriented so manufacturer, type, and size are easily read.

END OF SECTION

SECTION 26 32 13
ENGINE GENERATORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes engine generator set, exhaust silencer and fittings, transfer switch, fuel fittings, battery, and charger.
- B. Related Sections:
 - 1. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

1.2 REFERENCES

- A. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA MG 1 - Motors and Generators.
- B. International Electrical Testing Association:
 - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. National Fire Protection Association:
 - 1. NFPA 110 - Standard for Emergency and Standby Power Systems.
- D. Underwriters Laboratories Inc.:
 - 1. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

1.3 SYSTEM DESCRIPTION

- A. Description: Engine generator assembly and accessories to provide source of power for applications in accordance with NFPA 110.
 - 1. Capacity: per Bid Schedule.
 - 2. Fuel: per Bid Schedule.
 - 3. Local power: per Bid Schedule.
 - 4. Local power service panel: 200 amps (unless otherwise indicated in Bid Schedule).

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate electrical characteristics and connection requirements. Include plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, electrical diagrams including schematic and interconnection diagrams.

- C. Product Data: Submit data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, transfer switch (if installed), battery, battery rack, battery charger, exhaust silencer, vibration isolators, and remote radiator.
- D. Test Reports: Indicate results of performance testing.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit instructions and service manuals for normal operation, routine maintenance, oil sampling and analysis for engine wear, and emergency maintenance procedures.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years' experience.
- B. Supplier: Authorized distributor of specified manufacturer with minimum three years' experience.

1.7 MAINTENANCE SERVICE

- A. Contractor to purchase five (5) year manufacturer's extended warranty. Warranty to be in the Tribes name.

1.8 MAINTENANCE MATERIALS

- A. Furnish one set of tools required for preventative maintenance of engine generator system. Package tools in adequately sized metal tool box.
- B. Furnish two of each fuel, oil and air filter element (if applicable).

PART 2 PRODUCTS

2.1 ENGINE

- A. Product Description: Air-cooled in-line or V-type internal combustion engine.
- B. Rating: Sufficient to operate under 10 percent overload for one hour in ambient of 90 degrees F at elevation of 2,500 feet.
- C. Fuel System: Propane
- D. Engine speed: 1800 rpm
- E. Safety Devices: Engine shutdown on high water temperature, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer.

- F. Engine Starting: DC starting system with positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions.
- G. Radiator: Radiator using glycol coolant, with blower type fan, sized to maintain safe engine temperature in ambient temperature of 110 degrees F.
- H. Engine Accessories: Fuel filter, lube oil filter, intake air filter, lube oil cooler, fuel transfer pump, fuel priming pump, gear-driven water pump. Furnish fuel pressure gage, water temperature gage, and lube oil pressure gage on engine/generator control panel.
- I. Mounting: Furnish unit with suitable spring-type vibration isolators and mount on structural steel base.

2.2 GENERATOR

- A. Refer to Section 01 11 90 – Revisions to Standard Specifications

2.3 GOVERNOR

- A. Product Description: Electronic isochronous governor to maintain engine speed within 0.5 percent, steady state, and 5 percent, no load to full load, with recovery to steady state within 2 seconds following sudden load changes.

2.4 TRANSFER SWITCH (See Bid Schedule for Type)

- A. Automatic Transfer Switch
 - 1. Manufacturers:
 - a. Transfer switch to be from the same manufacturer as the generator.
 - 2. Product Description: NEMA ICS 10, automatic transfer switch.
 - 3. Configuration: Electrically operated, mechanically held transfer switch.
 - 4. Withstand and Close-On Ratings (WCR): ATS to meet minimum WCR RMS symmetrical amperes for available fault current.
 - 5. Automatic Sequence of Operation:
 - a. Initiate Time Delay to Start Alternate Source Engine Generator: Upon initiation by normal source monitor.
 - b. Time Delay To Start Alternate Source Engine Generator: 0.1 to 10 seconds, adjustable.
 - c. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.
 - d. Time Delay Before Transfer to Alternate Power Source: 5 to 180 seconds, adjustable.
 - e. Initiate Retransfer Load to Normal Source: Upon permission by normal source monitor.
 - f. Time Delay Before Transfer to Normal Power: 1 to 30 minutes, adjustable; bypass time delay in event of alternate source failure.
 - 6. Time Delay Before Engine Shut Down: 1 to 30 minutes, adjustable, of unloaded operation.
 - 7. Engine Exerciser: Start engine every 7 to 30 days; run for 10 to 30 minutes before shutting down. Bypass exerciser control when normal source fails during exercising period.
 - 8. Alternate System Exerciser: Transfer load to alternate source during engine exercising period.
 - 9. Enclosure:
 - a. Enclosure: NEMA 3R.

10. Rating: Shall be sized for rating of generator and local power source.

B. Manual Transfer Switch

1. Manufacturers:
 - a. Transfer switch to be from the same manufacturer as the generator.
 - b. Substitutions allowed.
2. Enclosure:
 - a. Enclosure: NEMA 3R.
3. Rating: Shall be sized for rating of generator and local power source.
4. UL listed.
5. Non fusible.

2.5 ACCESSORIES

- A. Skid-Mounted Fuel Tank (for diesel generators only): integrated skid-mounted steel tank, with fill and vent.
- B. Exhaust Silencer: Critical type silencer, with muffler companion flanges and flexible stainless steel exhaust fitting, sized in accordance with engine manufacturer's instructions.
- C. Batteries: Heavy duty, per generator manufacturer's recommendations. Match battery voltage to starting system. Furnish cables and clamps.
 1. Battery shall be fully charged at time of completion.
- D. Battery Tray: Treated for electrolyte resistance, constructed to contain spillage.
- E. Static Battery Charger: 2 amp rated.
- F. Line Circuit Breaker: UL 489, molded case circuit breaker on generator output with integral thermal and instantaneous magnetic trip in each pole. Furnish battery voltage operated shunt trip, connected to open circuit breaker on engine failure. Unit mount in enclosure to meet NEMA 250, Type 1 requirements.
- G. Engine-Generator Control Panel: NEMA 250, Type 1 generator-mounted control panel enclosure with engine and generator controls and indicators. Furnish provision for padlock and the following equipment and features:
 1. Frequency Meter: 45-65 Hz. Range.
 2. Output voltage adjustment.
 3. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, overspeed, and overcrank.
 4. Engine start/stop selector switch.
 5. Engine running time meter.
 6. Oil pressure gage.
 7. Water temperature gage.
 8. Auxiliary Relay: 3PDT, operates when engine runs, with contact terminals prewired to terminal strip.
 9. Additional visual indicators and alarms in accordance with NFPA 110.

- H. Weather-protective Enclosure: Reinforced steel housing allowing access to control panel and service points, with lockable doors and panels. Furnish fixed louvers, integrated fuel tank (for diesel generators only), battery rack, and silencer.

2.6 CONCRETE PAD

- A. Description: Permanently mount generator on concrete pad, with minimum 1 foot of clearance on each side of generator.
- B. Concrete Pad Thickness: Minimum 4 inches for propane/natural gas generators.
- C. Reinforcement: Minimum #4 rebar @ 12" OC both directions.
- D. Concrete pad shall extend 2 inches above grade.
- E. Concrete and reinforcement per Section 03 30 00.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install generator in accordance with the manufacturer's requirements.
 - 1. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.
 - 2. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.
 - 3. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.
 - 4. Equipment shall be initially started and operated by representatives of the manufacturer.
 - 5. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to final testing of the system.
- B. Fully Charge battery before completing job.
- C. Install transfer switch in accordance with the manufacturer's requirements.
- D. Ground and bond generator and other electrical system components in accordance with Section 26 05 26.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.

- B. Perform inspections and tests listed in NETA ATS, Section 7.22.
- C. Perform start-up in the presence of the manufacturer's representative.
 - 1. The complete installation shall be tested for compliance with the specification following the completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.
 - 2. Installation acceptance tests to be conducted on-site shall include a "cold start" test, a two hour full load test, and a one step rated load pickup test in accordance with NFPA 110. Provide a resistive load bank and make temporary connections for full load test, if necessary.
- D. Start-Up Testing:
 - 1. Test generator electrical output.
 - 2. Make necessary adjustments.
 - 3. Simulate failed utility power, and demonstrate how automatic transfer works.
 - 4. Demonstrate how to transfer power manually.
 - 5. Demonstrate how to adjust operational features of generator and automatic transfer switch.

3.3 ADJUSTING

- A. Adjust generator output voltage and engine speed to meet specified ratings.

3.4 CLEANING

- A. Clean engine and generator surfaces. Replace oil and fuel filters with new.

3.5 DEMONSTRATION AND TRAINING

- A. Furnish 2 hours of instruction each for up to five persons, to be conducted at project site with manufacturer's representative.
- B. Describe loads connected to standby system and restrictions for future load additions.
- C. Simulate power outage by interrupting normal source, and demonstrate how system operates to provide standby power.

END OF SECTION

SECTION 26 41 00

LIGHTNING PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes air terminals, interconnecting conductors, grounding, and bonding for lightning protection.

1.2 REFERENCES

- A. Lightning Protection Institute:
 - 1. LPI 175 - Standard of Installation.
- B. Underwriters Laboratories Inc.:
 - 1. UL 96 - Lightning Protection Components.
 - 2. UL 96A - Installation Requirements for Lightning Protection Systems.

1.3 SYSTEM DESCRIPTION

- A. Description: Conductor system protecting entire building.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate layout of air terminals, grounding electrodes, and bonding connections to structure and other metal objects. Include terminal, electrode, and conductor sizes, and connection and termination details.
- C. Product Data: Submit catalog sheets showing dimensions and materials of each component, and include indication of listing in accordance with UL 96.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with UL 96A.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in lightning protection equipment with minimum three years' experience and member of Lightning Protection Institute.

PART 2 PRODUCTS

2.1 COMPONENTS

- A. Product Listing: UL 96.
- B. Air Terminals:
 - 1. Material: Copper.
 - 2. Configuration: Solid.
 - 3. Use adhesive base for single-ply roof installations.
 - 4. Decorations: Ball.
 - 5. Grounding Rods: Solid copper.
 - 6. Ground Plate: Copper.
 - 7. Conductors:
 - a. Material: Copper.
 - b. Configuration: Solid rod.
- C. Connectors and Splicers: Bronze.

PART 3 EXECUTION

3.1 EXISTING WORK

- A. Remove exposed abandoned air terminals, interconnecting cable, and grounding electrodes, and other lightning protection components. Cut cable flush with walls, floors, and roof; patch surfaces.
- B. Maintain access to existing grounding and bonding connections, and other installations remaining active and requiring access. Modify installation or install access panel.
- C. Extend existing lightning protection installations using materials and methods compatible with existing installations and as specified.
- D. Clean and repair existing lightning protection components.

3.2 INSTALLATION

- A. Install in accordance with UL 96A.
- B. Connect conductors using mechanical connectors.
- C. Conceal interior conductors within building finishes. Conceal exterior conductors where practical.
- D. Bond exterior metal bodies on building to lightning protection system.

END OF SECTION

SECTION 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes interior luminaires, lamps, ballasts, and accessories.
- B. Related Sections:
 - 1. Section 26 05 26 - Grounding for Electrical Systems.
 - 2. Section 26 05 33 - Raceway and Boxes for Electrical Systems.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C82.1 - American National Standard for Lamp Ballast-Line Frequency Fluorescent Lamp Ballast.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate dimensions and components for each luminaire not standard product of manufacturer.
- C. Product Data: Submit dimensions, ratings, and performance data.

1.4 MAINTENANCE MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish one replacement lamps for each lamp installed.
- C. Furnish two spares of each ballast type.

PART 2 PRODUCTS

2.1 INTERIOR LUMINAIRES

- A. Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.

2.2 FLUORESCENT LIGHT

- A. Manufacturers:
 - 1. McMaster Carr: model 1618K17

2. Damp location steel fluorescent light rapid start with bulbs.
 3. 40 watt
 4. Rated for interior use
 5. Electronic ballast
 6. Less than 20 percent THD
 7. Suitable for lamps specified, with voltage to match luminaire voltage.
 8. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Fixture shall be surface mounted with white enameled steel reflector and directly wired in conduit
- C. Controlled by a wall switch as shown on the drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install suspended luminaires using pendants supported from swivel hangers. Install pendant length required to suspend luminaire at indicated height.
- B. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.
- C. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- D. Install recessed luminaires to permit removal from below.
- E. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- F. Install clips to secure recessed grid-supported luminaires in place.
- G. Install wall-mounted luminaires at height as indicated on Drawings.
- H. Install accessories furnished with each luminaire.
- I. Connect luminaires to branch circuit outlets provided under Section 26 05 33 using flexible conduit.
- J. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- K. Install specified lamps in each luminaire.
- L. Ground and bond interior luminaires in accordance with Section 26 05 26.

3.2 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

3.4 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Relamp luminaires having failed lamps at Substantial Completion.

END OF SECTION

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes exterior luminaries, poles, and accessories.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C82.1 - American National Standard for Lamp Ballast-Line Frequency Fluorescent Lamp Ballast.
 - 2. ANSI C82.4 - American National Standard for Ballasts-for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).
 - 3. ANSI O5.1 - Wood Poles, Specifications and Dimensions.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate dimensions and components for each luminaire not standard Product of manufacturer.
- C. Product Data: Submit dimensions, ratings, and performance data.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Store and handle solid wood poles in accordance with ANSI O5.1.

1.5 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.6 MAINTENANCE MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Furnish two spares of each type of lamp installed.

PART 2 PRODUCTS

2.1 LUMINAIRES

- A. Product Description: Complete exterior luminaire assemblies, with features, options, and accessories as specified.
- B. All exterior luminaires shall produce a minimum of 3,600 lumens, unless otherwise specified in the Drawings.
- C. Components:
 - 1. Standard light: McMaster Carr model number 1459K57 or equal.
 - 2. 150 watt bulb installed. McMaster Carr model number 1506K91 or equal.
 - 3. Rated for exterior use
 - 4. Motion sensitive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and Project conditions.
- B. Verify foundations are ready to receive fixtures.

3.2 EXISTING WORK

- A. Disconnect and remove abandoned exterior luminaries.
- B. Extend existing exterior luminaire installations using materials and methods as specified.
- C. Clean and repair existing exterior luminaries to remain or to be reinstalled.

3.3 INSTALLATION

- A. Install concrete bases for lighting poles at locations as indicated on Drawings, in accordance with Section 03 30 00.
- B. Install lamps in each luminaire.

3.4 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

3.5 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Clean photometric control surfaces as recommended by manufacturer.
- C. Clean finishes and touch up damage.

3.6 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Relamp luminaries having failed lamps at Substantial Completion.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.
 - 2. Removing designated paving and curbs.
 - 3. Removing designated trees, shrubs, and other plant life.
 - 4. Removing abandoned utilities.
 - 5. Excavating topsoil.
- B. Related Sections:
 - 1. Section 02 41 16 - Structure Demolition: Removing underground storage tanks and designated utilities.
 - 2. Section 31 22 13 - Rough Grading.
 - 3. Section 31 23 18 - Rock Removal.

1.2 QUALITY ASSURANCE

- A. Perform cutting and removal of paving and curbs in accordance with California Department of Transportation (Caltrans) standards.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.

3.2 PREPARATION

- A. Call California Dig Alert at 811 not less than three working days before performing Work. Contact Owner for information about utilities not identifiable by California Dig Alert.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work to minimum depth of 3 inches.
- B. Remove trees and shrubs within marked areas. Remove stumps, root system to depth of 12 inches, and surface rock.
- C. Clear undergrowth and deadwood, without disturbing subsoil.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Partially remove paving and curbs as indicated on Drawings. Neatly saw cut edges at right angle to surface.
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.

3.6 TOPSOIL AND SUBSOIL EXCAVATION

- A. Excavate topsoil and subsoil from areas to be further excavated or regraded, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil or subsoil
- C. Stockpile in area designated on site to height not exceeding 8 feet and protect from erosion.
- D. When excavating through roots, perform Work by hand and cut roots with sharp axe.
- E. Coordinate with Engineer for local placement of excess topsoil.

END OF SECTION

SECTION 31 22 13

ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating topsoil.
 - 2. Excavating subsoil.
 - 3. Cutting, grading, rough contouring, and compacting site for site structures, building pads, and other facilities.
- B. Related Sections:
 - 1. Section 02 41 16 - Structure Demolition.
 - 2. Section 31 10 00 - Site Clearing: Excavating topsoil.
 - 3. Section 31 23 16 - Excavation: Building excavation.
 - 4. Section 31 23 17 - Trenching: Trenching and backfilling for utilities.
 - 5. Section 31 23 18 - Rock Removal.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - 2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 3. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 PRODUCTS

2.1 MATERIALS

NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

- A. Call California Dig Alert at 811 not less than three working days before performing Work. Contact Owner for information about utilities not identifiable by California Dig Alert.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Protect utilities indicated to remain from damage.
- D. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- E. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 FILLING

- A. Fill areas to contours and elevations with unfrozen materials.
- B. Place material in continuous layers as follows:
 - 1. Subsoil Fill: Maximum 12 inches compacted depth.
 - 2. Structural Fill: Maximum 6 inches compacted depth.
- C. Maintain optimum moisture content of fill materials to attain required compaction density.
- D. Slope grade away from building or structure minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
- E. Make grade changes gradual. Blend slope into level areas.
- F. Repair or replace items indicated to remain damaged by excavation or filling.

3.4 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557.

- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D1556 or ASTM D6938.
 - 2. Moisture Tests: ASTM D6938.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at Contractor's expense.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating for building foundations.
 - 2. Excavating for paving and roads.
 - 3. Excavating for slabs-on-grade.
 - 4. Excavating for site structures.
- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
 - 2. Section 31 23 17 - Trenching: Excavating for utility trenches.
 - 3. Section 31 23 18 - Rock Removal: Removal of rock during excavating.
 - 4. Section 33 36 00 - Utility Septic Tanks.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan. Identify name and contact information for Competent Person.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 PREPARATION

- A. Call California Dig Alert at 811 not less than three working days before performing Work. Contact Owner for information about utilities not identifiable by California Dig Alert.
 - 1. Request underground utilities to be located and marked within construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Protect utilities indicated to remain from damage.
- D. Protect plant life, lawns, and other features remaining as portion of final landscaping.

- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.2 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work.
- B. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving, site structures, and construction operations.
- C. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 17.
- D. Slope banks with machine to angle of repose or less until shored.
- E. Do not interfere with 45 degree bearing splay of foundations.
- F. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- G. Trim excavation. Remove loose matter.
- H. Notify Engineer of unexpected subsurface conditions.
- I. Correct areas over excavated with structural fill Type specified in Section 31 23 17.
- J. Remove excess and unsuitable material from site.
- K. Repair or replace items indicated to remain that are damaged by excavation.

3.3 BACKFILLING

- A. Place structure fill material in uniform layers on all sides of the structure 6 inches thick.
- B. Do not fill structure material until the structure footing or other portions of the structure have been inspected.
- C. Compact to 95% of maximum density for bedding under structures. Compact to 90% in other circumstances.
- D. Use excavated soil as final backfill material unless Engineer determines it is unsuitable. Unsuitable final backfill material is solid or loose rock larger than 6 inches or lumps larger than 3 inches. Do not use organic matter or debris.

3.4 PROTECTION

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

- C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

3.5 RESTORATION

- A. Restore sidewalks, curbs, and gutters to their original condition. Comply with the standards and construction requirements of Caltrans or other local authority.
- B. Machine compact backfill under the sidewalk as follows:
 - 1. Cut the existing curb or sidewalk to a neat line.
 - 2. Match the depth of base course material with that present under adjacent curbs or sidewalks.
 - 3. Match the existing concrete sidewalk in width, thickness, slope and finish, but not less than 4 inches in thickness.
 - 4. Use wire mesh reinforcement, 6 inch by 6 inch, mid depth in concrete.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities from 5 feet outside building.
2. Compacted fill from top of utility bedding.
3. Backfilling and compaction.

B. Related Sections:

1. Section 03 30 00 - Cast-In-Place Concrete: Concrete materials.
2. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
3. Section 31 23 16 - Excavation: General building excavation.
4. Section 31 23 18 - Rock Removal: Removal of rock during excavating.
5. Section 31 37 00 - Riprap.
6. Section 33 11 13 - Water Mains: Water piping and bedding.
7. Section 33 11 16 - Water Distribution Valves and Hydrants.
8. Section 33 12 13 - Water Service Connections: Water piping and bedding from building to utility service.
9. Section 33 31 00 - Individual Sewerage Piping: Sanitary sewer piping and bedding from building to utility service.
10. Section 33 31 13 - Community Sewerage Piping: Sanitary sewer piping and bedding.
11. Section 33 36 00 - Utility Septic Tanks.

1.2 REFERENCES

A. ASTM International:

1. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
3. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

B. California Department of Transportation:

1. California Test Method 216 – Relative Compaction of Untreated and Treated Soils and Aggregates.
2. California Test Method 217 – Method of Test for Sand Equivalent.
3. California Test Method 229 – Method of Test for Durability Index
4. California Test Method 301 – Method of Test for Determining the “R” Value of Treated and Untreated Bases, Subbases, and Basement Soils by the Stabilometer.

1.3 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan. Identify name and contact information for Competent Person.
- C. Product materials for pipe embedment, structural fill or cement slurry mix.
- D. Obtain Engineer approval prior to using any locally procured material as backfill.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Imported Pipe Embedment: Angular crushed stone or gravel; free of shale, clay, friable material and debris; graded in accordance with ASTM D2321, Class 1B soils, within the following limits:

Sieve Size	Percent Passing
1 ½ inch	100
3/8 inch	90 to 100
No. 4	5 to 50
No. 200	0 to 5

- B. Imported Structural Fill: Complies with requirements of Caltrans Class 3 Aggregate Subbase:

Sieve Size	Percent Passing
3 inches	100
2 inches	87 to 100
No. 4	45 to 100
No. 200	0 to 34
Resistance (R-value)	40 minimum

- C. Cement Slurry Fill: Per Caltrans Standard Specifications, current edition.
- Fluid workable mixture of aggregate, cement and water that will flow without segregation of the aggregate while being placed.
 - Water shall be free from oil, salts and other impurities that would have an adverse effect.
 - Proportion cement slurry fill by weight or volume: Not less than 188 lbs of cement shall be used for each cubic yard of material produced.

4. Aggregate must be one of the following:
- Commercial quality concrete sand.
 - Excavated or imported material, free of organic material and other deleterious substances, and complying with grading requirements in the following table

Sieve Size	Percent Passing
1 ½ inches	100
1 inch	80 to 100
¾ inches	60 to 100
3/8 inches	50 to 100
No. 4	40 to 80
No. 100	10 to 40

PART 3 EXECUTION

3.1 LINES AND GRADES

- Lay pipes to lines and grades indicated on Drawings.
 - Owner reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- Use calibrated equipment with qualified operator to establish lines and grades.

3.2 PREPARATION

- Call California Dig Alert at 811 not less than three working days before performing Work. Contact Owner for information about utilities not identifiable by California Dig Alert.
 - Request underground utilities to be located and marked within and surrounding construction areas.
- Identify required lines, levels, contours, and datum locations.
- Protect plant life, lawns, and other features remaining as portion of final landscaping.
- Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- Maintain and protect above and below grade utilities indicated to remain.
- Establish temporary traffic control when trenching is performed in public right-of-way. Relocate controls as required during progress of Work.

3.3 TRENCHING

- A. Remove boulders and rock up of 1 cubic yard, measured by volume. Remove larger material as specified in Section 31 23 18.
- B. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.
- C. Excavate bottom of trenches between 12 and 24 inches wider than outside diameter of pipe.
- D. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe utilities.
- E. Do not interfere with 45 degree bearing splay of foundations.
- F. Perform work in accordance with excavation plan. If no excavation plan has been submitted and approved, slope or bench side walls of excavation starting 3 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.
- G. When subsurface materials at bottom of trench are loose or soft. Excavate to greater depth as directed by Engineer. Backfill with imported pipe embedment. Remove large rock, boulders, and large stones to provide 3 inches of soil cushion on all sides of the pipe and pipe accessories.
- H. Cut out soft areas of subgrade not capable of compaction in place. Excavate to greater depth as directed by Engineer. Backfill with imported structural fill and compact to density equal to or greater than requirements for subsequent backfill material.
- I. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- J. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with cement slurry fill as directed by Engineer.
- K. Remove excess subsoil not intended for reuse, from site.

3.4 STOCKPILING OF IMPORTED MATERIALS

- A. Stockpile materials on site at locations designated by Engineer.
- B. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.
- C. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- D. Control erosion from stockpiles in accordance with Section 31 25 13 and approved Storm Water Pollution Prevention Plan (SWPPP), where required.

3.5 STOCKPILE CLEANUP

- A. Leave unused materials in neat, compact stockpile.

- B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

3.6 SHEETING AND SHORING

- A. Conform to approved excavation plan, where applicable.
- B. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- C. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- D. Design sheeting and shoring to be removed at completion of excavation work.
- E. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- F. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.7 BACKFILLING

- A. Use excavated soil as pipe embedment unless Engineer determines it is unsuitable. Unsuitable material is defined as incapable of being compacted to specified density with optimum moisture content, solid or loose rock, lump material larger than 1-inch, organic matter, or debris.
- B. Use excavated soil as final pipe backfill or as structural fill unless Engineer determines it is unsuitable. Unsuitable final pipe backfill or structural fill is solid or loose rock larger than 6-inches or lumps larger than 3-inches. Do not use organic matter or debris.
- C. Backfill trenches to contours and elevations with unfrozen fill materials.
- D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- E. Place material in continuous layers as follows:
 - 1. All Backfill within Roadway and Shoulder: Maximum 6 inches compacted depth.
 - 2. Structural Fill: Maximum 6 inches compacted depth.
 - 3. Pipe Embedment and Haunching: Maximum 6 inches compacted depth.
 - 4. Final Backfill in Unimproved Areas: Maximum 12 inches compacted depth.
- F. Employ placement method that does not disturb or damage foundation perimeter drainage and utilities in trench.
- G. Maintain optimum moisture content of fill materials to attain required compaction density.
- H. Do not leave trench open at end of working day. If required, protect open trench to prevent danger to the public.

3.8 CEMENT SLURRY BACKFILLING

- A. Maintain a minimum 6-inches clear distance between outside of pipe and side of the excavation.
- B. Compacted earth plugs or other suitable system shall be placed at the ends of the trench to receive slurry backfill to completely contain the slurry in the trench.
- C. Place in a uniform manner that will prevent voids in, or segregation of, the backfill, and will not float or shift the pipe.
- D. Backfilling over or placing any material over the cement slurry backfill shall not commence until 4 hours after the slurry has been placed.
- E. Cement slurry backfill shall not be used where it would be in contact with aluminum or aluminum coated materials.

3.9 COMPACTION

- A. Compact backfill to percentage of maximum density determined by ASTM D1557 unless otherwise specified by permit or authority:

Percent of Maximum Density

<u>Location</u>	<u>Bedding & Haunching</u>	<u>Initial & Final Backfill</u>
Roadways, Improved Surfaces	95	95
Roadway Rights-of-Way, Outside of Roadway Prism	90	90
Backfill Around Structures	95	95
Unimproved Surfaces, Fields, Etc	90	80

3.10 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D1556 or ASTM D6938.
 - 2. Moisture Tests: ASTM D6938.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

- E. Frequency and Location of Tests: as directed by Engineer, typically not to exceed one location every 500 linear feet for pipe installations or every 1,000 square feet for structures. Multiple tests of different lifts at a single location may be required as directed by Engineer.

3.11 REMOVAL OF NUISANCE WATER

- A. Control site drainage, springs and runoff, and prevent water from adversely affecting trenching locations.
- B. Remove nuisance water entering the trenches. Water that can be removed through the use of sump or transfer pumps will not be considered dewatering for payment purposes.
- C. Keep trenches free from standing water until the facilities are in place, open ends plugged against the entrance of water, and backfill has been placed and compacted.

3.12 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION

SECTION 31 23 18

ROCK REMOVAL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing identified and discovered rock during excavation.
 - 2. Expansive tools and explosives to assist rock removal.
- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading.
 - 2. Section 31 23 16 - Excavation: Building excavation.
 - 3. Section 31 23 17 - Trenching: Trenching and backfilling for utilities.
 - 4. Section 31 37 00 - Riprap.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 495 - Explosive Materials Code.

1.3 DEFINITIONS

- A. Solid Rock: Solid continuous masses of igneous, metamorphic, or sedimentary rock that, in the opinion of the Engineer, cannot be removed without drilling, wedging, prying, sawing, jacking, hydraulic hammering or blasting. Soft, disintegrated rock that is capable of being excavated with rippers, picking, or other scarifying action is not considered solid rock.
- B. Loose Rock: Individual boulders or loose stones, each with volume in excess of 1 cu yd. Excavated boulders or rock fragments with a volume of less than 1 cu yd shall not be classified as Loose Rock for payment purposes.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate proposed method of blasting, delay pattern, explosive types, type of blasting mat or cover, and intended rock removal method. Shall be submitted at least 14 days before drilling operations begin or whenever a change in drilling and blasting procedures is proposed.
- C. Survey Report: Submit survey report on conditions of buildings near locations of rock removal.

1.5 QUALITY ASSURANCE

- A. Seismic Survey Firm: Company specializing in seismic surveys with five years of experience.

- B. Explosives Firm: Company specializing in explosives for disintegration of rock, with five years of experience.

1.6 PROJECT CONDITIONS

- A. Document conditions of buildings near locations of rock removal, prior to blasting, and photograph existing conditions identifying existing irregularities.
- B. Advise owners of adjacent buildings or structures in writing, prior to executing seismographic survey. Explain planned blasting and seismic operations.
- C. Obtain seismic survey prior to any planned blasting activities to determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties or other work.

1.7 SCHEDULING

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Schedule Work to avoid disruption to occupied buildings nearby.
- C. Conduct blasting operations during hours approved in writing by Owner.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Explosives: Type recommended by explosive firm following seismic survey.
- B. Delay Device: Type recommended by explosives firm.
- C. Blast Mat Materials: Type recommended by explosives firm.
- D. Mechanical Disintegration Compound: Grout mix of materials that expand on curing.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify site conditions and note subsurface irregularities affecting Work of this section.

3.2 ROCK REMOVAL BY MECHANICAL METHOD

- A. Excavate and remove rock by mechanical method.
 - 1. Hydraulic hammering or jacking.
 - 2. Rock saw or rockwheel.

- 3. Drill holes and use expansive tools, wedges, or mechanical disintegration compound to fracture rock.
- B. In utility trenches, excavate to 6 inches below invert elevation of pipe and 18 inches wider than pipe diameter.
- C. Remove rock at excavation bottom to form level bearing.
- D. Remove shaled layers to provide sound and unshattered base for foundations.
- E. Remove excavated materials from site.
- F. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 31 23 17.

3.3 ROCK REMOVAL BY EXPLOSIVE METHODS

- A. When rock is uncovered requiring explosives method for rock disintegration, notify Engineer.
- B. Drill blasting holes within 12 feet of finished slope.
- C. Disintegrate rock and remove from excavation.
- D. In utility trenches, excavate to 6 inches below invert elevation of pipe and 18 inches wider than pipe diameter.
- E. Remove rock at excavation bottom to form level bearing.
- F. Remove shaled layers to provide sound and unshattered base for foundations.
- G. Remove excavated materials from site.
- H. Correct unauthorized rock removal in accordance with backfilling and compacting requirements of Section 31 23 17.

3.4 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Request visual inspection of foundation bearing surfaces by Engineer before installing subsequent work.

END OF SECTION

SECTION 31 25 13
EROSION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rock Energy Dissipater.
 - 2. Sediment Traps.
- B. Related Sections:
 - 1. Section 31 10 00 - Site Clearing.
 - 2. Section 31 23 16 - Excavation.
 - 3. Section 31 37 00 - Riprap.
 - 4. Section 32 13 13 - Concrete Paving.

1.2 REFERENCES

- A. Environmental Protection Agency
 - 1. Clean Water Act, Section 402.
- B. California Department of Transportation (Caltrans)
 - 1. Standard Specifications for Construction of Local Streets and Roads, latest edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on silt fencing, erosion fiber logs, geotextile, or alternate erosion control measure proposed.
- C. Submit a Storm Water Pollution Prevention Plan (SWPPP) in accordance with Federal EPA requirements if the total area to be disturbed is greater than 1-acre total.

PART 2 PRODUCTS

2.1 ROCK MATERIALS

- A. Rock: Sound, hard and angular shape; conforming with Caltrans standard "Light" Riprap. See Section 31 37 00.

2.2 GEOTEXTILE FABRIC

- A. Woven Polypropylene Geotextile
 - 1. Sunshine Supplies Mirafi 500X, or equal.

2. Shall comply with Caltrans standards.

2.3 SILT FENCING

- A. 15 mil screen fabric with a minimum of 120 pounds of grab tensile strength and a minimum opening size of 170.
- B. All seams shall be heat sealed or sewn.
- C. Posts shall be wood or steel, 2" x 2" x 36" minimum.
- D. Shall comply with Caltrans standards.

2.4 EROSION FIBER LOGS

- A. Filled with curled wooden fibers, wood chips, and/or compost, with filter fabric sock or polyester netting exterior covering. Shall be free of weeds.
- B. Approved Products: American Excelsior Sediment Log, FlexTran Silt Sock, or equal
- C. Posts shall be wood or steel, 2" x 2" x 36" minimum.
- D. Shall comply with Caltrans standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted subgrade is acceptable and ready to support devices and imposed loads.
- C. Verify gradients and elevations of base or foundation for other work are correct.

3.2 ROCK ENERGY DISSIPATER

- A. Excavate to indicated depth of rock lining or nominal placement thickness as follows. Remove loose, unsuitable material below bottom of rock lining, then replace with suitable material. Thoroughly compact and finish entire foundation area to firm, even surface.

Rock size	Nominal Placement Thickness inches
Caltrans "Light" Riprap	30

- B. Lay and overlay geotextile fabric over substrate. Lay fabric parallel to flow from upstream to downstream. Overlap edges upstream over downstream and upslope over downslope. Provide a minimum overlap of 3 feet. Offset adjacent roll ends a minimum of 5 feet when lapped. Cover fabric as soon as possible and in no case leave fabric exposed more than 4 weeks.

- C. Carefully place rock on geotextile fabric to produce an even distribution of pieces, with minimum of voids and without tearing geotextile.
- D. Unless indicated otherwise, place full course thickness in one operation to prevent segregation and to avoid displacement of underlying material. Arrange individual rocks for uniform distribution.
 - 1. Saturate rock with water. Fill voids between pieces with grout, for at least top 6 inches. Sweep surface with stiff broom to remove excess grout.
 - 2. Moist cure grouted rock for at least 3 days after grouting, using water saturated burlap in accordance with Section 03 30 00.

3.3 SEDIMENT TRAPS AND CHECK DAMS

- A. Clear site, as specified in Section 31 10 00.
- B. Divert drainage away from construction areas.
- C. Prevent discharge or deposition of soil materials into surface waters.
- D. Remove sediment traps or check dams only after the area has stabilized and vegetation has developed to the extent no further erosion is likely.
- E. Comply with all requirements of SWPPP, where applicable, to control erosion in all areas of ground disturbance and around stockpiles of material.
- F. Silt fencing
 - 1. Place silt fences following a constant elevation contour, in an arc or horseshoe shape with ends pointing up towards the slope.
 - 2. Drive stakes into the soil to a depth such that the silt fence contacts the ground.
 - 3. Trench the silt fence into the ground and tamp the bottom of the filter material to ensure that runoff is forced through the fence rather than under it.
- G. Erosion Control Fiber Logs
 - 1. Install as necessary or as otherwise indicated on the plans at spacing not to exceed California Department of Transportation specifications.
 - 2. Place perpendicular to the direction of flow in a drainage swale or ditch.
 - 3. Overlap butt ends of logs against each other and secure using nylon zip ties.
 - 4. Place stakes through erosion log or alternating upstream and downstream of the erosion log; secure the log to the stakes.
 - 5. Place fiber logs in a furrow that is 2 to 4 inches deep so that runoff is forced through the erosion log rather than over it.
 - 6. Place spoils directly downhill and against fiber log.
- H. Gravel Bags or Rock Dams
 - 1. Install as necessary or as otherwise indicated on the plans.
 - 2. Place perpendicular to the direction of flow in a drainage swale or ditch.
 - 3. Install rock to allow at least 6 inches of clearance for water to flow over rock dam, below height of adjacent channel walls.

3.4 SITE STABILIZATION

- A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time.
- B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.
- C. Stockpile and waste pile heights shall not exceed 10 feet. Slope stockpile sides at 2: 1 or flatter.
- D. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.5 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

3.6 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
- B. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.
- C. Do not damage structure or device during cleaning operations.
- D. Do not permit sediment to erode into construction or site areas or natural waterways.
- E. Clean channels when depth of sediment reaches approximately one half channel depth.

END OF SECTION

SECTION 31 37 00

RIPRAP

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Riprap placed loose.
- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading.
 - 2. Section 31 23 16 - Excavation: Excavating for riprap.
 - 3. Section 31 23 17 - Trenching
 - 4. Section 31 25 13 - Erosion Controls.

1.2 REFERENCES

- A. California Department of Transportation:
 - 1. Caltrans Standard Specifications, current edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for riprap, binder and geotextile fabric, where required.

1.4 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Binder (where required): Portland cement.
- B. Geotextile Fabric (where required): Non-biodegradable, woven.
- C. Riprap: Granite type; broken stone or irregular shaped rock; solid and nonfriable; size as shown in Drawings. Broken pieces of concrete shall not be accepted. Shall conform to Caltrans standard sizes and placement methods per table below:

Rock size	Percentage larger than (based on weight)							
	Class							
	1 T	½ T	¼ T	Light	Facing	No. 1	No. 2	No. 3
2 ton	0-5	--	--	--	--	--	--	--
1 ton	50-100	0-5	--	--	--	--	--	--
½ ton	--	50-100	0-5	--	--	--	--	--
¼ ton	95-100	--	50-100	0-5	--	--	--	--
200 lb	--	95-100	--	50-100	0-5	0-5	--	--
75 lb	--	--	95-100	--	50-100	50-100	0-5	--
25 lb	--	--	--	95-100	90-100	90-100	25-75	0-5
5 lb	--	--	--	--	--	--	90-100	25-75
1 lb	--	--	--	--	--	--	--	90-100

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

3.2 PLACEMENT

- A. Place geotextile fabric over substrate, lap edges and ends.
- B. Place riprap at culvert pipe ends, at embankment slopes, and around splash pads or other areas of anticipated high levels of erosion, as indicated on Drawings.
- C. Installed Thickness: 6 inch average, or as indicated on Drawings.

END OF SECTION

SECTION 32 11 23

AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aggregate subbase.
 - 2. Aggregate base course.
- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading: Preparation of site for base course.
 - 2. Section 31 23 17 - Trenching: Compacted fill under base course.
 - 3. Section 32 12 16 - Asphalt Paving: Binder and finish asphalt courses.
 - 4. Section 32 13 13 - Concrete Paving: Finish concrete surface course.
 - 5. Section 33 05 13 - Manholes and Structures: Manholes including frames.

1.2 REFERENCES

- A. California Department of Transportation (Caltrans):
 - 1. Standard Specifications, latest edition

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Materials Source: Submit name of aggregate materials suppliers.
- C. Manufacturer's Certificate: Submit certified testing from supplier to prove material meets or exceeds Caltrans requirements.

1.4 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform Work in accordance with California Department of Transportation standards.

PART 2 PRODUCTS

2.1 AGGREGATE MATERIALS

- A. Subbase Aggregate: Caltrans Class 2 Aggregate Subbase:

Sieve Size	Percent Passing
3 inches	100
2 ½ inches	87 to 100
No. 4	35 to 95
No. 200	0 to 29
Sand Equivalent, min	18
R-value, min	50

- B. Base Aggregate: Caltrans Class 2 Aggregate Base, 1 ½ inch maximum:

Sieve Size	Percent Passing
2 inches	100
1-1/2 inches	87 to 100
3/4 inches	45 to 90
No. 4	20 to 50
No. 30	6 to 29
No. 200	0 to 12
Sand Equivalent, min	22
R-value, min	78

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted substrate is dry and ready to support paving and imposed loads.
- C. Verify substrate has been inspected, gradients and elevations are correct.

3.2 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT

- A. Spread aggregate over prepared substrate to total compacted thickness of 6 inches, unless otherwise indicated on Drawings.
- B. Roller compact aggregate to 95 percent maximum density.
- C. Level and contour surfaces to elevations, profiles, and gradients indicated.
- D. Maintain optimum moisture content of fill materials to attain specified compaction density.
- E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Flat Surface: ½ inch measured with 10 foot straight edge.
- C. Maximum Variation From Thickness: ¼ inch.
- D. Maximum Variation From Elevation: ½ inch.

3.5 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction testing will be performed in accordance with ASTM D1557.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- D. Frequency of Tests: One test for every 1000 square yards compacted aggregate.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Asphalt materials.
 - 2. Asphalt paving base course, binder course, and wearing course.
 - 3. Asphalt paving overlay for existing paving.
- B. Related Requirement:
 - 1. Section 31 22 13 - Rough Grading: Preparation of site for paving.
 - 2. Section 32 11 23 - Aggregate Base Courses: Compacted subbase for paving.
 - 3. Section 33 05 13 - Manholes and Structures: Manholes including frames.

1.2 REFERENCE STANDARDS

- A. ASTM International:
 - 1. ASTM D1188 - Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
 - 2. ASTM D2726 - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
 - 3. ASTM D3549 - Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.
- B. California Department of Transportation (Caltrans):
 - 1. Standard Specifications, latest edition.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit product information for asphalt and aggregate materials.
 - 2. Submit mix design with laboratory test results supporting design.
- C. Manufacturer's Certificate: Certify Products and Materials meet or exceed Caltrans specifications.

1.4 QUALITY ASSURANCE

- A. Mixing Plant: Certified by State of California.
- B. Obtain materials from same source throughout.
- C. Perform Work in accordance with California Department of Transportation standards.

1.5 AMBIENT CONDITIONS

- A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.
- B. Do not place asphalt mixture when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.1 ASPHALT PAVING

- A. Asphalt Materials:
 - 1. Asphalt Cement: Hot Mix Asphalt in accordance with California Department of Transportation standards, Section 39. Dense-graded, ½-inch Type A HMA or match existing pavement.
 - 2. Primer: In accordance with California Department of Transportation standards, Section 93.
 - 3. Tack Coat: Performance grade asphalt binder, in accordance with California Department of Transportation standards, Section 92.
- B. Aggregate Materials:
 - 1. Coarse Aggregate: In accordance with California Department of Transportation standards.
 - 2. Fine Aggregate: In accordance with California Department of Transportation standards.
- C. Aggregate Subbase: Specified in Section 32 11 23.

2.2 MIXES

- A. Use dry material to avoid foaming. Mix uniformly.
- B. Asphalt Paving Mixtures: Designed in accordance with California Department of Transportation standards.

2.3 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Submit proposed mix design of each class of mix for review prior to beginning of Work.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted subbase is dry and ready to support paving and imposed loads.
- D. Verify gradients and elevations of base are correct.
- E. Verify manhole frames are installed in correct position and elevation.

3.2 PREPARATION

- A. Prepare subbase in accordance with California Department of Transportation standards.

3.3 DEMOLITION

- A. Saw cut and notch existing paving as indicted on Drawings.
- B. Clean existing paving to remove foreign material, excess joint sealant and crack filler from paving surface.
- C. Repair surface defects in existing paving to provide uniform surface to receive new paving.

3.4 INSTALLATION

- A. Subbase:
 - 1. Aggregate Subbase: Install as specified in Section 32 11 23.
- B. Primer:
 - 1. Apply primer in accordance with California Department of Transportation standards, Section 93.
- C. Tack Coat:
 - 1. Apply tack coat in accordance with California Department of Transportation standards.
 - 2. Apply tack coat to contact surfaces of curbs and gutters.
 - 3. Coat surfaces of manhole frames with oil to prevent bond with asphalt paving. Do not tack coat these surfaces.
- D. Single Course Asphalt Paving:
 - 1. Install Work in accordance with California Department of Transportation standards, Section 92.
 - 2. Allow tack coat to be inspected prior to placing asphalt.
 - 3. Place asphalt within 24 hours of applying primer or tack coat.

4. Compact paving by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
5. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.5 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Flatness: Maximum variation of $\frac{1}{4}$ inch measured with 10 foot straight edge.
- C. Scheduled Compacted Thickness: Within $\frac{1}{4}$ inch.
- D. Variation from Indicated Elevation: Within $\frac{1}{2}$ inch.

3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Requirements for inspecting, testing.
- B. Take samples and perform tests in accordance with California Department of Transportation standards
- C. Asphalt Paving Mix Temperature: Measure temperature at time of placement. Hot mix asphalt below 230° F shall be rejected.
- D. Asphalt Paving Thickness: ASTM D3549; test one core sample from every 1000 square yards compacted paving.
- E. Asphalt Paving Density: ASTM D1188 or ASTM D2726; test one core sample from every 1000 square yards compacted paving.

3.7 PROTECTION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from mechanical injury until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fence framework, fabric, and accessories.
 - 2. Excavation for post bases.
 - 3. Concrete foundation for posts and center drop for gates.
 - 4. Manual gates and related hardware.
- B. Related Sections:
 - 1. Section 03 30 00 – Cast-in-Place Concrete: Concrete anchorage for posts.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
 - 2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - 5. ASTM A824 - Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link Fence.
 - 6. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
 - 7. ASTM F626 - Standard Specification for Fence Fittings.
 - 8. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
 - 9. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
 - 10. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
 - 11. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.
- B. Chain Link Fence Manufacturers Institute:
 - 1. CLFMI - Product Manual.

1.3 SYSTEM DESCRIPTION

- A. Fence Height: 6 feet nominal height, unless otherwise indicated on Drawings.
- B. Line Post Spacing: At intervals not exceeding 10 feet.
- C. Fence Post and Rail Strength: Conform to ASTM F1043 Light Industrial Fence quality.

- D. Barbed Wire: Conform to ASTM A121, 3 strands of wire, twisted with four point barbs.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
- C. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.

1.5 QUALITY ASSURANCE

- A. Supply material in accordance with CLFMI - Product Manual.
- B. Perform installation in accordance with ASTM F567.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- C. Identify each package with manufacturer's name. Store fence fabric and accessories in secure and dry place.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Master Halco Galvanized Steel Fabric, Posts, and Hardware.
 - 2. Builders Fence Company Galvanized Steel Fabric, Posts, and Hardware.
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.

2.2 MATERIALS AND COMPONENTS

- A. Materials and Components: Conform to CLFMI Product Manual and ASTM F1043 Light Industrial / Commercial Fence Framework.
- B. Steel Chain Link Fabric: 2 inch mesh, 9 gauge.
 - 1. Zinc-Coated Steel Fabric: ASTM A392 hot dipped galvanized before or after weaving.
 - a. Class 1: 1.2 ounce per square foot
 - 2. Fabric selvage: Twisted top selvage, knuckled bottom selvage.

- C. Steel Fence Framework: Round steel pipe and rail: ASTM F1043, Group IC-L Light Industrial / Commercial Fence Framework, schedule 40 galvanized pipe per ASTM F1083. Exterior hot dipped zinc coating minimum average 1.8 ounce per square foot. Regular Grade, Type I round.
 - 1. Line post: 1.90 inch OD, 2.28 pounds per foot.
 - 2. End, Corner, Pull, Terminal and Swing Gate post (up to 4 foot width): 2.375 inch OD, 3.12 pounds per foot.
 - 3. Swing Gate post (over 4 foot width) and Sliding Gate post (up to 10 foot width): 2.875 inch OD, 4.64 pounds per foot.
 - 4. Sliding Gate post (over 10 foot width): 4.00 inch OD, 6.56 pounds per foot.
 - 5. Top, brace, bottom and intermediate rails: 1.66 inch OD, 1.84 pounds per foot.
- D. Metallic Coated Steel Marcellled Tension Wire: 7 gauge marcellled wire complying with ASTM A824. Match coating type to that of the chain link fabric.
 - 1. Type II Zinc Coated Class 4 – 1.2 ounce per square foot.
- E. Metallic Coated Steel Barbed Wire: Comply with ASTM A121, Design Number 12-4-5-14R, double 12 ½ gauge twisted strand wire, with 4 point 14 gauge round barbs spaced 5 inches on center. Match coating type to that of the chain link fabric.

2.3 ACCESSORIES

- A. Tension and Brace Bands: Galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge, minimum width of ¾ inch and minimum zinc coating of 1.20 ounce per square foot.
- B. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps and Rail Sleeves: In compliance with ASTM F626, pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 ounce per square foot.
- C. Truss Rod Assembly: In compliance with ASTM F626, 3/8 inch diameter steel truss rod with a pressed steel tightener, minimum zinc coating of 1.2 ounce per square foot, assembly capable of withstanding a tension of 2,000 pounds.
- D. Tension Bars: In compliance with ASTM F626. Galvanized steel one-piece length 2 inch less than fabric height, minimum zinc coating of 1.2 ounce per square foot.
 - 1. Bars for 2 inch mesh shall have a minimum cross section of 3/16 inch by ¾ inch.
- E. Barbed Wire Arms: In compliance with ASTM F626, pressed steel galvanized after fabrication, minimum zinc coating of 1.2 ounce per square foot, capable of supporting a vertical load of 250 pounds.
 - 1. Sloped to 45 degrees, double arm, manufactured to accommodate 3 strands of barbed wire.
- F. Gate Hardware: Fork latch with gravity drop, Center gate stop and drop rod (where indicated in drawings); 180 degree gate hinges for each leaf and hardware for padlock keyed to match hardware.
 - 1. Gate latch fabricated of 5/16 inch thick by 1 ¾ inch pressed steel galvanized after fabrication.
 - 2. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges.

2.4 GATES

A. General:

1. Gate Types, Opening Widths and Directions of Operation: As indicated on Drawings.
2. Design gates for operation by one person.

B. Swing Gates:

1. Fabricate gates to permit 180 degree swing.
2. Gates Construction: Galvanized steel welded fabrication in compliance with ASTM F900 with welded corners. Gate frame members 1.90 inch OD.
3. Frame members spaced no greater than 8 feet apart vertically and horizontally.
4. Match gate fabric to that of the fence system.

C. Sliding Gates:

1. Framing and Posts: ASTM F1184, Class 2 for internal rollers.
2. Gate framing to be of welded construction, minimum 1.90 inch OD pipe members.
3. Frame members spaced no greater than 8 feet apart vertically and horizontally.
4. Match gate fabric to that of the fence system.
5. Rollers for overhead and cantilever sliding gates: Bearing type. Furnish non-sealed bearings with grease fitting for periodic maintenance.
6. Secure rollers to post or frame without welding.

2.5 FINISHES

- A. Components and Fabric: Galvanized to ASTM A123 for components; ASTM A153 for hardware; ASTM A392 for fabric.
- B. Accessories: Same finish as framing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567.
- B. Set intermediate, terminal, and gate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- C. Line Post Footing Depth Below Finish Grade: 3 feet.
- D. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: 3 feet.
- E. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- F. Install top rail through line post tops and splice with 6 inch long rail sleeves.
- G. Install center brace rail on corner gate leaves.

- H. Place fabric on outside of posts and rails.
- I. Do not stretch fabric until concrete foundation has cured 7 days.
- J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- K. Position bottom of fabric 2 inches above finished grade.
- L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- N. Install bottom tension wire stretched taut between terminal posts.
- O. Install support arms sloped outward and attach barbed wire; tension and secure.
- P. Support gates from gate posts. Do not attach hinged side of gate from building wall.
- Q. Install gate with fabric and barbed wire overhang to match fence. Install three hinges on each gate leaf, latch, catches, drop bolt, retainer and locking clamp.
- R. Where indicated on drawings, provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
- S. Connect to existing fence at existing terminal post.
- T. Install posts with 6 inches maximum clear opening from end posts to buildings, fences and other structures.
- U. Excavate holes for posts to diameter and spacing indicated on Drawings without disturbing underlying materials.
- V. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.

3.2 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: ¼ inch.
- C. Maximum Offset From Indicated Position: 1 inch.

END OF SECTION

SECTION 32 91 19
LANDSCAPE GRADING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Final grade topsoil for finish landscaping.
- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading: Site contouring.
 - 2. Section 31 23 17 - Trenching: Backfilling trenches.
 - 3. Section 32 92 19 - Seeding and Soil Supplements: Finish ground cover.

1.2 QUALITY ASSURANCE

- A. Furnish each topsoil material from single source throughout the Work.

PART 2 PRODUCTS

2.1 MATERIAL

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify building and trench backfilling have been inspected.
- C. Verify substrate base has been contoured and compacted.

3.2 PREPARATION

- A. Protect landscaping and other features remaining as final Work.
- B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

3.3 SUBSTRATE PREPARATION

- A. Eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds debris, roots, branches and stones in excess of 2 inch in size. Remove contaminated subsoil.
- C. Scarify surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

- A. Place topsoil in areas where seeding or sodding is required to nominal depth of 4 inches. Place topsoil during dry weather.
- B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
- C. Remove roots, weeds, rocks, and foreign material while spreading.
- D. Manually spread topsoil close to plant material and buildings to prevent damage.
- E. Remove surplus subsoil and topsoil from site.
- F. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.5 PROTECTION OF INSTALLED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Prohibit construction traffic over topsoil.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fertilizing.
 - 2. Seeding.
 - 3. Hydroseeding.
 - 4. Mulching.
 - 5. Maintenance.
- B. Related Sections:
 - 1. Section 31 22 13 - Rough Grading: Rough grading of site.
 - 2. Section 31 23 17 - Trenching: Rough grading over cut.
 - 3. Section 32 91 19 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C602 - Standard Specification for Agricultural Liming Materials.
- B. California Department of Transportation:
 - 1. Caltrans Standard Specifications, current edition.

1.3 DEFINITIONS

- A. Weeds: Vegetative species other than specified species to be established in given area.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for seed mix, fertilizer, mulch and other accessories.

1.5 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

- B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.1 SEED MIXTURE

- A. Seed Mixture: Choose seed mixture per Caltrans Standard Specifications to meet local soil and climatic conditions. Use of the Caltrans TransPLANT online tool is recommended (<https://transplant.dot.ca.gov/TransPlant.php>).

2.2 ACCESSORIES

- A. Mulching Material:
 - 1. Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.
 - 2. Wood cellulose fiber, dust or chip form, free of growth or germination inhibiting ingredients.
- B. Fertilizer: Commercial grade; recommended for grass; of proportion necessary to eliminate deficiencies of topsoil.
- C. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.
- D. Erosion Fabric: Wood fiber matting, open weave.
- E. Stakes: Softwood lumber, chisel pointed.
- F. String: Inorganic fiber.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section.

3.2 FERTILIZING

- A. Apply after smooth raking of topsoil.
- B. Do not apply fertilizer at same time or with same machine used to apply seed.
- C. Mix fertilizer thoroughly into upper 2 inches of topsoil.

- D. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

3.3 SEEDING

- A. Apply seed at rate of 2.5 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.
- D. Immediately following seeding, apply mulch to thickness of 1/8 inches. Maintain clear of shrubs and trees.
- E. Apply water with fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

3.4 HYDROSEEDING

- A. Apply fertilizer, mulch and seeded slurry with hydraulic seeder at minimum rate of 35 lbs per 1000 sq ft evenly in one pass.
- B. After application, apply water with fine spray immediately after each area has been hydroseeded. Saturate to 4 inches of soil and maintain moisture levels two to four inches.

3.5 SEED PROTECTION

- A. Cover seeded slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- B. Lay fabric smoothly on surface, bury top end of each section in 6 inches deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.
- C. Secure outside edges and overlaps at 36 inch intervals with stakes.
- D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

END OF SECTION

SECTION 33 05 17

PRECAST CONCRETE VALVE VAULTS AND METER BOXES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Precast concrete valve vaults.
 - 2. Precast concrete meter boxes.
- B. Related Sections:
 - 1. Section 33 11 16 - Water Distribution Valves and Hydrants.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - 3. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 4. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 5. ASTM C150 - Standard Specification for Portland Cement.
 - 6. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 7. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
 - 8. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
 - 9. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.

1.3 DESIGN REQUIREMENTS

- A. Design Criteria:
 - 1. Watertight precast reinforced air-entrained concrete structures designed to ASTM C890 A16 (AASHTO H20) live loading and installation conditions, and manufactured to conform to ASTM C913.
 - 2. Minimum 28-day Compressive Strength: 4,000 psi.
 - 3. Honeycombed or retempered concrete is not permitted.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on valve vaults and meter boxes.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations and inverts of buried pipe, components and connections.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Transport and handle precast concrete units with equipment designed to protect units from damage.
- C. Do not place concrete units in position to cause overstress, warp or twist.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE VALVES AND METER BOXES

- A. Water Meter Box Manufacturers:
 - 1. Christy B12 Meter Box and Lid
 - 2. J&R Concrete Model W3 ½ Box and Lid
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Materials:
 - 1. Portland Cement: ASTM C150, Type II.
 - 2. Coarse Aggregates: ASTM C33; Graded 1 inch to No. 4 Sieve.
 - 3. Sand: ASTM C33; 2.35 fineness modulus.
 - 4. Water: Potable; clean and free of injurious amounts of acids, alkalis, salts, organic materials, and substances incompatible with concrete or steel.
 - 5. Air-Entraining Admixtures: ASTM C260.
 - 6. Reinforcing Steel:
 - a. Deformed Bars: ASTM A615, Grade 40.
 - b. Welded Wire Fabric: ASTM A185.
 - 7. Joint Sealant:
 - a. ASTM C990.
- C. Valve Vault and Meter Box Frames and Covers:

1. Cast Iron Castings: ASTM A48, Class 30 or better; free of bubbles, sand and air holes, and other imperfections.

2.2 FABRICATION AND MANUFACTURE

- A. Fabricate precast reinforced concrete structures in accordance with ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping connection, size, location and invert are as indicated on Drawings.

3.2 PREPARATION

- A. Remove scale and dirt from components before assembly.
- B. Establish invert elevations for each component in system.
- C. Hand trim excavation to suit valve vaults and meter boxes. Remove stones, roots or other obstructions.

3.3 VAULT AND METER BOX BEDDING

- A. Excavate in accordance with Section 31 23 17 for work of this Section. Hand trim excavation for accurate placement of vaults and meter boxes to elevations indicated.
- B. Place bedding material level in one continuous layer not exceeding 6 inches compacted depth, compact to 90 percent.
- C. Backfill around sides of vaults and meter boxes, tamped in place and compacted to 90 percent.
- D. Install vaults and meter boxes and related components on bedding or structural fill.
- E. Install filter fabric per Drawings.

3.4 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.

END OF SECTION

SECTION 33 11 13

WATER DISTRIBUTION MAINS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe and fittings for public water line including potable water line and fire water line.
2. Tapping Sleeves and Valves.
3. Underground pipe markers.

B. Related Requirements:

1. Section 03 30 00 - Cast-In-Place Concrete: Concrete for thrust restraints.
2. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.
3. Section 33 05 17 - Precast Concrete Valve Vaults and Meter Boxes.
4. Section 33 05 23 - Trenchless Utility Installation: Waterline installation under roadways and other obstructions.
5. Section 33 11 16 - Water Distribution Valves and Hydrants.
6. Section 33 12 13 - Water Service Connections: Backflow prevention at water main.
7. Section 33 13 00 - Disinfecting of Water Utility Distribution: Disinfection of water piping.

1.2 REFERENCE STANDARDS

A. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
4. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
5. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
6. ASTM F2164 - Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure.
7. ASTM F2620 - Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

B. American Water Works Association:

1. AWWA C104 - ANSI Standard for Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. AWWA C105 - ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm), for Water.
4. AWWA C111 - ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

5. AWWA C115 - ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
6. AWWA C151 - ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
7. AWWA C153 - ANSI Standard for Ductile-Iron Compact Fittings for Water Service.
8. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
9. AWWA C605 - Water Treatment - Underground Installation of Polyvinyl Chloride PVC Pressure Pipe and Fittings for Water.
10. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. through 12 In. (100 mm Through 300 mm), for Water Distribution.
11. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 36 In. (350 mm Through 1,200 mm), for Water Transmission and Distribution.
12. AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 in. Through 65 in., for Waterworks.
13. AWWA M55 - PE Pipe – Design and Installation.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on pipe materials, pipe fittings, valves and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- C. Certification of pressure testing and bacteriological testing to verify proper disinfection of pipe.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Block individual and stockpiled pipe lengths to prevent moving.
- C. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
- D. Store PVC materials out of sunlight as much as practicable.
- E. Ship and deliver polyethylene pipe and fittings from manufacturer with dust plugs on pipe ends and fitting ends.
- F. Do not use chains, wire rope, forklifts or other methods or equipment that may gouge or damage polyethylene pipe.

1.6 EXISTING CONDITIONS

- A. Verify field measurements prior to fabrication. Indicate field measurements on shop drawings.

PART 2 PRODUCTS

2.1 WATER PIPING

- A. Ductile Iron Pipe:
 - 1. Pipe Class: AWWA C151, for nominal thickness, rated water working pressure and maximum depth of cover.
 - 2. Fittings: Ductile iron, AWWA C110. Compact fittings AWWA C153.
 - a. Coating and Lining:
 - 1) Bituminous Coating: AWWA C110.
 - 2) Cement Mortar Lining: AWWA C104, double thickness.
 - 3. Joints:
 - a. Mechanical and Push-On Joints: AWWA C111.
 - b. Flanged Joints: AWWA C115.
 - c. Restrained Joints (where indicated on drawings): Boltless, push-on type, joint restraint independent of joint seal.
 - 4. Jackets: AWWA C105 polyethylene jacket: Double layer, half lapped, 10 mil polyethylene tape. Required at all fittings and flanged joints.
- B. Polyvinyl Chloride (PVC): AWWA C900 and AWWA C905, Class 165, or as indicated on drawing:
 - 1. Fittings: PVC AWWA C900/AWWA C905, or ductile iron AWWA C153, or cast iron AWWA C111.
 - 2. Joints: ASTM D3139, PVC flexible elastomeric seals. Solvent-cement couplings are not permitted.
- C. Polyvinyl Chloride (PVC) with internal restrained joints: AWWA C900, Class 235:
 - 1. Fittings: PVC AWWA C900/AWWA C905, or ductile iron AWWA C153, or cast iron AWWA C111.
 - 2. Joints: ASTM D3139, PVC flexible elastomeric seals. Solvent-cement couplings are not permitted.
- D. Polyvinyl Chloride (PVC): ASTM D1785 Schedule 40 or 80, as indicated in Drawings:
 - 1. Fittings: PVC AWWA C900/AWWA C905, or ductile iron AWWA C153, or cast iron AWWA C111.
 - 2. Joints: ASTM D3139, PVC flexible elastomeric seals. Solvent-cement couplings are not permitted.
- E. High Density Polyethylene Pipe: AWWA C906, made from PE4710 resin unless otherwise indicated in Drawings, Dimension Ratio (DR) as specified in Bid Schedule:
 - 1. Fittings: AWWA C906, molded or fabricated.
 - 2. Joints: ASTM F2620, butt fusion.

2.2 TAPPING SLEEVES AND VALVES

- A. Tapping Sleeves:
 - 1. Manufacturer List:
 - a. Kennedy Valve Co.
 - b. Mueller Co.
 - c. ROMAC Industries, Inc.
 - d. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Tapping Valves:
 - 1. Manufacturer List:
 - a. Kennedy Valve Co.
 - b. Mueller Co.
 - c. U.S. Pipe
 - d. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.

2.3 VALVES AND FIRE HYDRANTS

- A. Valves: Conform to Section 33 11 16.
- B. Fire Hydrants: Conform to Section 33 11 16

2.4 UNDERGROUND PIPE MARKERS

- A. Description: Plastic Ribbon Tape: Bright colored, continuously printed "WATER", minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.
- B. Trace Wire: Electronic detection materials for non-conductive piping products.
 - 1. Unshielded 10 AWG THWN insulated copper wire.
 - 2. Conductive tape.

2.5 FINISHES

- A. Steel: Galvanizing, ASTM A123; hot dip galvanize after fabrication.

2.6 ACCESSORIES

- A. Concrete for Thrust Restraints: Conform to Section 03 30 00.
- B. Steel rods, bolt, lugs and brackets: ASTM A36 Grade A carbon steel.
- C. Protective Coating: Bituminous coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify existing utility water main size, location, and invert are as indicated on Drawings.

3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. The use of chisels or hand saws will not be permitted. Grind edges smooth with beveled end for push-on connections.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31 23 17 for Work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated on Drawings.
- B. Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.
- C. Provide sheeting and shoring in accordance with Section 31 23 17.
- D. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth; compact to 95 percent.

3.4 INSTALLATION – PIPE

- A. Install ductile iron piping and fittings to AWWA C600.
- B. Install PVC pipe in accordance with AWWA C605.
- C. Handle and assemble pipe in accordance with manufacturer's instructions and as indicated on Drawings.
- D. Steel Rods, Bolt, Lugs, and Brackets: Coat buried steel with one coat of coal tar coating before backfilling.
- E. Maintain minimum 10 ft parallel horizontal separation of water main from sewer piping.

- F. Maintain minimum 25 ft horizontal separation of water main from septic tank, septic drainfield or pressure-dosed mound.
- G. Water mains shall be no less than 45 degrees to and at least one foot above sanitary sewer and storm drain lines where those lines must cross. All portions of the water main within 10 horizontal feet of the sewer line shall be encased in a continuous sleeve or cement slurry fill.
- H. Install pipe to indicated elevation to within tolerance of 1 inch.
- I. Route pipe in straight line. Re-lay pipe that is out of alignment or grade.
- J. Install pipe with no high points. If unforeseen field conditions arise which necessitate high points, install air release valves as directed by Engineer.
- K. Install pipe to have bearing along entire length of pipe. Do not lay pipe in wet or frozen trench.
- L. Prevent foreign material from entering pipe during placement.
- M. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- N. Close pipe openings with watertight plugs during work stoppages.
- O. Install access fittings to permit disinfection of water system performed under Section 33 13 00.
- P. Establish elevations of buried piping with not less than 2.5 feet of cover, unless otherwise specified in drawings. Measure depth of cover from final surface grade to top of pipe barrel.
- Q. Install plastic ribbon tape continuous buried 12 inches below finish grade, above pipe line; coordinate with Section 31 23 17.

3.5 INSTALLATION – POLYETHYLENE PIPE

- A. Install HDPE pipe and fittings in accordance with ASTM D2321 and AWWA M55.
- B. Bending radius of polyethylene pipe shall be not less than 50 feet if not near a fitting or a joint.
- C. Bending radius of polyethylene pipe shall be not less than 100 feet when near a fitting or a joint.
- D. For all Polyethylene pipe, wait a minimum of 24 hours after burial before initiating pressure testing or installing in-line anchoring.
- E. For all connections of polyethylene pipe to PVC or to Ductile Iron pipe:
 - 1. Restrained joints shall be used at all such connections.
 - 2. Thrust anchors shall be installed at all such connections as well. These anchors may be comprised of either:
 - a. A suitable number of restrained joints on the PVC or Ductile Iron pipe, as submitted by the Contractor, or
 - b. Thrust blocks on the PVC or Ductile Iron pipe, if feasible, or
 - c. In-line anchoring of Polyethylene pipe near the connection.

3.6 TRACE WIRE INSTALLATION

- A. Install trace wire continuous over top of pipe; coordinate with Section 31 23 17.
- B. Provide attachments to the pipe with plastic zip ties or duct tape a minimum of every 10 feet.
- C. Avoid underground splices, but where necessary, make splices with an underground, waterproof splice kit.
- D. Provide riser boxes at each gate valve location.
 - 1. Install an independent tracer wire line between each gate valve box in each direction of pipe.
 - 2. Bring tracer wire a minimum of 18 inches of slack wire above gate valve riser using box construction specified.
 - 3. Install box to elevation that will not interfere with operation and maintenance of the valve.
- E. Test tracer wire for proper functioning using a conductive/inductive type locator in the presence of the Engineer or a designated representative.
- F. Repair and retest, at no cost, any section of trace wire that does not function properly.

3.7 INSTALLATION - VALVES AND HYDRANTS

- A. Install valves and hydrants in accordance with Section 33 11 16.

3.8 INSTALLATION - TAPPING SLEEVES AND VALVES

- A. Install tapping sleeves and valves in accordance with Drawings and in accordance with manufacturer's instructions.

3.9 THRUST RESTRAINT

- A. Provide valves, tees, bends, caps, and plugs with concrete thrust blocks. Pour concrete thrust blocks against undisturbed earth. Locate thrust blocks at each elbow or change of pipe direction to resist resultant force and so pipe and fitting joints will be accessible for repair. Provide thrust restraint bearing on subsoil as shown in Drawings and in compliance with AWWA standards.
- B. Install tie rods, clamps, set screw retainer glands, or restrained joints. Protect metal restrained joint components against corrosion by applying a bituminous coating. Do not encase pipe and fitting joints to flanges.
- C. Install thrust blocks, tie rods, and/or joint restraint at dead ends of water main.

3.10 CONNECTION TO EXISTING WATER MAINS

- A. Shut off of water mains will not be permitted overnight, on weekends, or on federal, state, or tribal holidays. Water shut-off is limited to 4 hours maximum, and only after public notification.

- B. Make the necessary arrangements with the owner of the existing utility prior to any connections to any water mains. Residents shall be notified at least two working days in advance of water shut-off.
- C. Do not start work until all the materials, equipment, and labor have been assembled on the site. When work is started on a connection, proceed continuously without interruption, and as rapidly as possible, until completed.
- D. Make connections to existing water mains in a neat, workmanlike manner to suite actual conditions encountered at the existing water main. Adhere to manufacturer's recommendations to avoid damage to pipe coating when wet or dry tapping.
- E. Prevent the existing water main from being contaminated when making the connection. Take all action necessary to prevent trench water, mud or other contaminants from entering the connection line or main at any time.

3.11 SERVICE CONNECTIONS

- A. Install service connections in accordance with Section 33 12 13.

3.12 DISINFECTION OF POTABLE WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Section 33 13 00.

3.13 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Requirements for inspecting, testing.
- B. Pressure test system in accordance with AWWA C600 (ductile iron), AWWA C605 (PVC), ASTM F2164 (HDPE) and the following:
 - 1. Pressure testing shall not be allowed prior to 7 days after pouring any concrete thrust blocks or restraints, to allow proper curing time.
 - 2. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
 - 3. Conduct hydrostatic test for at least two-hour duration.
 - 4. Fill section to be tested with water slowly, expel air from piping at high points. Install corporation stops at high points. Close air vents and corporation stops after air is expelled. Raise pressure to specified test pressure.
 - 5. Observe joints, fittings and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.
 - 6. Correct visible deficiencies and continue testing at same test pressure for additional 2 hours to determine leakage rate. Maintain pressure within plus or minus 5.0 psig of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
 - 7. Compute maximum allowable leakage by the following formula:

$L = (SD\sqrt{P})/C$
L = testing allowance, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during hydrostatic test, in psig
C = 148,000
When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

8. When test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections and retest until leakage is within allowable limits. Correct visible leaks regardless of quantity of leakage. If no visible leaks are apparent, verify all air is removed from system and retest. If retest fails, locate source of leakage and make corrections.
- C. Compaction Testing for Bedding: In accordance with Section 31 23 17.
 - D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
 - E. Frequency of Compaction Tests: At least once for every 1,000 linear feet of pipe installed, minimum one test required for any installation over 500 linear feet.

END OF SECTION

SECTION 33 11 16

WATER DISTRIBUTION VALVES AND HYDRANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for site water line including domestic water line and fire water line.
 - 2. Valves.
 - 3. Pressure reducing valves.
 - 4. Hydrants.
 - 5. Underground pipe markers.
 - 6. Precast concrete vault.
- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Concrete for thrust restraints.
 - 2. Section 31 23 16 - Excavation: Product and execution requirements for excavation and backfill required by this section.
 - 3. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.
 - 4. Section 33 11 13 - Water Distribution Mains.
 - 5. Section 33 12 13 - Water Service Connections.
 - 6. Section 33 13 00 - Disinfecting of Water Utility Distribution: Disinfection of site service utility water piping.

1.2 REFERENCE STANDARDS

- A. ASTM International:
 - 1. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- B. American Water Works Association:
 - 1. AWWA C502 - Dry-Barrel Fire Hydrants.
 - 2. AWWA C503 - Wet-Barrel Fire Hydrants.
 - 3. AWWA C504 - Rubber-Sealed Butterfly Valves.
 - 4. AWWA C508 - Swing-Check Valves for Waterworks Service, 2 in. (50 mm) Through 24 in. (600 mm) NPS.
 - 5. AWWA C509 - Resilient-Seated Gate Valves for Water-Supply Service.
 - 6. AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
 - 7. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.
 - 8. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
- C. National Sanitation Foundation:
 - 1. NSF 61 - Drinking Water System Components - Health Effects
- D. National Fire Protection Association:
 - 1. NFPA 281 - Recommended Practice for Fire Flow Testing and Marking of Hydrants

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on pipe materials, pipe fittings, valves and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.

1.5 QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.1 GATE VALVES

- A. Manufacturer List:
 - 1. Clow Valve Co.
 - 2. Mueller Co.
 - 3. Waterous Co.
 - 4. Kennedy Valve Co.
 - 5. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. 2-1/2 inches and Smaller: Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, IPS ends, with control rod, post indicator, extension box and valve key.
- C. 3 inches and Larger: AWWA C509 or AWWA C515; iron body, bronze or ductile iron; including the manufacturer's name, pressure rating, and year of fabrication cast into valve body.
 - 1. Resilient seats.
 - 2. Stem: Non-rising bronze stem.
 - 3. Operating Nut: Square; open counterclockwise unless otherwise indicated.
 - 4. Ends: Flanged, mechanical joint or bell end connections.
 - 5. Coating: AWWA C550; interior/exterior.
 - 6. Sizes 12 inch diameter and smaller: 200 psig, or as indicated in Drawings.
 - 7. Sizes 16 inch diameter and larger: 150 psig, or as indicated in Drawings.

2.2 VALVE BOXES

- A. 12 inch diameter Valves and Smaller: Domestic cast iron, two-piece, screw or sliding type, with minimum inside shaft diameter of 5 ¼ inches.
- B. Valves Larger than 12 inch diameter: Domestic cast iron, three-piece, screw or sliding type, round base, with minimum inside shaft diameter of 5 ¼ inches.
- C. PVC C900 DR 18 riser pipe in lieu of cast iron telescoping riser may be allowable with approval of Engineer.
- D. Cast iron lid, marked "WATER" or "RAW WATER" as appropriate.

2.3 BALL VALVES

- A. 2 inches and Smaller: Brass body, full port, teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, IPS inlet end, IPS outlet, with control rod, extension box and valve key.

2.4 COMBINATION AIR VALVES

- A. Manufacturer List:
 - 1. Val-Matic.
 - 2. Apco Valve.
 - 3. Cla-Val.
 - 4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Description: Cast Iron Body, stainless steel float. Combines both functions of air release and vacuum release. Low pressure components shall be included where applicable.
- C. Valve Box: Cylindrical steel enclosure, set on concrete base with anchor. The exterior of steel enclosure shall be field painted with two coats of yellow reflectorized paint.

2.5 SWING CHECK VALVES

- A. Manufacturer and Product List:
 - 1. Flomatic Model 745.
 - 2. Apco Model CVS-6000.
 - 3. Mueller Swing Check Valve.
 - 4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products
- B. 2 inches to 24 inches: AWWA C508, iron body, bronze trim, 45 degree swing disc, renewable disc and seat, flanged ends.

2.6 PRESSURE REDUCING VALVE STATIONS

- A. Manufacturer List:

1. Cla-Val
2. Flomatic
3. OCV Control Valves
4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products

- B. Product Info: Ductile Iron body and cover, sized as shown in Drawings, pressure settings as shown in Drawings.
- C. Enclosure: Fiberglass enclosure, continuous stainless steel hinge on one side, lockable on opposite side. Sized to accommodate inlet and outlet piping, and all piping, valves, and accessories for entire pressure reducing station as shown in Drawings. 1" of urethane foam insulation on interior of enclosure.

2.7 BUTTERFLY VALVES

- A. 2 inches to 24 inches: AWWA C504, iron body, bronze disc, resilient replaceable seat, water or lug ends, infinite position lever handle.

2.8 BLOW OFF HYDRANT

- A. Manufacturer List:
1. Kupferle Foundry Company Model Mainguard #78.
 2. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Description: Blow-off hydrant shall be non-freezing, self draining type. All working parts shall be bronze design with aluminum plunger and serviceable from above grade with no digging. Shall be lockable to prevent unauthorized use. Outlet shall be bronze, 2 1/2 inch diameter.
- C. Accessories: Meter box per Section 33 05 17.

2.9 FIRE HYDRANT

- A. Manufacturer List:
1. Clow Valve Co.
 2. Mueller Co.
 3. American Darling
 4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Dry-barrel Break-away Type: AWWA C502; cast-iron body, compression type valve.
1. Bury Depth: As indicated on the Drawings.
 2. Inlet Connection: 6 inches.
 3. Valve Opening: 4 1/2 inches diameter.
 4. Ends: Flange, Mechanical Joint or Bell End.
 5. Bolts and Nuts: Stainless steel or Bronze.
 6. Coating: AWWA C550; interior.
 7. Direction of Opening: Counterclockwise unless otherwise indicated.

- C. Wet-Barrel Type: AWWA C503; cast-iron body.
 - 1. Valve Openings: Individual for pumper and hose nozzles.
 - 2. Ends: Mechanical joint or bell end.
 - 3. Bolts and Nuts: Stainless steel or Bronze.
 - 4. Coating: AWWA C550; interior.
 - 5. Check Valve: Break-off type, compatible with hydrant.
- D. Hydrant Extensions: Fabricate in multiples of 6 inches with rod and coupling or flange to increase barrel length.
- E. Hose and Streamer Connection: Match sizes and type of thread with utility company and fire department, two hose nozzles (2 ½ inch), one pumper nozzle (4 ½ inch).
- F. Finish: Primer and two coats of enamel in traffic or safety yellow color, in accordance with NFPA 281 requirements.
- G. Hydrant Wrench: Furnish one hydrant wrench per contract as applicable.

2.10 FLUSH HYDRANT

- A. Manufacturer List:
 - 1. James Jones J-342, J-344, J-344HP or equal.
 - 2. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Hydrant: AWWA C503, wet barrel type, with minimum 2 inch diameter valve seat opening.
- C. Hydrant Extensions: Galvanized steel with PVC based tape wrap on all exposed surfaces (3M Scotchrap, 20 mil thickness, or equal).
- D. Hose and Streamer Connection: One hose nozzle (2 inch, 2 ½ inch, or 4 inch, as indicated in Drawings).
- E. Finish: Primer and two coats of enamel in traffic or safety yellow color.
- F. Hydrant Wrench: Furnish one hydrant wrench per contract as applicable.

2.11 ACCESSORIES

- A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.
- B. Protection Posts: black iron or galvanized steel, 4 in diameter, 6 ft long, buried 3 ft deep (3 ft exposed). Paint post with 2 coats of yellow reflectorized paint. Cap with concrete or stampable aluminum cap as required in Drawings.
- C. Gravel for weep hole or drainage: 3/8 inch washed pea gravel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Locate, identify, and protect utilities to remain from damage.
- C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
 - 1. Notify Engineer not less than 3 days in advance of proposed utility interruption.
 - 2. Do not proceed without permission from the Owner.
- D. Perform trench excavation, backfilling and compaction in accordance with Section 31 23 17.

3.3 BEDDING

- A. Excavate trench in accordance with Section 31 23 17 for Work of this Section.
- B. Form and place concrete for pipe thrust restraints at change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Place thrust restraint bearing on subsoil.
 - 1. Where native subsoil is not suitable, place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth; compact to 95 percent. Imported pipe embedment only to be used with Engineer approval in advance.
 - 2. Backfill around sides and to top of thrust restraint with cover fill, tamp in place and compact to 95 percent.

3.4 INSTALLATION - VALVES AND HYDRANTS

- A. Set valves on compacted soil or compacted fill material, with thrust block or thrust restraint as shown in Drawings.
- B. Pour concrete pads around valves and hydrants per Drawings. Coordinate with Section 03 30 00. No not encase break-off check valves or other accessories in concrete pad.
- C. Center and plumb valve box over valve. Set valve box cover flush with finished grade in paved streets. Set valve box cover 2 inches above finished grade in dirt streets, shoulders or unimproved areas.
- D. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway.

- E. Set hydrants to grade, with nozzles at least 20 inches above finished grade and safety flange not more than 6 inches, nor less than 2 inches above grade or concrete pad.
- F. For dry barrel hydrants, provide drainage pit filled with 3 cubic feet of pea gravel. Encase elbow of hydrant in gravel to 6 inches above drain opening. Do not connect drain opening to sewer.

3.5 INSTALLATION – PRESSURE REDUCING VALVE STATION

- A. Field set pressure to settings as shown in Drawings.
- B. Concrete installation: Refer to Sections 03 10 00, 03 20 00, and 03 30 00.
- C. Anchor the enclosure base to the concrete slab as shown in Drawings.
- D. Use galvanized steel or stainless steel for all nuts and bolts.
- E. Use caulking between enclosure base and the concrete slab.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Section 33 13 00.

3.7 FIELD QUALITY CONTROL

- A. Pressure test system in accordance with AWWA C600 and the following:
 - 1. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
 - 2. Conduct hydrostatic test for at least two-hour duration.
 - 3. Fill section to be tested with water slowly, expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled. Raise pressure to specified test pressure.
 - 4. Observe joints, fittings and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.
 - 5. Correct visible deficiencies and continue testing at same test pressure for additional 2 hours to determine leakage rate. Maintain pressure within plus or minus 5.0 psig of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
 - 6. Compute maximum allowable leakage by the following formula:

$L = (SD\sqrt{P})/C$
L = testing allowance, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during hydrostatic test, in psig
C = 148,000

When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.
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7. When test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections and retest until leakage is within allowable limits. Correct visible leaks regardless of quantity of leakage.
- B. Compaction Testing for Bedding: In accordance with Section 31 23 17.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at Contractor's expense.

END OF SECTION

SECTION 33 12 13

WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for domestic water service connections to buildings.
 - 2. Corporation stop assembly.
 - 3. Curb stop assembly.
 - 4. Meter setting equipment.
 - 5. Water meters.
 - 6. Backflow preventers.
 - 7. Underground pipe markers.
 - 8. Precast concrete vault.
 - 9. Bedding and cover materials.
- B. Related Requirements:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - 2. Section 31 23 17 - Trenching.
 - 3. Section 33 05 13 - Manholes and Structures.
 - 4. Section 33 11 13 - Water Distribution Mains.
 - 5. Section 33 13 00 - Disinfecting of Water Utility Distribution

1.2 REFERENCE STANDARDS

- A. American Society of Mechanical Engineers:
 - 1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
 - 2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- B. American Society of Sanitary Engineering:
 - 1. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent.
 - 2. ASSE 1013 - Reduced Pressure Principle Backflow Preventers.
- C. ASTM International:
 - 1. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 - 2. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
 - 3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 4. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - 5. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- D. American Welding Society:
 - 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

- E. American Water Works Association:
 - 1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
 - 2. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
 - 3. AWWA C800 - Underground Service Line Valves and Fittings.
 - 4. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in., for Water Service.
 - 5. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on pipe materials, pipe fittings, corporation stop assemblies, curb stop assemblies, meters, meter setting equipment, service saddles and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, curb stops, connections and thrust restraints.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with utility company standards.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. During loading, transporting, and unloading of materials and products, exercise care to prevent any damage.
- C. Store products and materials off ground and under protective coverings and custody and in manner to keep these clean and in good condition until used.
- D. Exercise care in handling precast concrete products to avoid chipping, cracking, and breakage.

PART 2 PRODUCTS

2.1 WATER PIPING AND FITTINGS

- A. Copper Tubing: ASTM B88, Type K, annealed:
 - 1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
 - 2. Joints: Compression connection or AWS A5.8, BCuP silver braze.
- B. PVC Pipe: ASTM D1785, Schedule 40 or 80, as indicated in Drawings:

1. Fittings: ASTM D2466, PVC.
 2. Joints: ASTM D2855, solvent weld.
- C. Polyethylene Pipe: AWWA C901:
1. Fittings: AWWA C901, molded or fabricated.
 2. Joints: Butt fusion or compression.

2.2 CORPORATION STOP ASSEMBLY

- A. Manufacturer List:
1. Mueller Co.
 2. A.Y. McDonald Co.
 3. Ford Meter Box Co.
 4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Corporation Stops:
1. Brass or red brass alloy body conforming to ASTM B62.
 2. Inlet end threaded for tapping according to AWWA C800.
 3. Outlet end suitable for service pipe specified.
- C. Service Saddles:
1. Double strap type, bronze construction, designed to hold pressures in excess of pipe working pressure.

2.3 CURB STOP ASSEMBLY

- A. Manufacturer and Product List:
1. Mueller Co. 300 Series.
 2. A.Y. McDonald Co. 76000 Series.
 3. Ford Meter Box Co. "B" Series.
 4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Curb Stops:
1. Brass or red brass alloy body conforming to ASTM B62.
 2. Plug type valve.
 3. Positive pressure sealing.
- C. Curb Boxes and Covers:
1. Cast iron body, Extension Type or Buffalo Type.
 2. Minneapolis or Arch Pattern Base.
 3. Lid with inscription WATER, with Pentagon Plug.

2.4 METER SETTING EQUIPMENT

- A. Manufacturer and Product List:
1. Mueller Company Copper Meter Yokes
 2. A.Y. McDonald 700 Series.

3. Ford Meter Box Co. 70 Series.
4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.

B. Outside Meter Setting:

1. Meter Yokes: Copper or iron, riser type assembly with bronze inlet inverted key angle valve expansion type outlet connection and ell fitting; flared copper tubing connections both ends.
2. Meter Yokes: Copper or iron, inlet and outlet horizontal or vertical setting with matching couplings, fittings and stops.
3. Accessories: Dual check valve, shut off valve, and test valve/drain.

2.5 WATER METERS

A. Manufacturer and Product List:

1. Badger Meter, Inc. Recordall Series.
2. Neptune Technology Group Model T-10.
3. Rockwell/Sensus Model SR II.
4. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.

B. Where indicated, furnish materials in accordance with manufacturer and model indicated on drawings. No substitutions permitted.

C. AWWA C710, positive displacement disc type suitable for fluid with bronze case and cast iron bottom cap, hermetically sealed register, remote reading to AWWA C706 where indicated.

D. Meter: Brass body turbine meter with magnetic drive register.

1. Service: Cold water, 122 degrees F.
2. Maximum Flow: 20 gpm.
3. Maximum Operating Pressure: up to 150 psi.
4. Accuracy: 1-1/2 percent.
5. Nominal Size: 5/8 inch x 3/4 inch, unless otherwise noted.

2.6 BALL VALVES

A. 2 inches and Smaller: Brass body, lead free, full port, teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, IPS inlet end, IPS outlet, with control rod, extension box and valve key.

2.7 INDIVIDUAL PRESSURE REDUCING VALVES

A. 1 inch and Smaller: Lead free, brass body, integral strainer, maximum working pressure 300 psi or higher, adjustable reduce pressure setting between 25 and 75 psi.

2.8 UNDERGROUND PIPE MARKERS

A. Plastic Ribbon Tape: Bright colored, continuously printed "WATER", minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.9 PRECAST CONCRETE VAULTS AND METER BOXES

- A. Precast Concrete Valve Vaults and Meter Boxes: Conform to Section 33 05 17.

2.10 ACCESSORIES

- A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.

3.3 INSTALLATION - CORPORATION STOP ASSEMBLY

- A. Make connection for each different kind of water main using suitable materials, equipment and methods approved by the Architect/Engineer.
- B. Provide service saddles for mains other than of cast iron or ductile iron mains.
- C. Attached corporation stops using service saddles at 10 and 2 o'clock position on main's circumference; locate corporation stops at least 12 inches apart longitudinally and staggered.
- D. For plastic pipe water mains, provide full support for service clamp for full circumference of pipe, with minimum 2 inches width of bearing area; exercise care against crushing or causing other damage to water mains at time of tapping or installing service clamp or corporation stop.
- E. Use proper seals or other devices so no leaks are left in water mains at points of tapping; do not backfill and cover service connection until approved by the Architect/Engineer.

3.4 BEDDING

- A. Excavate pipe trench in accordance with Section 31 23 17 for Work of this Section.

- B. Where native subsoil is not suitable, place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth; compact in accordance with Section 31 23 17. Pipe embedment only to be used with Engineer approval in advance.
- C. Backfill around sides and to top of pipe, tamp in place and compact in accordance with Section 31 23 17.

3.5 INSTALLATION - PIPE AND FITTINGS

- A. Maintain minimum 10 ft parallel horizontal separation of water service line from sewer piping.
- B. Maintain minimum 25 ft horizontal separation of water service line from septic tank, septic drainfield or pressure-dosed mound.
- C. Water service lines shall be no less than 45 degrees to and at least one foot above sanitary sewer and storm drain lines where those lines must cross. All portions of the water service line within 10 horizontal feet of the sewer line shall be encased in a continuous sleeve or cement slurry fill.
- D. Group piping with other site piping work whenever practical.
- E. Install pipe to indicated elevation to within tolerance of 1 inch.
- F. Route pipe in straight line.
- G. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- H. Install access fittings to permit disinfection of water system performed under Section 33 13 00.
- I. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- J. Establish elevations of buried piping with not less than 2.5 feet of cover.
- K. Install plastic ribbon tape continuous buried 12 inches below finish grade, above pipe line; coordinate with Section 31 23 17.
- L. Backfill trench in accordance with Section 31 23 17.

3.6 INSTALLATION - CURB STOP ASSEMBLY

- A. Set curb stops on solid bearing or compacted soil.
- B. Center and plumb curb box over curb stops. Set box cover flush with finished grade.

3.7 INSTALLATION - WATER METERS

- A. Install positive displacement meters in accordance with AWWA M6, with isolating valve on inlet.

3.8 INSTALLATION - BACKFLOW PREVENTERS

- A. Install backflow preventer where indicated on the Contract Drawings and in accordance with manufacturer's instructions.
- B. Comply with local water company requirements and plumbing codes in regards to testing and installation requirements.

3.9 SERVICE CONNECTIONS

- A. Install water service in accordance with utility company requirements with double check valve backflow preventer.
- B. Install water meter and backflow preventer in concrete vault located on site. Refer to Section 33 05 17.
- C. Install water service to 5 feet of building. Connect to building water service. Provide isolation ball valve and hose bib.
- D. Install individual pressure reducing valve, where required, upstream of any hose bib and house connection.

3.10 PRECAST CONCRETE VAULT

- A. Conform to Section 33 05 17.

3.11 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Section 33 13 00.

END OF SECTION

SECTION 33 13 00

DISINFECTING OF WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes disinfection of potable water distribution system; and testing and reporting results.
- B. Related Sections:
 - 1. Section 33 11 13 - Water Distribution Mains.
 - 2. Section 33 11 16 - Water Distribution Valves and Hydrants: Product and Execution requirements for installation, testing, of site domestic water distribution piping.
 - 3. Section 33 12 13 -Water Service Connections
 - 4. Section 33 21 00 - Individual Water Supply Wells: Product and Execution requirements for installation, testing, and disinfection of water wells.
 - 5. Section 33 21 13 - Community Water Supply Wells: Product and Execution requirements for installation, testing, and disinfection of water wells.

1.2 REFERENCES

- A. American Water Works Association:
 - 1. AWWA B300 - Hypochlorites.
 - 2. AWWA B301 - Liquid Chlorine.
 - 3. AWWA C651 - Disinfecting Water Mains.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit procedures, proposed chemicals, and treatment levels for review.
- C. Test Reports: Indicate results comparative to specified requirements.
- D. Certificate: Certify cleanliness of water distribution system meets or exceeds specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Disinfection Report:
 - 1. Type and form of disinfectant used.
 - 2. Date and time of disinfectant injection start and time of completion.
 - 3. Test locations.
 - 4. Name of person collecting samples.

5. For community water system, initial and 24 hour disinfectant residuals in treated water in ppm for each outlet tested.
6. For individual water system, initial and 3 hour disinfectant residuals in treated water in ppm for each outlet tested.
7. Date and time of flushing start and completion.
8. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. For community water system or well, initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. For individual water system or well, initial and 3 hour disinfectant residuals in ppm for each outlet tested.
7. Coliform bacteria test results for each outlet tested.
8. Certify water conforms, or fails to conform, to bacterial standards of Environmental Protection Agency.

- D. Water Quality Certificate: Certify water conforms to quality standards of Environmental Protection Agency, suitable for human consumption.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA C651.

PART 2 PRODUCTS

2.1 DISINFECTION CHEMICALS

- A. Chemicals: AWWA B300, Hypochlorite and AWWA B301, Liquid Chlorine.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping system has been cleaned and inspected.
- C. Perform scheduling and disinfecting activity with start-up, water pressure testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 INSTALLATION

- A. Provide and attach required equipment to perform the Work of this section.
- B. Perform disinfection of water distribution system and installation of system and pressure testing. Refer to Section 33 11 13 for pressure testing requirements.
- C. Inject or input treatment disinfectant into piping system to chlorine dose of no less than 25 milligrams per liter, in accordance with AWWA C651.
- D. Maintain disinfectant in system for 24 hours, or as required by AWWA C651.
- E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water. Dechlorinate before disposal if there is no place to safely dispose of high chlorine water. Take water samples for total and fecal coliform testing after chlorine is flushed from system.
- F. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Disinfection, Flushing, and Sampling:
 - 1. Disinfect pipeline installation in accordance with AWWA C651.
 - 2. Upon completion of retention period required for disinfection, flush pipeline until chlorine concentration in water leaving pipeline is no higher than that generally prevailing in existing system or is acceptable for domestic use. Test for fecal and total coliforms. If water indicates presence of coliforms, disinfection needs to be completed again.
 - 3. Legally dispose of chlorinated water. When chlorinated discharge may cause damage to environment, apply neutralizing chemical to chlorinated water to neutralize chlorine residual remaining in water.
 - 4. After final flushing and before pipeline is connected to existing system, or placed in service, employ an approved independent testing laboratory to sample, test and certify water quality suitable for human consumption.
 - 5. If test fails, Contractor shall repeat disinfection and testing process in accordance with AWWA until test is successful. All repeat testing shall be done at Contractor's expense.

END OF SECTION

SECTION 33 13 13

WATER STORAGE TANK DISINFECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Water tank disinfection.
 - 2. Bacteriological testing.
- B. Related Sections:
 - 1. Section 09 97 14 - Steel Water Storage Tank Painting.
 - 2. Section 09 97 24 - Concrete Water Storage Tank Painting.
 - 3. Section 33 16 13 - Prestressed Concrete Water Storage Tanks.
 - 4. Section 33 16 19 - Welded Steel Water Storage Tanks.

1.2 REFERENCES

- A. American Water Works Association:
 - 1. AWWA B300 - Hypochlorites.
 - 2. AWWA B301 - Liquid Chlorine.
 - 3. AWWA C652 - Disinfection of Water Storage Facilities.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Disinfection Procedure: Submit procedure description including type of disinfectant to and calculations indicating quantities of disinfectants required to produce specified chlorine concentration in accordance with Section 3 and 4 of AWWA C652. Plan shall include plans to dechlorinate effluent after testing if discharge will be released to the environment.
- C. Test Reports: Indicate results of bacteriological and residual chlorine laboratory test reports.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA C652.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Store disinfectants in cool, dry place away from combustibles such as wood, rags, oils and grease.

- C. Handle disinfectants with caution; protect skin and eyes from contact; avoid breathing vapors; wear gloves, aprons, goggles, and vapor masks.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Furnish personnel working inside tank during disinfection with equipment to comply with Federal and State regulations for work conducted in hazardous atmosphere.
- B. Neutralize disinfectant solution before disposal.
- C. Legally dispose of disinfection solution off Project site.
- D. Repair damage caused by disinfectant solution and disinfection procedures.

PART 2 PRODUCTS

2.1 DISINFECTANTS

- A. Chlorine Forms: In accordance with AWWA C652, Section 3.
 - 1. Liquid chlorine conforming to AWWA B301.
 - 2. Sodium hypochlorite conforming to AWWA B300.
 - 3. Calcium hypochlorite conforming to AWWA B300.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Conduct inspection of tank interior before beginning disinfection.
 - 1. Verify tank is clean and free of polluting materials.
 - 2. Verify tank pipe and vent connections are properly made and clear of obstructions.
 - 3. Verify paint is thoroughly cured in accordance with paint manufacturer's instructions and all painter's holidays have been identified and repaired.

3.2 PREPARATION

- A. Protect aquatic life and vegetation from damage from disinfectant solution purged from tank.

3.3 APPLICATION

- A. Use any one or a combination of the three methods for disinfecting tank specified in Section 4 of AWWA C652:
 - 1. Chlorination Method 1: Water storage facility is filled to overflow level with chlorinated water with free chlorine residual of not less than 10 mg/L at the end of 24 hour period. See AWWA C652 for full instructions.

2. Chlorination Method 2: A solution of at least 200 mg/L free chlorine is applied to surface of the water storage tank that would be in contact with water when facility is full to the overflow elevation. See AWWA C652 for full instructions.
3. Chlorination Method 3: Water and chlorine added to result in a solution with at least 50 mg/L free chlorine filling 5% of total storage volume. After a period of not less than 6 hours, storage tank is filled to overflow level with potable water. Resulting chlorinated water is held for a period not less than 24 hours after filling is complete. See AWWA C652 for full instructions.

3.4 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Collect samples of water from filled tank for bacteriological analysis in accordance with Section 4.4 of AWWA C652; take inlet and outlet water samples.
- C. Test water samples for bacterial contamination and residual chlorine in accordance with Federal EPA standards for potable water. Water samples must be taken when chlorine residual is at or below system levels, typically less than 1.0 mg/L.
- D. When water samples fail to meet Federal EPA standards for potable water perform the following corrective measures until water quality conforms to Federal EPA standards:
 1. Inlet and Outlet Water Sample Failure: Eliminate source of contamination in water supply, repeat disinfection, and retest water quality.
 2. Outlet Water Sample Failure: Repeat disinfection, and retest water quality.

END OF SECTION

SECTION 33 16 20

BOLTED STEEL WATER STORAGE TANKS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Bolted steel elevated water tank.
 - 2. Tank foundation.
- B. Related Sections:
 - 1. Section 03 20 00 - Concrete Reinforcing.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.
 - 3. Section 09 97 14 - Steel Water Storage Tank Painting.
 - 4. Section 31 23 16 - Excavation.
 - 5. Section 31 23 17 - Trenching.
 - 6. Section 33 11 13 - Water Distribution Mains.
 - 7. Section 33 11 16 - Water Distribution Valves and Hydrants.
 - 8. Section 33 13 13 - Water Storage Tank Disinfection.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- C. American Water Works Association:
 - 1. AWWA D100 – Welded Carbon Steel Tanks for Water Storage.
 - 2. AWWA D103 – Factory-Coated Bolted Carbon Steel Tanks for Water Storage.
- D. NSF International
 - 1. NSF/ANSI 61 – Drinking Water System Components – Health Effects.

1.3 DEFINITIONS

- A. PURCHASER used in AWWA D103 means Owner.

1.4 DESIGN REQUIREMENTS

- A. Design in conformance with requirements listed in AWWA D103, Paragraph III.A, as noted, supplemented, or modified below:
 - 1. Compliance with NSF/ANSI 61 is required.
 - 2. Dimensions and Capacity:

- a. Minimum usable tank capacity: 60,000 Gallons
 - b. Diameter as indicated on Drawings
 - c. Height as indicated on Drawings
 - d. Overflow Weir Height as indicated on Drawings and shall ensure that free board is in accordance with most recent and pertinent AWWA standards while maintaining minimum usable capacity.
3. Roof: Steel dome roof.
 4. Bottom: Steel tank bottom.
 5. Location of Site: As indicated on Drawings.
 6. Access Road: As indicated on Drawings.
 7. Snow Loading: Per AWWA D103
 8. Special Wind Load Requirements: AWWA D103, Section 5.2.4 and Section 15.3.
 9. Earthquake Design: Fixed percentage method as specified in AWWA D103, Section 5.2.5 and Section 14.2.1. See drawings for seismic design constants.

- B. Design and construct foundation based upon subsurface investigation report, if included.
- C. All designs, calculations, drawings, etc. shall be stamped by a Professional Civil Engineer licensed by the State of California. This is implied anywhere professional engineer, engineer or similar statement is used.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Signed and sealed by professional engineer licensed in the State of California. Indicate the following:
 1. Tank Shop Drawings:
 - a. Complete plan, elevation, and sectional drawings showing critical dimensions.
 - b. Structural plate and support member sizes and thickness.
 - c. Water supply and overflow piping details including fittings, pipe support methods, and drain pipe. Tank manufacturer is required to verify the structural integrity for all piping, valves and appurtenances attached to tank wall.
 - d. Ladder and ladder safety device details.
 - e. Handrail details.
 - f. Access hatch details.
 2. Tank Foundation Shop Drawings:
 - a. Submit specification for foundation concrete describing ingredients, reinforcement, air content, slump, placement and consolidation, curing and finishing in accordance with these specifications.
 - b. Submit concrete design mix including ingredient proportions, minimum cement content, and water/cement ratio in accordance with these specifications.
 - c. Submit drawings of reinforcing bars including bar lists.
- C. Product Data:
 1. Submit data for expansion joint fittings and other pipe specialty fittings.
 2. Submit data ladder and ladder safety devices.
 3. Coating material and color option samples.

- D. Design Data: Submit structural calculations for tank and tank foundation, signed and sealed by professional engineer.
- E. Manufacturer's Field Reports: Certify foundation, anchor bolts, and tank have been properly installed and leveled and are free of leaks.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual location layout and final configuration of tank and accessories.
- C. Contractor to provide report from independent inspector on condition of entire interior and exterior of the completed tank in the field for holidays, scratches or other defects.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA D103.
- B. One-year warranty inspection will be scheduled by Engineer and/or Owner 11 months after substantial completion. There will be no additional payment for participation in the warranty inspection, nor for correcting any problems encountered during the inspection. Failure to attend will be suitable cause for action against performance bonding.

1.8 QUALIFICATIONS

- A. Fabricator: Company specializing in performing work of this section with minimum five years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five years documented experience.
- C. Welders Credentials: Refer to AWWA D103, Section 8.1.
- D. Design water tank and foundations under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of California. All work to be stamped by California Licensed Civil Engineer.

1.9 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.10 MAINTENANCE MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance materials.

- B. Furnish two safety harnesses with double lanyards for ladder safety rail system.

PART 2 PRODUCTS

2.1 BOLTED STEEL WATER TANK

- A. Manufacturers:
 - 1. Paso Robles Tank – Brown-Minneapolis Tank, Inc.
 - 2. Superior Tank Co.
 - 3. CST Industries, Inc.
 - 4. Tarsco Bolted Tank
 - 5. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Furnish materials complying with this specification and standards specified in AWWA D103, Section 2.

2.2 TANK CONSTRUCTION

- A. In conformance with requirements listed in AWWA D103, Paragraph III, supplemented, or modified below:
 - 1. Compliance with NSF/ANSI 61 is required.
 - 2. Pipe and Fittings for Fluid Conductors: AWWA D103, Section 4.9 – Pipe and Fittings for Fluid Conductors: Modify to indicate screwed joints are not allowed.
 - 3. Roof Support: Self-supporting, unless otherwise indicated on Drawings.
 - 4. Manholes, Ladders and Other Accessories: AWWA D103, Section 7.
 - a. Shell Manholes:
 - 1) round manhole 30 inch diameter
 - 2) square manhole 30 inches per side
 - 3) 2 feet above tank base and located as indicated on Drawings.
 - b. Ladders: Provide exterior ladder per the Drawings.
 - c. Liquid Level Gauge: A liquid level gauge complete with board, marker, float, stainless steel cable, pulleys, and accessories shall be provided. The gauge shall be designed and constructed for the marker to travel **full** tank height.
 - 5. Pipe and Pipe Connections:
 - a. AWWA D103, Section 7.2 - Pipe Connections:
 - 1) Provide inlet and outlet pipe at diameter shown in Drawings.
 - b. Provide other accessories as indicated on Drawings.
 - 6. Removable Silt Stop: AWWA D103, Section 7.2.1. On a common outlet / drain line on the tank floor, provide removable silt stop.
 - 7. Overflow: AWWA D103, Section 7.3 - Overflow. Provide welded joint steel overflow pipe as indicated on Drawings suitably supported and extending to grade level; diameter of overflow as indicated on Drawings. Provide overflow weir box designed to handle design flow at high water level. Terminate overflow pipe at 2 feet above finished grade or catch basin to provide air break. Provide 24 mesh stainless steel, aluminum or bronze mesh insect screen and screen holder over air break opening.
 - 8. Safety Cages, Rest Platforms, Guardrails or Other Safety Devices: AWWA D103, Section 7.5.

- a. Safety Devices: Provide safety rail, complying with OSHA Standards, along entire ladder length.
 - b. Fall Protection:
 - 1) Ladders shall be equipped with a fall arrest system meeting OSHA regulations. The system shall be supplied complete with safety harness.
 - 2) Perimeter handrails shall be affixed to access and inspect the roof. Double handrails shall encompass the entire perimeter of the tank roof.
 - 3) Roof Walkway to access hatch and vent shall be reached from the outside tank ladder according to the following.
 - a) For slopes 5 in 12 or greater, a ladder or stairway shall be provided.
 - b) Slopes less than 5 in 12 and greater than 2 in 12 shall be provided with a single handrail and nonskid walkway.
 - c) Slopes 2 in 12 or less do not require a handrail or nonskid surface.
 - c. Ladder Gate: Steel door welded to a steel gate with covers the bottom rungs of the ladder vertically and the entry to the cage, horizontally. The combined unit shall be affixed with corrosion resistant sturdy hinges capable of supporting the ladder gate. The material shall be galvanized or painted steel to match the tank coating. There shall be a locking hasp and a handle. The ladder gate shall operate smoothly and prevent the use of the ladder when closed.
9. Special Vent Required for Screening of Tank Vent: AWWA D103, Section 7.7.2 - Vent. Provide total free open vent area based on highest potential flow. Provide 24 mesh stainless steel, aluminum or bronze insect screen. Frost proof. Maximum water discharge of 1800 GPM
 10. Welds: AWWA D103, Section 8 - Welding. Modify to indicate lap welds tack welded on one side are not permitted. Seal welding is required.
 11. Written Report Certifying Work: Prepare and submit as specified in AWWA D103, Section 11.2, a notarized statement attesting to the proper construction and installation.
 12. Surface Preparation: Refer to Section 09 97 14.
 13. Soil Investigation and Foundation: AWWA D103, Section 13.2. Soil data included in Exhibits, where available.
 14. Concrete: ACI 318.
 15. Vertical Distance from Finished Ground Level to Crown of Inlet and Outlet Pipes (Earth Cover) at Tank Foundation: AWWA D103, Section 13.7.2. As indicated on Drawings.
 16. Specification Sheet for Seismic Data: AWWA D103, Section 14.
 17. Vertical Acceleration: AWWA D103, Section 14.
 18. AWWA D103, Section 4 - Materials:
 - a. Section 4.3 - Reinforcing Steel: Modify to use only Grade 60.
 19. AWWA D103, Section 5 - General Design:
 - a. Section 5.8 - Minimum Thickness: For parts of tank not in contact with water: $\frac{1}{4}$ inch, except web thickness in rolled shapes may be less than $\frac{1}{4}$ inch.
 - b. Wall thickness shall be designed to withstand the exterior piping loads with no additional supports.
 20. Name Plate: A nameplate similar to Fig. 14, AWWA D100 shall be filled out with the required information and securely fastened to the tank. Minimum information shall include company name and address, year, design capacity, diameter, height, and tank company's project number and IHS project number.
 21. Coating:
 - a. Suitable for potable water storage tank and NSF compliance.

- b. Per AWWA D103 Section 12.4, 12.5, 12.6.

2.3 REINFORCEMENT

- A. Reinforcing Steel Bars: In accordance with Section 03 20 00.

2.4 CONCRETE

- A. Concrete: In accordance with Section 03 30 00.

2.5 INLET AND OUTLET PIPE

- A. Inlet and Outlet Pipe: ASTM A53, Grade B, Schedule 40, steel pipe, welded joints, flanged ends per Drawings. Coated to match the tank coating.

2.6 OVERFLOW AND DRAIN PIPE

- A. Overflow and Drain Pipe: ASTM A53, Grade B, Schedule 40, steel pipe, welded joints, flanged ends per Drawings. Coated to match the tank coating.
- B. Underground Solid Drain Line
 - 1. Plastic Pipe: ASTM D3034, SDR 35, Poly Vinyl Chloride (PVC) material; bell and spigot style rubber ring sealed gasket joint.
 - a. Fittings: PVC.
 - b. Joints: ASTM F477, elastomeric gaskets.
 - 2. Piping materials described in 33 11 13 – Water Distribution Mains.

2.7 FLEXIBLE PIPE COUPLINGS

- A. Manufacturer List
 - 1. EBAA Iron, Inc. (Force Balanced Flex-Tend): www.ebaa.com
 - 2. Substitutions Permitted: Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.
- B. Description:
 - 1. Factory pre-assembled, double ball flexible expansion joint.
 - 2. Force Balanced: The flexible expansion fitting shall not expand or exert an axial imparting thrust under internal water pressure. The flexible expansion fitting shall not increase or decrease the internal water volume as the unit expands or contracts.
 - 3. Ductile iron meeting ASTM A536 and AWWA C153.
 - 4. Rated to minimum 250 psi.
 - 5. Safety Factor: minimum 2:1.
 - 6. Deflection: Joints 4-inch through 12-inch minimum 20 degrees deflection per ball
 - 7. Total linear travel of 8-inches minimum expansion.
 - 8. Interior Coating: parts in contact with water shall have 15 mils minimum epoxy coating meeting AWWA C213 and NSF-61 certified.
 - 9. Exterior Coating: exterior surfaces shall have 6 mils minimum epoxy coating meeting AWWA C116.
 - 10. Gaskets: EPDM gaskets meeting AWWA C111 and NSF61 certified.

2.8 INTERIOR PIPE AND SUPPORTS (DELETE 2.8 IF TANK WILL HAVE SEPARATE INLET AND OUTLET. This is for a combined inlet and outlet.)

- A. Interior pipe to be PVC 900 DR 18 unless otherwise noted on drawings. Size shall be as shown on drawings.
- B. Interior pipe support shall be designed by the tank manufacturer's civil or structural engineer to meet seismic requirements. Engineer shall be licensed in the state of California. Other requirements are as follows:
 - 1. Supports shall be secured to the tank floor.
 - 2. Support materials and all interior components shall be NSF 61 Approved.
 - 3. Materials shall be resistant to corrosion and suitable for submerged service. FBE, powder coated, or stainless steel is acceptable. Substitutions are allowed with IHS engineer approval.
 - 4. Scratch protection between support baseplate and tank bottom shall be provided (NSF approved). Neoprene and EPDM are approved materials.

2.9 TANK ACCESSORIES

- A. Roof Hatch:
 - 1. Minimum 2 feet x 2 feet with locking hasp and bronze cylinder lock. Minimum neck height to be 4 inches.
 - 2. NSF 61 approved neoprene gasket.
- B. Ladder:
 - 1. Outside Ladder: Aluminum construction.
 - a. First Section: From 0 to 8 feet from ground level, with 0.25 inch steel ladder and hatch gate as shown in Drawings.
 - b. Remainder of Ladder: Provide safety cage, hinged entrance cover attached to ladder gate, hasp and bronze cylinder lock.
 - c. Ladder Grab Extension: 3 feet above roof.
 - 2. Handrail on Roof: Aluminum 3.5 feet high where indicated on Drawings; conform to OSHA Standards.

2.10 FOUNDATION DESIGN AND CONSTRUCTION

- A. Furnish material and construct in accordance with AWWA D103, Section 13 Foundation Design and Construction. Foundation Type, seismic design, and materials of construction shall be determined by the tank manufacturer in conjunction with the geotechnical report. A licensed civil or structural engineer shall seal the design for the tank, seismic restraints, and foundation design.

2.11 OTHER MATERIALS

- A. Furnish other materials in accordance with AWWA D103, Section 4 to complete installation.

2.12 FABRICATION

- A. AWWA D103, Section 9 - Shop Fabrication: No changes or modification to this Section.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify elevations and grading for elevated tank and location of elevated tank.
- C. Refer to Section 31 23 16 for excavation and Section 31 23 17 for backfill requirements.

3.2 INSTALLATION

- A. Install tank and tank foundations in accordance with AWWA D103 and the following:
 - 1. AWWA D103, Section 10 - Erection:
 - a. Prior to bolt installation, the fiber expansion board shall be installed.
 - b. Install bolts on vertical tank walls such that the head portion is located inside the tank and the washer and nut are on the exterior.
 - c. Size bolt lengths to achieve a neat and uniform appearance. 2 to 4 threads shall extend past the nut after proper installation.
 - d. Provide high impact polypropylene copolymer encapsulation of entire bolt head up to the splines on the shank.
 - e. Provide encapsulated nuts to cover the bolt threads on the inside of the tank floor.
 - 2. AWWA D103, Section 12 - Coatings:
 - a. Interior and exterior coatings shall be factory applied prior to delivery.
 - b. Field paint for touch ups to factory-applied coating and to piping and accessories.
 - c. Refer to Section 09 97 14 for surface preparation prior to applying coatings.
- B. Underground solid drain line:
 - 1. Installation as described in 33 11 13 – Water Distribution Mains.
 - 2. Install in accordance with the requirements of ASTM D 2321.
 - 3. The pipe shall form a smooth flow line with no sags or bellies.
 - 4. Pipe slope shall maintain a minimum slope of 1/8" per foot (1.0% slope).
- C. Installation of Flexible (Expansion) Pipe Couplings shall be installed horizontally level and vertically plumb. Pipe and coupling installation shall not induce a deflection of the flexible coupling. Flexible expansion couplings shall be installed with a minimum 12 inches of clearance in all directions and provide full range of motion.

3.3 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection and Testing:
 - 1. Hydrostatic Testing:
 - a. Test completed and cleaned tank for liquid tightness by filling tank to its overflow elevation with water provided by Owner. Note: in some circumstances, this may take a week or more. Understand locally available water sources and pumping rates.

- b. Correct leaks disclosed by this test.
 - c. Drain and legally dispose test water off site.
 - 2. Concrete testing for foundation in accordance with Section 03 30 00.
 - 3. Vacuum testing of the bottom panels and porosity in welded seams
 - a. Test for porosity in the bolted joints of the tank bottom by observation for bubbles in a soap solution coating the joints with a glass top metal testing box. This shall be operated at a minimum vacuum of 2 psi.
 - b. Contractor shall correct all deficiencies and repeat the test at Contractor's expense.
- C. Contractor to provide independent inspector to inspect entire interior and exterior of the completed tank in the field for holidays, scratches or other defects.
 - 1. All scratches, defects and holidays to be repaired.
 - 2. Panels with 5 or more holidays shall be replaced.
 - 3. Bolts with failing protective covers shall be replaced.
 - 4. Repairs to coating systems shall be made within 3 business days of being identified.
- D. Certifications: At the time of the final inspection, the Contractor shall provide a notarized statement similar to Fig. 24, AWWA D-100, signed by a principal of the company. The certificate shall state that the tank was designed, fabricated, erected and inspected in accordance with AWWA D-103 as applicable.

3.4 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Clean interior and exterior of tank to remove debris, construction items, and equipment.
- C. Disinfect tank in accordance with Section 33 13 13.

END OF SECTION

SECTION 33 19 00

SLOW SAND FILTER

PART 1 - GENERAL

1.1 SUMMARY

- A. This specification includes the specifics on the type of filter media to be used in the slow sand filters, and the arrangement of the underdrain.

1.2 REFERENCES

- A. National Science Foundation
 - NSF 61

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit catalog data for each product specified.
- C. Test Reports: Indicate procedures and results for specified factory and field testing and inspection.
- D. Manufacturer's Field Reports: Indicate activities on site, adverse findings, and recommendations.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations and elevations of piping, media layers, and other constructed elements.
- C. Operation and Maintenance Data: Submit bound copies of startup, operation, and maintenance instructions

1.5 TRAINING

- A. Training program shall educate operators and maintenance personnel with the required level of system familiarity to provide a common working knowledge concerning all significant aspects of the system being supplied.
- B. System supplier shall provide one half day (4 hours) of training.
- C. System supplier shall provide all instructional course material, equipment and manuals to conduct the training program. Tribe shall provide facilities for training.

1.6 GENERAL REQUIREMENTS

- A. All components shall be new, unused and UL listed.

1.7 ACCEPTANCE

- A. Work covered by this section shall not be accepted until testing connected with this work has been completed satisfactorily.
- B. Work found defective in performance shall be corrected.

PART 2-PRODUCTS

2.1 FILTER SAND

- A. Manufacturer and Product List:
 - 1. Kleen Industrial Services *Silica Sand #30 (40-60)*
 - 2. Cemex *Lapis Lustre #0/30 Filter Sand*
 - 3. Substitutions Permitted: Section 01 60 00 – Product Requirements
- B. Product Info:
 - 1. Compliant with NSF 61.
 - 2. Consisting of washed, rounded, durable grains. Shall not include flat or elongated particles.
 - 3. Free from clay, loam, and organic matter.
 - 4. Characterized by the following grain attributes:
 - a. 10th percentile Grain Size, d_{10} : 0.4 mm
 - b. No grains larger than: 0.85 mm
 - c. Coefficient of Uniformity, U_c : 1.5 or lesser

2.2 ROUGH SAND

- A. Manufacturer and Product List
 - 1. Kleen Industrial Services *[1/8 x 1/16] Filter Gravel*
 - 2. Cemex *Lapis Lustre #2/12 Filter Sand*
 - 3. Substitutions Permitted: Section 01 60 00 – Product Requirements
- B. Product Info
 - 1. Compliant with NSF 61.
 - 2. Consisting of washed, rounded, durable grains. Shall not include flat or elongated particles.
 - 3. Free from clay, loam, and organic matter.
 - 4. Characterized by the following grain attributes:
 - a. 10th percentile Grain Size, d_{10} : 1.5 mm
 - b. No grains larger than: 2.36 mm
 - c. Coefficient of Uniformity, U_c : 2 or lesser

2.3 FINE GRAVEL

A. Manufacturer and Product List

1. Kleen Industrial Services, *[3/8 x 1/4] Filter Gravel*
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Product Info

1. Compliant with NSF 61.
2. Consisting of washed, rounded, durable grains. Shall not include flat or elongated particles.
3. Free from clay, loam, and organic matter.
4. Characterized by the following grain attributes:
 - a. 10th percentile Grain Size, d_{10} : 5.8 mm
 - b. No grains larger than: 12.5 mm
 - c. Coefficient of Uniformity, U_c : 2 or lesser

2.4 ROUGH GRAVEL

A. Manufacturer and Product List

1. Kleen Industrial Services, *[3/4 x 5/8] Filter Gravel*
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Product Info

1. Compliant with NSF 61.
2. Consisting of washed, rounded, durable grains. Shall not include flat or elongated particles.
3. Free from clay, loam, and organic matter.
4. Characterized by the following grain attributes:
 - a. 10th percentile Grain Size, d_{10} : 16 mm
 - b. No grains larger than: 37.5 mm
 - c. Coefficient of Uniformity, U_c : 2 or lesser

2.5 FILTER ROCK

A. Manufacturer and Product List:

1. SRI Supreme *Stringer Pit 1x3 Cobble Sieve, Drain Rock*
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Product Info:

1. Compliant with NSF 61.
2. Consisting of washed, rounded, durable grains. Shall not include flat or elongated particles.
3. Free from clay, loam, and organic matter.
4. Characterized by the following grain attributes:
 - a. 10th percentile Grain Size, d_{10} : 30 mm
 - b. No grains larger than: 80 mm
 - c. Coefficient of Uniformity, U_c : 2 or lesser

2.6 DIFFERENTIAL PRESSURE GAUGE

A. Manufacturers:

1. McMaster-Carr High-Pressure Differential Gauge
2. [High-Pressure Differential Gauge, Aluminum Case, 2-1/2" Dial Diameter, 1/4 NPT Female Connection | McMaster-Carr](#)
3. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Product Info:

1. 2 ½" Dial Size
2. Pressure Range: 0-50 psi
3. ¼" Female NPT threaded connections
4. Maximum Pressure 3,000 PSI

2.7 UNDERDRAIN

A. Manufacturers

1. Schedule 40 PVC, Per 33 11 13 Water Distribution Main

B. Product Info:

1. 1.5" and 4" Schedule 40 PVC
2. Laterals
 - a. 1.5" PVC, with two (2) 1/8" perforations every 4", offset 60° from bottom of pipe
3. Headers
 - a. 4" PVC, no perforations

2.8 LEVEL INDICATORS

A. Manufacturers

1. CRAIN / SECO 7" Wide Stream Gauge
 - a. <https://www.engineersupply.com/crain-7-wide-stream-gauge.aspx?variantId=6ce62c2d-5b3c-48c7-9aba-e98e04e10dba>
2. Substitutions Permitted: Section 01 60 00 – Product Requirements

B. Description

1. 7" wide
2. 10' tall
3. Measures in feet with 1/5th foot gradations
4. Ordered as two parts, (0.5' - 5.5' range) and (5.5' - 10.5' range)

PART 3-EXECUTION

3.1 EXECUTION

A. LAYERS OF MEDIA

1. The layers of the media shall be placed as follows (from top to bottom):

MATERIAL	DEPTH OF LAYER
FILTER SAND	48"
COURSE SAND	4"
FINE GRAVEL	4"
ROUGH GRAVEL	4"
ROCK	8"

B. PLACEMENT

1. Layers shall be placed evenly, orderly, and to depths specified in Drawings
2. Work shall be performed to minimize layer intermixing

C. UNDERDRAIN

1. The underdrain shall rest on the Rock layer
2. The header pipe shall be inclined 0.83% to maintain positive drainage.
 - a. The header pipe should have 7" above the floor of the filter on the West end, and 3" above the floor on the East end.
3. Laterals shall be spaced evenly along headers, with 7 laterals per each of 4 beds (approximately 33.4" spacing, 28 laterals total)

D. STARTUP

1. Filter shall not run into distribution until filter is allowed to ripen – by YPUD discretion

END OF SECTION

SECTION 33 21 13

COMMUNITY WATER SUPPLY WELLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Drilling and casing for water well.
 - 2. Pump and controller.
 - 3. Water and system testing and certification.
- B. Related Sections:
 - 1. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
 - 2. Section 26 05 33 - Raceway and Boxes for Electrical Systems.
 - 3. Section 31 23 17 - Trenching: Excavating and Backfilling for conduit and pipe from well head to building.
 - 4. Section 33 11 13 – Water Distribution Mains.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 2. ASTM C150 - Standard Specification for Portland Cement.
 - 3. ASTM D1785- Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 - 4. ASTM D2241 – Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
- B. American Water Works Association:
 - 1. AWWA A100 - Standard for Water Wells.
- C. California Department of Water Resources
 - 1. Bulletins 74-81 and 74-90 Combined: Water Well Standards.
- D. National Electrical Manufacturers Association:
 - 1. NEMA MG 1 - Motors and Generators.
 - 2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SYSTEM DESCRIPTION

- A. Water well with the following characteristics:
 - 1. Anticipated Formation type (**select one**): [Stable Consolidated Formation]. This type of well is built to obtain water at various depths from consolidated formations, either fractured or unfractured. It is not cased or screened in the producing zone for no formation stabilization

or filtering is needed. The well may be cased through the formations above the producing zone, if they are unconsolidated or unstable, to prevent borehole collapse or to exclude water of undesirable quality. A minimum casing length with an annular seal is required to prevent surface water infiltration.] or [Unstable Consolidated Formation. This type of well is built to obtain water from unstable, potentially caving formations. It is usually screened through the producing zone and may, under some conditions, require the addition of coarse filter (formation stabilizer) material. With some exceptions, the well will usually be cased through all the formations above the producing zone and will have a surface seal.] or [Unconsolidated Formation Natural Filter. This type of well is built to obtain water at various depths from unconsolidated formations which can be stabilized naturally by development following the installation of the casing and screen. A well of this type may be constructed by boring, driving, drilling or a combination of methods. It is not effective where thin zones of productive zones must be developed in long intervals containing abundant fine particles. To assure safety from surface infiltration, a surface seal to a suitable depth is necessary.] or [Unconsolidated Formations Artificial Filter. This type of well is built to obtain water at various depths from unconsolidated formations that cannot be stabilized by the use of a casing/screen combination and development only. Stabilization of the formation requires addition of a material that is coarser than the formation material in the screen interval. This added material acts as an additional filter to prevent the fine aquifer materials from entering the well. A well of this type may be constructed by boring, driving, drilling or a combination of two or more of these methods.]

2. Upper Drill Hole: [] inch diameter, [] feet deep.
3. Lower Drill Hole: [] inch diameter, [] feet deep.
4. Upper Casing Size: [] inch nominal diameter, [] feet deep.
5. Lower Casing Size: [] inch nominal diameter, [] feet deep.
6. Screen Size (where required): [] inch nominal diameter (pipe size or telescoping), set at depth of productive zones of well, as approved by Engineer.
7. Screen Slot Size (where required): anticipated [] inch, depending on geological conditions encountered, to be approved by Engineer
8. Surface Seal: minimum 50 feet deep, or to depth required to seal off surface water, as directed by Engineer.
9. Total Well Depth: Per bid schedule. Total well depth may be altered by Engineer, depending on location of water-bearing formations.
10. Pump Depth: Per bid schedule. Pump depth may be altered by Engineer, depending on location of water-bearing formations.

1.4 PERFORMANCE REQUIREMENTS

- A. Water well capable of producing minimum [] gallons of water per minute.
- B. Maximum Suspended Solids in Delivered Water: 5 ppm.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Well casing, screens, drop pipe, drilling fluids, surface seal, annular transition seal, filter pack, pump, motor, pump controller, booster pump, pressure system, storage tank and all

accessories. Include data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

- C. Submit proof of California C-57 license to perform this work.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of well, depth, subsoil strata, and drilling difficulties encountered on IHS well log (form attached) or on State of California Well Completion Report.
- C. Submit signed copy of driller's log book statements.
- D. Submit executed certification of well pump after performance testing.
- E. Approved and completed county well drilling permit, if applicable.
- F. Results of step drawdown testing on IHS form (form attached).
- G. Operation and Maintenance Data: Submit equipment manuals.
- H. Provide minimum 5 year written warranty for submersible pump.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with AWWA A100 and State of California Water Well Standards.
- B. Maintain separation distances per California DWR standards or the following guidelines:
 - 1. Any sewer (sanitary or storm, main or lateral): 50 feet.
 - 2. Septic tank, drainfield or pressure-dosed mound: 100 feet.
 - 3. Cesspool or seepage pit: 150 feet.
 - 4. Property line, home or structure: 10 feet.

1.8 QUALIFICATIONS

- A. Drilling Firm: Company specializing in performing Work of this section with minimum 5 years documented experience and licensed in State of California
- B. Drilling Equipment: reverse rotary, direct rotary, or air rotary.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Well Casing (Steel): ASTM A53, Grade B, ¼ inch wall thickness black steel pipe, with ventilated well cap.

- B. Well Casing (PVC): ASTM D2241, SDR 17 PVC, with Certa-lok fittings, with ventilated well cap. PVC slotted casing to have a required slot opening of 0.032 inches, unless otherwise specified on drawings or unless otherwise directed by Engineer.
- C. Centralizers: Bow-spring type, sized for casing and borehole diameter.
- D. Screens: Type 304 Stainless steel or PVC continuous slot (as specified in drawings), screens shall be wire-wound design, fabricated by circumferentially wrapping triangularly shaped wire around circular array of rods or perforated channels. Wire configuration to produce inlet slots with sharp outer edges, widening inwardly to minimize clogging.
- E. Drop Pipe (Steel): ASTM A53, Grade B, schedule 40 galvanized pipe. Diameter as noted in Bid Schedule.
- F. Drop Pipe (PVC): ASTM D1785, Sch. 80 or Sch. 120 Deep Set PVC per bid schedule, with threaded stainless steel deep well couplings.
- G. Check Valve: Stainless steel construction, threaded couplings, rated for deep well use.
- H. Filter Pack Material:
 - 1. Clean, well-rounded, smooth and uniform, mostly grains. Material to be mostly siliceous with not more than 5 percent calcareous material by weight and a minimum specific gravity of 2.5.
 - 2. Determine grading of filter pack material from sieve analyses of aquifer materials. 30-percent-passing size of filter pack material shall be 4 to 6 times 30-percent-passing size of aquifer sample having the finest grain-size distribution. Minimum uniformity coefficient of filter pack material shall be 2.5.
- I. Formation Stabilizer: Well rounded. Grain size distribution should be equal to or slightly larger than the natural formation.
- J. Surface Seal:
 - 1. Portland cement type ASTM C150, Type I, III, or V with not more than 5 gallons of water per 94 pound bag of cement. Use of bentonite (up to 6 percent by weight of cement) to reduce shrinkage, or other additives to reduce permeability, increase fluidity, or control setting time must be approved by Engineer.
 - 2. Bentonite seal may be allowable if approved by Engineer.
 - a. Bentonite clay mixtures shall be mixed with clean water prior to placement at recommended ratios, typically about 1 gallon of water for every 2 pounds of bentonite. Bentonite preparations must be given adequate time to hydrate (typically over one hour) prior to placement.
 - b. Granulated or powdered bentonite shall be less than 1/5 the radial thickness of the annular space. Direct placement of dry bentonite into annular space shall be limited to short sections below the water line, and only with Engineer approval.
- K. Annular Transition Seal (where required): Mixture of bentonite with minimum amount of clean water required to facilitate placement.
- L. Cable Tie:

1. Threaded plastic strap or stainless steel band.

M. Pitless Unit:

1. Manufacturers:
 - a. Baker Manufacturing Co. Standard Industrial Pitless Unit, NSF-61 certified.
 - b. Substitutions Permitted: Section 01 60 00 - Product Requirements.

N. Sounding Tube:

1. 1" diameter, per bid schedule, ASTM D1785, Sch. 40 PVC, threaded fittings. Shall provide clear, unobstructed clearance for lowering of probe to full depth of well. Bottom of tube shall have elbow installed to prevent sounder from being dropped into well.

O. Pump:

1. Manufacturers:
 - a. Goulds Pumps.
 - b. Grundfos.
 - c. Substitutions Permitted: Section 01 60 00 - Product Requirements.
2. Type: Vertical shaft, multiple stage, close coupled, for insertion in well casing.
3. Casing: Cast iron casing with stainless steel housing and intake screen, check valve with stainless steel stem and valve seat with rubber seal built into discharge casing.
4. Impellers and Diffusers: Bronze.
5. Shaft: Stainless steel with stainless steel shaft sleeve.
6. Motor: NEMA MG 1, submersible type:
7. Characteristics: [] hp; [115] [200] [230] volt, [[single] [three]] phase 60 Hertz.
8. Pump: Submersible type for deep well pump, water lubricated:
 - a. Operating Performance: [] gpm flow capacity, [] feet total dynamic head, [] hp motor.
 - b. If directed by Engineer, install PVC or stainless steel shroud over pump impellers.
9. Pump Controller: NEMA 250 Type [3R] [4X] enclosure with main disconnect interlocked with door, containing across-the-line electric motor starter with starting relay [and ambient compensate quick trip overloads in each phase with manual trip button and reset button]; circuit breaker, control transformer, hand-off-automatic selector switches, pilot light.
10. Disconnect: NEMA 250 Type [3R] [4X] enclosure.
11. Control Voltage: 120 VAC.

2.2 ELECTRICAL WIRE AND CONDUIT

- A. Refer to Sections 26 05 03, 26 05 19, and 26 05 33.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify site conditions are capable of supporting equipment for performing drilling operations and testing.

3.2 PREPARATION

- A. Protect structures near well from damage.
- B. Disinfect all tools and equipment prior to lowering into well to prevent contamination.
- C. Method of drilling will be left to the discretion of the Contractor. Equipment used shall be in good repair and capable of drilling in unconsolidated and consolidated formations.
- D. Do not set drilling rod, drop pipe, submersible cable, or any other items to go down the hole on the ground.

3.3 DRILLING

- A. Drill concentric well shaft to diameters and depths required to meet performance criteria.
- B. Record accurate log of materials penetrated to determine depths and thicknesses of underlying formations.
- C. Prepare electric log recording resistivity, spontaneous potential and gamma for the total depth of borehole (mud rotary drilling only).
- D. For drilling in rock formations, record caliper, temperature, fluid conductivity, and optical or acoustic televiewer logs to the total depth of borehole.
- E. Place well casing and screen assembly immediately after drilling. Keep screen and casing assembly under tension during filter packing.
- F. Clean shaft bottom of loose material.
- G. Maintain well opening and casing free of contaminating materials.
- H. Maintain minimum 10 ppm Cl residual in any drilling fluid.

3.4 SURFACE SEALING

- A. Allow inspection of casing prior to placement of surface seal.
- B. Place surface seal tight to surrounding work with minimum 2" thickness. Method of sealing shall be approved by Engineer prior to starting. Method of placement must force grout or bentonite under pressure from the bottom of the space, grouted towards the top surface of pitless unit in a single operation.
- C. Type III or Type V Portland Neat Cement shall not be used in any grout when casing material is PVC.
- D. Where there is a transition in borehole from Portland Cement grout to filter pack or formation stabilizer, a 5 foot depth minimum clay annular transition seal shall be installed between the grout seal and formation stabilizer or filter pack layers.

- E. No drilling, test pumping, or other work permitted in well within number of hours shown below to allow grout to cure properly:

<u>Type of Portland Neat Cement</u>	<u>Minimum Curing Time</u>
Type I	72 hours
Type III	48 hours
Type V	6 hours

3.5 WELL CONSTRUCTION

- A. Size, locate and install well screens according to AWWA A100.
- B. Screen sections are joined by welded or threaded connections. If joints are to be welded, the welding rod must be made of material suitable for joining corrosion resistant materials. Where dissimilar metals are joined, a dielectric coupling or dissimilar metals adapter shall be used.
- C. A suitable length of riser pipe should be used on top of the screen.
- D. Install centralizers at 40 foot intervals where required to maintain casing centered in borehole.
- E. The grading of the filter pack material shall be selected by the Contractor based on the formation samples and the driller's log.
- F. Before placement, the filter pack material should be treated with a chlorine solution having 50-mg/l free-chlorine residual.
- G. The filter pack shall be introduced uniformly and continuously to minimize or eliminate hydraulic segregation and bridging. The filter pack shall be placed by gravity, with use of a tremie pipe recommended. The filter pack shall extend at least 25 percent of the screen length above the top of the screen and riser pipe.
- H. Cut off shaft top 18 inches above grade. Do not permit metal cuttings to enter casing.
- I. Weld cap on top of casing at completion. Remove cap when installing water system.

3.6 DEVELOPMENT

- A. Use one of the following methods for well development:
 - 1. Surging or swabbing with plungers.
 - 2. Surging with compressed air.
 - 3. High velocity water jetting, or
 - 4. Combinations of the above listed methods.
- B. Pumping is not considered well development.

3.7 DISINFECTION

- A. Well disinfection shall comply with California Department of Water Resources Bulletin 74-81, Water Well Standards.
- B. Inject and circulate a chlorine solution into well so that the chlorine concentration is at least 50 ppm. Do not use granulated HTH for disinfection.
- C. Maintain disinfectant in well for minimum 24 hours.
- D. Positive bacteriological results require repeated well disinfection and samples retaken until negative results are obtained. Contractor shall notify Engineer of positive bacteriological results within 24 hours.

3.8 WATER QUALITY TESTING

- A. Collect water samples (below) during the latter portion of the pump test and submit them to an EPA certified laboratory. Record date, time and temperature of each sample. Conform to all lab-sampling requirements.
- B. Conduct testing for all EPA-regulated primary (microorganisms, inorganic, organic, and radionuclides) and secondary contaminants.
- C. Conduct additional testing for the following parameters:

Alkalinity	Calcium	Corrosivity (Langelier Index)
Hardness (Total)	Hardness (Carbonate)	Silica
- D. Contractor will furnish sample containers.

3.9 TEST PUMPING

- A. Notify Engineer 3 days prior to test pumping.
- B. Discharge shall be measured with an accurate totalizing meter and stopwatch. Discharge shall be maintained within plus or minus 5 percent of the designated rate by means of a gate valve or throttling device.
- C. Select pump capable of running up to 4 times the desired well capacity.
- D. Discharged water shall be pumped from the discharged line to the nearest storm sewer or ditch to prevent recirculation of discharged water into the aquifer being tested as approved by the Engineer. Where no storm sewer or storm ditch is located reasonably nearby, the discharge point should be 200 feet downhill from the well, or 500 feet from the well on flat terrain.
- E. At least 18 hours prior to test pumping, conduct pre-test. Read and record static water level prior to starting pump. Pump well for two hours at each flow rate: 33%, 67% and 100% of its expected yield. During pre-test pumping, record drawdown levels as described below.

- F. Test pumping shall be conducted at multiple flow rates with the minimum flow rate tested of 25% of the desired well capacity (as stated in 1.4.A), and the maximum flow rate up to 5 times the desired well capacity. Test pumping rates and durations shall be approved by the Engineer prior to commencing the testing.
1. Typical flow rates would be at 50%, 75%, 100%, 150% and 200% of the desired well capacity. However, pumping rates may be adjusted higher or lower by the Engineer prior to the start of the pump test to match realistic flow rates the well can achieve.
- G. It is anticipated that test pumping will be performed according to the following schedule:

<u>Predominant Aquifer Material</u>	<u>Total Pumping Time, hrs</u>
Silt or Clay Aquifer	170
Fractured Rock	72 or 240 (per bid schedule)
Fine Sand	30
Medium sand and coarser materials	8

Running the test beyond these times requires Engineer approval.

- H. Measure and record the drawdown and time of reading the test pump form according to the following schedule:
1. First 10 minutes--drawdown recorded every 1 minute.
 2. Next 55 minutes--drawdown recorded every 5 minutes.
 3. Next 2 hours--draw down recorded every 15 minutes.
 4. Final hours--drawdown recorded every 30 minutes.
 5. Final 2 hours (sand) or final 4 hours (silt, clay or rock)—flow rate and drawdown should be steady state. If not, consult Engineer whether to extend length of time of pump test or retest at a lower flow rate after allowing well to recover to static level.
- I. Record drawdown measurements at a given flow rate until the water level stabilizes for one hour. Each time period shall be a minimum of 4 hours unless otherwise approved by Engineer. Stabilization shall be less than 6 inches of drop in water level over an uninterrupted 60 minute period.
- J. Immediately upon completion of the test pumping, take recovery measurements and record them on the Aquifer Test Data form (form attached). The recovery readings to be measured according to the following schedule:
1. First 5 minutes--recovery readings every 1-minute.
 2. Next 55 minutes--recovery reading every 5 minutes.
 3. Final hours--recovery reading every 15 minutes.
- K. Recovery readings are for 4 hours or until the water level recovers to within 1 foot of the static water level, whichever comes first.
- L. If for any reason the pump is shut down for more than 10 minutes, the test shall be terminated. The well shall be allowed to rest for a period equal to the time tested or until the water level recovers to within 1 foot of the static water level, whichever comes first.

3.10 DESTRUCTION

- A. Destroy wells when there is insufficient capacity, unsatisfactory water quality, poor alignment, loss of tools, or other unforeseen problems.
- B. Adhere to State and local health department rules and regulations for well destruction.
- C. Well destruction due to contamination, poor alignment, loss of tools, or any other cause attributable to the Contractor, will be conducted at the Contractor's expense. Costs for well drilling and construction costs associated with such improperly constructed wells shall also be borne by the Contractor.

3.11 INSTALLATION - PUMP

- A. Install according to manufacturer's instructions.
- B. Secure pump lifting cable to pump. Install pump onto threaded riser pipe.
- C. Set pump intake to depth below finished grade recommended by Engineer.
- D. Secure wiring harness to pump column at 20 foot intervals.
- E. Install a check valve 20 feet above pump and immediately above well casing.
- F. Install pitless unit to set pump discharge 3 feet below finished grade.

3.12 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Alignment: In accordance with AWWA A100, well must permit passage of a 40 foot dummy through its entire depth.
- C. Maximum Offset From Indicated Position: 1 inch.

3.13 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Sand Content: not to exceed 5 ppm. If sand content is above 5 ppm, continue development until it is below 5 ppm.

END OF SECTION

SECTION 33 51 00

LIQUID PROPANE-GAS DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings.
 - 2. Ball valves.
 - 3. Pressure regulating valves.
 - 4. Propane storage tanks.
 - 5. Underground pipe markers.
 - 6. Bedding and cover materials.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete: Foundations for storage tanks.
 - 2. Section 31 23 16 - Excavation: For tank foundation excavation requirements.
 - 3. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B16.3 - Malleable Iron Threaded Fittings.
 - 2. ASME B16.11 - Forged Steel Fittings - Socket-Welding and Threaded.
 - 3. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
 - 4. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - 5. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
 - 6. ASME B16.33 - Manually Operated Metallic Gas Valves for Use in Gas Piping Systems Up to 125 psig (sizes 1/2 - 2).
 - 7. ASME B31.8 - Gas Transmission and Distribution Piping Systems.
 - 8. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
 - 9. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- B. ASTM International:
 - 1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- C. National Fire Protection Association:
 - 1. NFPA 58 - Liquefied Petroleum Gas Code.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit data on tank, pipe materials, pipe, fittings, valves and accessories.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of pipe mains, valves, connections, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

- A. Welding Materials and Procedures: Conform to ASME Section IX and applicable state regulations.
- B. Conform to NFPA 58.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS

- A. Steel Pipe Below Ground: ASTM A53/A53M, Grade B, Schedule 40 black:
 - 1. Fittings: ASME B16.11, forged steel, or ASTM A234/A234M forged steel welding type.
 - 2. Joints: welded.
 - 3. Jackets: Double layer, half lapped, 10 mil polyethylene tape.
- B. Steel Pipe Above Ground: ASTM A53/A53M, Grade B, Schedule 40 black:
 - 1. Fittings: ASME B16.3, malleable iron, ASME B16.11, forged steel, or ASTM A234/A234M, forged steel welding type.
 - 2. Joints: Threaded.

2.2 BALL VALVES

- A. Manufacturers:
 - 1. Watts, Model GBV.
 - 2. Apollo, 80-100 Series
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.

- B. 1/4 inch to 1 inch: MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, full port.
- C. Furnish valves with manufacturer's name and pressure rating marked on valve body.

2.3 PRESSURE REGULATING VALVES

- A. Manufacturers:
 - 1. Marshall Excelsior, Model Excelsa-Flo First Stage.
 - 2. RegO, Model Low Pressure Second Stage.
 - 3. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Valves: Single stage, malleable iron body, corrosion-resistant, pressure regulator with atmospheric vent, elevation compensator; with threaded ends for 2 inch and smaller, flanged ends for 2-1/2 inch and larger.
- C. Furnish valves with manufacturer's name and pressure rating marked on valve body.
- D. Capacity: Inlet and outlet gas pressures, specific gravity, and flow rate to match requirements of the generator to be installed under this contract.

2.4 PROPANE STORAGE TANKS

- A. Manufacturers:
 - 1. Trinity Containers, Aboveground domestic.
 - 2. Substitutions Permitted: Section 01 60 00 - Product Requirements.
- B. Construction: NFPA 58, closed, welded steel, tested and stamped in accordance with ASME Section VIII; minimum 250 psig rating; cleaned, prime coated with one coat of rust inhibitive paint and two coats of high gloss enamel. Furnish with steel support saddles, pressure gage; tapping for installation of piping and accessories.
- C. Pipe Bollards: black iron or galvanized steel, 4 in diameter, 6 ft long, buried 3 ft deep (3 ft exposed). Paint post with 2 coats of yellow reflectorized paint. Cap with concrete as required in Drawings.

2.5 UNDERGROUND PIPE MARKERS

- A. Plastic Ribbon Tape: Bright colored, continuously printed, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.6 BEDDING AND COVER MATERIALS

- A. Bedding and Cover: Use crushed stone or gravel that is free of shale, clay, friable material, and debris. Shall meet standard of Imported Pipe Embedment in Section 31 23 17.
- B. Soil Backfill from Above Pipe to Finish Grade: Native Material. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections with threading and unions.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31 23 17.
- B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth, compact to 95 percent.
- C. Backfill around sides and to top of pipe with cover fill, tamped in place and compacted to 95 percent.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPING

- A. Maintain separation of gas line from sewer piping as indicated on Drawings.
- B. Route piping in straight line.
- C. Install piping to conserve space and not interfere with use of site space.
- D. Install piping to allow for expansion and contraction without stressing pipe or joints.
- E. Install valves and other fittings as indicated on Drawings.
- F. Establish elevations of buried piping with not less than 18 inches of cover in non-traveled areas and 36 inches of cover in driveways and parking areas.
- G. Lay pipe on bedding.
- H. Wrap couplings and fittings of steel pipe with polyethylene tape and heat shrink over pipe.
- I. Install plastic ribbon tape continuous over top of pipe buried 6 inches below finish grade, above pipe line; coordinate with Section 31 23 17.

- J. Backfill trench in accordance with Section 31 23 17.

3.5 SERVICE CONNECTIONS

- A. Install sleeve in foundation for gas service main. Seal enlarged sleeve watertight.
- B. Anchor service main to exterior surface of foundation wall.
- C. Install service regulator as indicated on Drawings.
- D. Install regulator vent with rain and insect proof opening, terminating away from building openings.
- E. Install Work in accordance with State of California standards.

3.6 PROPANE TANK INSTALLATION

- A. Excavate for tank foundation in accordance with Section 31 23 16.
- B. Place tank legs on concrete footings, level within tolerance of 2 inches.
- C. Prepare and grade area outside tank perimeter, for distance of 6 feet. Grade, place and compact gravel fill to compacted depth of 3 inches. Compact to 95 percent.
- D. Install relief valve, shutoff valve, pressure regulator, pressure gage and removable protection cover. Install piping, shutoff valve and pressure gage to underground piping.
- E. Set tank regulator to outlet pressure of 10 psig.
- F. Install Work in accordance with State of California standards.

3.7 FIELD QUALITY CONTROL

- A. Pressure test LPG piping in accordance with NFPA 58.
- B. When pressure tests do not meet specified requirements, remove defective work, replace and retest.

END OF SECTION

SECTION 44 10 15

WATER QUALITY MONITORING AND CONTROL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. The Ke-nek water system planned improvements will draw raw water from a surface intake on Owl Creek and an infiltration gallery on Tully Creek. The water will gravity feed through the Owl Creek intake and be pumped from the Tully Creek intake to the treatment train. The water shall be pre-treated through a roughing filter; treated through a slow sand filter bed, then chlorinated, before flowing into storage.

This project shall incorporate water treatment monitoring equipment to meet EPA reporting requirements. This work includes a free chlorine analyzer; a differential pH with temperature sensor; a tank level pressure transducer/transmitter, turbidimeters, and a flow meter transmitter. Power and telephone communications connection points shall be provided by local utility companies.

The water treatment monitoring equipment shall communicate with the Cloud-based SCADA system currently utilized by the Yurok Public Water System. The sensor and monitoring equipment listed in this document shall communicate through the Module Channel Controller, both to pass on information to the SCADA system and to actuate alarms and dosing equipment. All HACH products are to be integrated with the existing CLAROS data system utilized by the Yurok Tribe. MODBUS or 4-20mA-based communication protocols shall be used, or other with engineer approval.

- B. System to be installed from single supplier.

1.2 REFERENCES

- A. National Electric Code
- B. NFPA 79 Electrical Standard for Industrial Machinery
- C. Underwriters Laboratories, Inc. (UL)

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate electrical characteristics and connection requirements, including layout of completed assemblies, interconnecting cabling, dimensions, weights, and external power requirements.

- C. Product Data: Submit catalog data for each component specified showing electrical characteristics and connection requirements.
- D. Test Reports: Indicate procedures and results for specified factory and field testing and inspection.
- E. Manufacturer's Field Reports: Indicate activities on site, adverse findings, and recommendations.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of controller cabinets and input and output devices connected to system. Include interconnection wiring and cabling information, and terminal block layouts in controller cabinets.
- C. Operation and Maintenance Data: Submit bound copies of operating and programming instructions, and include card replacement, adjustments, and preventive maintenance procedures and materials.

1.5 TRAINING

- A. Training program shall educate operators and maintenance personnel with the required level of system familiarity to provide a common working knowledge concerning all significant aspects of the system being supplied.
- B. System supplier shall provide one half day (4 hours) of training.
- C. System supplier shall provide all instructional course material, equipment and manuals to conduct the training program. Tribe shall provide facilities for training.

1.6 GENERAL REQUIREMENTS

- A. All components shall be new, unused and UL listed.
- B. All wiring shall be numbered using an owner approved numbering system.

1.7 ACCEPTANCE

- A. Work covered by this section shall not be accepted until testing connected with this work has been completed satisfactorily.
- B. Work found defective in performance shall be corrected.

PART 2-PRODUCTS

2.1 FREE CHLORINE ANALYZER

- A. Manufacturer and Product List:
 - 1. [Hach CL17sc Colorimetric Chlorine Analyzer or approved equal.](#)

B. Product Info:

1. Measurement: 0 to 5 mg/L (ppm) free residual chlorine;
2. Accuracy: $\pm 5\%$ of reading or ± 0.04 mg/L (ppm), whichever is greater;
3. Precision: 5% of reading or 0.01 mg/L (ppm), whichever is greater;
4. Minimum detection limit: 0.03 mg/L (ppm);
5. Resolution: 0.01 mg/L (ppm);
6. Repeatability: 5% of reading or 0.01 mg/L (ppm), whichever is greater
7. Cycle Time: 2.5 minutes
8. Sample flow rate: 0.9 to 3.2 GPH.
9. Enclosure: IP66 rated, gasketed door latched
10. Frequency of Readings: every 2.5 minutes
11. Power Source: 12VDC, 400mA max. Supplied by module channel controller
12. Analog output: as 4-20mA
13. Communication protocol output: Modbus, Hart
14. LED light source: peak wavelength of 510nm.

2.2 DIFFERENTIAL pH SENSOR

A. Manufacturer and Product List:

1. Hach model pHD-SC pH Sensor or approved equal.
and
2. Hach Differential pH Digital Gateway. Product Number 6120500 or approved equal.
and
3. Hach Flow Cell for 1" NPT Sensor or approved equal.

B. Sensor Product Info:

1. Method of Measuring: probe or sensor with differential electrode measurement technique using 3 electrodes.
2. Internal electrode: non-flowing, foul-resistant characteristics.
3. Temperature Compensator: 300 ohm NTC thermistor. The sensor shall measure and record temperature data for reporting.
4. pH range: -2.0 to 14.0 pH
5. Sensor Temperature range: -5 to 105 Deg C.
6. Sample flow rate: Not to exceed 10 ft/sec.
7. Probe Wetted Material: Ryton.
8. Stainless Steel Model

C. Gateway Product Info:

1. Function: Convert [-1500 to 1500 mV] analog voltage signal from differential pH sensor to [4 to 20 mA] analog current signal, as readable by selected Module Channel Controller

D. Mount Info

1. Hach Flow Cell for 1" NPT Sensor
2. 3/8" Inlet
3. 1/2" Outlet

2.3 TURBIDIMETER

A. Manufacturer and Product List

1. Hach 1720E Low Range Process Turbidimeter or approved equal

B. Product Specifications

1. Alarm: Three-set points alarms
2. Communications: Modbus, Profibus, HART
3. Samples at a programmable rate, with capability for every 15 minutes.
4. Low Measurement Range: 0-40 NTU [$\pm 2\%$ or ± 0.02 NTU, whichever is greater]
5. High Measurement Range: 40-100 NTU [$\pm 5\%$]

2.4 FLOW SWITCH

A. Manufacturer:

1. McMaster-Carr, Compact Insertion Flow Switch for Water
2. [Compact Insertion Flow Switch for Water, 1/2 NPT Male Connection, for 1-1/2 to 8 Pipe Size | McMaster-Carr](#)
3. Substitutions Permitted: Section 01 60 00 - Product Requirements

B. Type:

1. For 4" pipe size
2. Trimmable paddle
3. Flow actuation set points, 4-130 gpm

2.5 MODULE CHANNEL CONTROLLER

A. Manufacturer and Product List:

1. Hach SC1000 Probe Module or approved equal.

B. Product Information:

1. Menu-driven display, with touchpad
2. With alarm capabilities
3. Power: US Power Cord
4. Communication: Modbus, Ethernet, Analog 4-20 mA analog input
5. Connectivity: LAN Ethernet, Cellular 4G, Wi-Fi
6. Data storage card functionality, for software upload and data logging
7. Enclosure: IP65, Metal enclosure with corrosion-resistant finish
8. Up to 12 analog 0-20 mA outputs with a maximum impedance of 500 ohms
9. Remote reading functionality and remote data download
10. Programmable alarm points, formulaic interpretations of signals

C. Accessories and Customizations:

1. With Display Module
2. With Output Module
3. With External Input Module (External DIN Rail Input Module)

PART 3-EXECUTION

3.1 GENERAL SITE INFORMATION

- A. Kenek Water Treatment Plant – Perform all work in accordance with the drawings and technical specifications to connect the monitoring equipment

controller to the Module Channel Controller, and accordingly, the Yurok Public Water System's cloud-based SCADA system

3.2 EXECUTION

A. Free Chlorine Analyzer

1. Must operate unattended for 30 days between chemical reagent changes and measurement cell cleaning.
2. Available control options are:
 - a. On/off control where the concentration alarm outputs activate or deactivate a pump when chlorine levels fall below or exceed acceptable levels.
 - b. Proportional control where the 4-20mA output current is scaled to pace a feed pump proportional to output.
3. Standard SPDT relay alarms, 5 amp resistive loads at 230V AC power, Alarm options: concentration set point, analyzer system warning, and analyzer system shut down.
4. Provide 1 Hach Maintenance Kits for CLF17 Chlorine Analyzer and 11 Hach Free Chlorine Reagent Sets to Owner.

B. Differential pH Sensor

1. Mount the sensor the electrode facing down with 1-inch NPT threads for end of pipe for immersion into vessel.
2. Output: Must be compatible with the SC1000 and existing cloud-based SCADA. If needed, an interface shall be provided to make it compatible.
3. Provide: 2 Salt Bridge Replacements

C. Tank Level Transmitter

1. Mounted to tank outlet to measure water level within the tank, in-line readings
2. To trigger alarm at customizable low-level set point
3. Output: 4-20 mA signal, or as readable by selected module channel controller
 - a. Scaling from empty tank level (4mA) to full tank level (20mA)

D. Turbidimeter

1. Measures combined effluent turbidity of slow sand filter
2. In-line live measurement reading
 - a. Schedulable intervals to log data every 4 hours, or other interval per YPUD
3. Output: 4-20 mA signal, or as readable by selected module channel controller
4. Alarm for exceeding 1 NTU, or as specified by YPUD.

E. Control System

1. Install in accordance with manufacturer's specifications and supplier recommendations.
2. Install in accordance with NEC and state and local codes.
3. Supply surge protection for all control components.
4. Complete testing and training as specified.
5. Provide the PLC and MODBUS programming to establish the control and monitoring parameters.
6. Provide coordination with the MODBUS programmer to provide data address configuration, polling sequence and timing.
7. Monitored values:
 - a. Free Chlorine Residual

- b. pH
 - c. Temperature
 - d. Water Level in Tank
 - e. Flow
 - f. Turbidity (x3)
 - Pre-Roughing Filter
 - Post-Roughing Filter, Pre-Slow Sand Filter
 - Post-Slow Sand Filter
8. Configure DMR system for the Owner using the software included with the product to:
- a. Scale each 4-20 mA input received from the various monitoring instruments (chlorine analyzer, pH sensor, temperature sensor, turbidimeter and tank level transmitter) for viewing/retrieval in standard engineering units.
 - b. Record, time stamp, and save in memory each monitored value at a specified interval
 - normally every 15 minutes or as directed by the Engineer.
- F. Conduit and Wireways:
- 1. Wireways and exposed conduit shall be run parallel to floors and walls.
 - 2. Conduit bends shall be constant radius without wrinkles, made with an appropriate sized bending tool.
 - 3. The total of the bends in a conduit run between junction boxes or pulling elbows shall be less than 360 degrees.
- G. Conduit Support:
- 1. Metallic conduit supports at least every 10 feet and within 3 feet of an outlet box, junction box, cabinet or fitting.
 - 2. Non-metallic conduit supports at least every 3 feet for 1 inch and smaller and every 5 feet for conduit larger than 1 inch.
 - 3. Support shall be one or two hole straps manufactured for the type and size conduit to be supported.
- H. Conduit Cutting:
- 1. Conduit shall be saw cut.
 - 2. Conduit: All sharp edges and burrs to be removed by reaming or filing.
 - 3. Water pipe or nipples shall not be used unless the cut ends are reamed or filed to remove all burrs or sharp edges.
- I. Conductor Protection: Protect conductors at conduit ends, nipples or connections by plastic insulating bushings or insulated throats unless the fitting provides equivalent protection.
- J. Testing and Startup
- 1. All elements of system shall be tested to demonstrate adherence to these Specification.
 - a. System supplier shall provide all special testing, calibration, materials and equipment.
 - b. System supplier shall coordinate and schedule all testing and startup work with the YPUD and Project Engineer.
 - c. Testing shall include requirements as follows:
 - 1) PLC and controls,
 - 2) chlorine analyzer,

- 3) differential pH,
- 4) temperature sensor,
- 5) turbidity sensor,
- 6) flow meter and transmitter,
- 7) and tank level transmitter.
2. Make final settings as directed by YPUD or Project Engineer

K. INPUT/OUTPUT Schedule

1. INPUT: Tank Level Submersible Pressure Transducer
 - a. 4-20 mA signal
2. INPUT: Live Reading Turbidimeter
 - a. 4-20 mA signal
3. INPUT: Free Chlorine Analyzer
 - a. 4-20 mA signal
4. INPUT: pH and Temperature
 - a. 4-20 mA signal
 - 1) The Hach pH/SC sensor outputs the differential pH as a voltage signal, -1500 mV to 1500 mV. The Digital Gateway specified translates this signal to a 4-20mA signal as usable by the specified Module Channel Controller
 - 2) The Hach pH/SC sensor also contains a thermistor for temperature reading and for automatic adjustment of pH reading
5. OUTPUT: Chlorine Chemical Pump Controls
6. OUTPUT: Low Water Alarm
7. OUTPUT: Low Chlorine Alarm
8. OUTPUT: High Turbidity Alarm

END OF SECTION

SECTION 44 44 14
CHEMICAL FEED PUMPS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes the following:
 - 1. Chemical feed pumps with accessories.
- B. Related Sections:
 - 1. Section 26 05 03 - Equipment Wiring Connections: Execution requirements for electrical connections to pumps specified by this section.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit complete information concerning materials of construction and fabrication.
 - 2. Product Data: Submit certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements. Submit manufacturer model number, dimensions, service sizes, and finishes.
- C. Manufacturer's Installation Instructions:
 - 1. Submit detailed instructions on installation requirements including storage and handling procedures, anchoring, and layout.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Submit maintenance instructions for equipment and accessories.

1.4 QUALITY ASSURANCE

- A. Ensure materials of construction on pump liquid end are compatible with chemicals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspect for damage.

- C. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

1.6 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish one year manufacturer's warranty for pumps.

1.7 EXTRA MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for spare parts and maintenance products.
- B. Furnish two complete sets of manufacturer's recommended spare parts for each pump including but not limited to:
 - 1. Two complete rebuild kits for each type of feed pump provided, to include replacement diaphragm, ball check valves, O-rings, and gaskets.
- C. Furnish special tools required for equipment maintenance. Furnish list of equipment and tools needed to maintain and calibrate equipment.

PART 2 PRODUCTS

2.1 CHEMICAL FEED PUMPS

- A. Manufacturers:
 - 1. Liquid Metronics (LMI)
 - 2. Substitutions Permitted, unless otherwise specified in Drawings: Section 01 60 00 - Product Requirements.
- B. Electronically controlled solenoid actuated diaphragm type.
- C. Materials of Construction: PVC head and fittings, ceramic balls, fluorofilm diaphragm, viton seal rings, or as appropriate for chemical being pumped.
- D. Chemical feed pump plug shall have twist lock, so that it can only be energized at appropriate receptacle.
- E. Controls:
 - 1. Pump powered by plug and cord connected to 120 volts, 1 phase short stroke electronically controlled solenoid actuator.
 - 2. Pump stroke length manually adjustable over 3: 1 ratio.
 - 3. Stroke frequency adjustable over 20: 1 ratio.
 - 4. Stroke frequency electronically adjusted by means of integral potentiometer having 0 to 100% calibrated dial.

- F. (Where required in Drawings) Provide analog to digital converter for each pump to convert 4-20mA pacing signal to pulse output signal for controlling pump stroke frequency. Furnish converter with splash and dust proof enclosure and power from pump served. Furnish pump connecting cable with plug and signal input cable in sufficient lengths to meet requirements in Drawings.
- G. Pump Accessories:
 - 1. Furnish combination back pressure and pressure relief valve (four function valve) for each feed pump mounted on discharge end of pump creating back pressure on pump to creating accurate metering, preventing siphoning, relieving excess pressure by bypassing pumped liquid back to storage tank, and enabling depressurizing of pump discharge head and line without removal of discharge tubing or fittings. Valve constructed of PGC or PVDF.
 - 2. Furnish plastic wall mounting shelf for each pump.
 - 3. Furnish one graduated calibration column. Materials of construction compatible with chemicals being used.
- H. Capacity:
 - 1. Location: as shown in Drawings.
 - 2. Chemical Pumped: Liquid sodium hypochlorite, unless otherwise shown in Drawings.
 - 3. Discharge Capacity: as shown in Drawings.
 - 4. Discharge Pressure: as shown in Drawings.

2.2 CHEMICAL SOLUTION TANK

- A. Manufacturers:
 - 1. Liquid Metronics (LMI)
 - 2. Substitutions Permitted, unless otherwise specified in Drawings: Section 01 60 00 - Product Requirements.
- B. Tank capacity as shown in Drawings, polyethylene construction.
- C. Accessories:
 - 1. PVDF chemical feed tubing.
 - 2. Foot valve on chemical feed line inlet in tank.
 - 3. Liquid level switch designed for tank.
 - 4. Tank mixer compatible with chemicals to be stored in tank.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify layout and orientation of pumps, accessories, and piping connections.

3.2 INSTALLATION

- A. Mount pump shelf to wall with stainless steel expansion bolts.
- B. Fasten pump to mounting shelf with stainless steel bolts. Alternately, fastening pump to chemical tank may be approved by Engineer, if tank and pump are manufactured to allow direct mounting.
- C. Install piping accessories in pump suction and discharge as indicated on Drawings.
- D. Connect piping to pump suction and discharge.
- E. Replace electrical plug of pump motor with twist lock fitting.
- F. Install chemical feed injection quill on lower third of horizontal pipe cross section.
- G. Chemical feed pump receptacle to be activated by closure of flow switch and pump starter.
- H. Flush piping with clean water.

3.3 FIELD QUALITY CONTROL

- A. Sections 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Pre-operational Check: Before operating system or components, make the following checks:
 - 1. Vent air from system to assure water in pump.
- C. Start-up and Performance Testing:
 - 1. Determine calibration curves for each pumping unit by plotting capacity versus six different stroke settings between 0 and 100 percent at 10 percent increments. Compute capacities by measuring time to fill or drain calibration column with potable water. Provide one calibration column. Calibration column is to become property of Owner. Size calibration column for two minute run time at largest pump's maximum capacity.
 - 2. Operate each chemical feed system on clear water for continuous period of four hours, under supervision of manufacturer's representative. Demonstrate system control functions and alarms. Utilizing signal generator, demonstrate proper operation of pump pacing.
 - 3. Hydrostatically test system piping for leaks at 150 psig or 120% of maximum operating pressure, whichever is greater.
- D. Equipment Acceptance:
 - 1. Adjust, repair, modify and replace components of system failing to perform and repeat tests.
 - 2. Make final adjustments to equipment under direction of manufacturer's representative.

END OF SECTION