

EAST BAY MUNICIPAL UTILITY DISTRICT

REQUEST FOR QUOTATION (RFQ) No. 2204

for

Briones Center and Orinda WTP Slide Gates

Contact Person: **Jeff Bandy**

Phone Number: **510-287-1846**

E-mail Address: jeff.bandy@ebmud.com

For complete information regarding this project, see RFQ posted at <https://www.ebmud.com/business-center/materials-and-supplies-bids/current-requests-quotation-rfqs/> or contact the EBMUD representative listed above. Please note that prospective bidders are responsible for reviewing this site during the RFQ process, for any published addenda regarding this RFQ.

Bids Due by

1:30 p.m.

on

December 22, 2021

EFFECTIVE IMMEDIATELY: All bid submissions shall be mailed (USPS, FedEx, UPS, etc.) to the address or PO Box noted below and must be received no later than 1:30 p.m. on the bid due date.

<p>RESPONSE DELIVERED BY SERVICE (UPS, FedEx, DHL, etc.) to: EBMUD–Purchasing Division 375 Eleventh Street, First Floor Oakland, CA 94607</p>	<p>RESPONSE DELIVERED BY MAIL (USPS) to: EBMUD–Purchasing Division P.O. Box 24055 Oakland, CA 94623</p>
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NOTE: Bid submissions delivered by hand, via courier or vendor representative, will only be accepted from 12:30-1:30 p.m. on the bid due date noted above at 375 Eleventh Street, Oakland, CA, first floor. No hand delivered bids will be accepted outside of this timeframe.

EAST BAY MUNICIPAL UTILITY DISTRICT

RFQ No. 2204

for

Briones Center and Orinda WTP Slide Gates

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I. STATEMENT OF WORK

A. SCOPE

It is the intent of these specifications, terms, and conditions to provide two (2) 72-in 316 stainless steel slide gates, one (1) 112-in 316 stainless steel slide gate, and one (1) 48-in 316 stainless steel slide gate that meet the requirements of this proposal.

East Bay Municipal Utility District (District) intends to award a contract to the lowest cost bidder(s) whose response meets the District's requirements.

B. BIDDER QUALIFICATIONS

1. Bidder Minimum Qualifications

- a. Bidder, bidder's principal, or bidder's staff shall have been regularly engaged in the business of providing slide gates for at least five (5) years.
- b. Bidder shall possess all permits, licenses, and professional credentials necessary to supply product and perform services as specified under this RFQ.

C. SPECIFIC REQUIREMENTS

1. Fabrication

- a. All metal fabrication of the slide gates shall be of 316 stainless steel except as noted otherwise in the Technical Requirements.

2. Technical Requirements: The products supplied and services provided shall comply with the requirements of the following specifications, drawings and forms:

- Specification Section 01 33 00 – Submittal Procedures
- Specification Section 01 42 19 – Reference Standards
- Specification Section 01 45 27 – Shop Inspections
- Specification Section 01 75 17 – Field Testing and Startup
- Specification Section 01 79 00 – Demonstration and Training
- Specification Section 01 81 02 – Seismic Design Criteria
- Specification Section 05 05 24A – Mechanical Anchoring and Fastening to Concrete and Masonry



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- Specification Section 05 50 00 – Metal Fabrications
- Specification Section 33 12 01 – Basic Mechanical Materials and Methods
- Specification Section 33 12 16.32 – Electric Motor Valve Actuators
- Specification Section 40 05 59.34 – Fabricated Stainless Steel Slide Gates
- Form: Field Functional Test Data
- Form: Manufacturer’s Certification of Proper Installation
- Form: O & M Manual Review Checklist
- Form: Maintenance Summary Form
- Drawing: 4099-G-10 LAFAYETTE TUNNEL NO 2 BRIONES DIVERSION WORKS AND BRIONES PUMPING PLANT PLAN
- Drawing: 4099-g-15 LAFAYETTE TUNNEL NO 2 BRIONES DIVERSION WORKS AND BRIONES PUMPING PLANT DETAIL
- Drawing: 4099-G-15 LAFAYETTE TUNNEL NO 2 GENERAL ARRANGEMENT
- Drawing: 4099-G-38 LAFAYETTE TUNNEL NO 2 SECTIONS & DETAILS
- Drawing: 265-S-001 DIVERSION WORKS SPILLWAY GATES PLAN, SECTIONS, AND DETAILS
- Drawing: 4099-G-18 LAFAYETTE TUNNEL NO 2 DETAILS
- Drawing: 4099-G-42 LAFAYETTE TUNNEL NO 2 ORINDA RAW WATER LINE, INFLUENT CHANNEL SECTIONS AND DETAILS
- Drawing: 510-00E-227 SCHEMATIC DIAGRAM 480V MODULATING ACTUATORS
- Drawing: 510.08-M-002.7 SOUTH RAW WATER CHANNEL PLAN, SECTIONS AND DETAILS

D. SUBMITTALS

See Specification 01 33 00 and Section 40 05 59.34 for additional submittal requirements.



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E. DELIVERY

The equipment shall be delivered to the following locations:

One (1) 114-in width by 114-in height and one (1) 48-in width by 48-in height 316 stainless steel slide gate:

Orinda Water Treatment Plant
190 Camino Pablo
Orinda, CA 94563

Two (2) 72-in width by 84-in height 316 stainless steel slide gates:

Briones Center
470 Manzanita Dr.
Orinda, CA 94563

The District shall schedule all equipment deliveries by means of written notification a minimum of fourteen (14) work days in advance of delivery. Schedule deliveries only between the hours of 8:00 a.m. and 3:00 p.m., Monday through Friday. No deliveries will be accepted on Saturdays, Sundays or District Holidays. The Supplier shall coordinate delivery times and dates with District staff. Contact Jeff Bandy at 510-287-1846 prior to delivery. The District's Contractor shall be responsible for unloading the equipment from the truck and the supplier shall be responsible for delivery to the site.

F. FAILURE TO MEET SPECIFICATIONS

In the event any shipment or shipments of a Contractor's product do not meet the specification or delivery requirements, the District may reject the shipment or shipments and, at its option, may purchase this material from any supplier on the open market who can meet the District's specification requirements or the District may demand immediate replacement by Contractor of the non-conforming product. Any costs over and above the original contract price will be charged back to the Contractor. In addition, Contractor shall bear the costs of removal and disposition for any delivery which fails to conform to the specifications.



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II. CALENDAR OF EVENTS

EVENT	DATE/LOCATION
RFQ Issued	November 24, 2021
Deadline For Submission of Questions or Request for Substitution (Preapproved equal)	December 3, 2021 by 4:30 p.m.
Addendum to Announce Pre-Approved Equivalents (if necessary)	December 7, 2021
Response Due	December 22, 2021, by 1:30 p.m. At this time all bids will be opened publicly in the EBMUD Board Room at 375 Eleventh St., Oakland, CA 94607
Anticipated Contract Start Date	January 25, 2022
Delivery Date	No later than October 3, 2022

Note: All dates are subject to change **by District**.

*Due to COVID-19, in-person bid inspection will be suspended. Following the opening a list of submitted pricing will be posted to:

<https://www.ebmud.com/business-center/materials-and-supplies-bids/>

Bidders are responsible for reviewing <https://www.ebmud.com/business-center/materials-and-supplies-bids/current-requests-quotation-rfqs/> for any published addenda. Hard copies of addenda will not be mailed out.

III. DISTRICT PROCEDURES, TERMS, AND CONDITIONS

A. RFQ ACCEPTANCE AND AWARD

1. RFQ responses will be evaluated to determine that they are responsive, responsible, and that they meet the specifications as stated in this RFQ.
2. The District reserves the right to award to a single or to multiple Contractors, dependent upon what provides the lowest overall cost to the District.
3. The District has the right to decline to award this contract or any part of it for any reason.



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4. Any specifications, terms or conditions, issued by the District, or those included in the bidder's submission, in relation to this RFQ, may be incorporated into any purchase order or contract that may be awarded as a result of this RFQ.
5. Award of contract. The District reserves the right to reject any or all proposals, to accept one part of a proposal and reject the other, unless the bidder stipulates to the contrary, and to waive minor technical defects and administrative errors, as the interest of the District may require. Award will be made or proposals rejected by the District as soon as possible after bids have been opened.

B. BRAND NAMES, APPROVED EQUIVALENTS, DEVIATIONS, AND EXCEPTIONS

Any references to manufacturers, trade names, brand names, and/or catalog numbers are intended to be descriptive, but not restrictive, unless otherwise stated, and are intended to indicate the quality level desired. Bidders may offer an equivalent product that meets or exceeds the specifications.

The District reserves the right to be the sole judge of what shall be considered equal and/or acceptable, and may require the bidder to provide additional information and/or samples. If the bidder does not specify otherwise, it is understood that the brand and/or product referenced in this RFQ will be supplied.

Taking exception to the RFQ, or failure on the part of the bidder to comply with all requirements and conditions of this RFQ, may subject the RFQ response to rejection. If no deviations are shown, the bidder will be required to furnish the material exactly as specified. The burden of proof of compliance with the specifications will be the responsibility of the bidder.

This RFQ is subject to acceptance only on the terms and conditions stated in this RFQ. Any additional or different terms and conditions proposed by the bidder are hereby rejected, and shall be of no force or effect unless expressly assented to in writing by the District.

Proposals for "pre-approved or equal" substitutions requested during the bidding period shall be furnished in writing no later than **December 3, 2021** to:

Purchasing Division, Becky Sharpe (MS#102)
office (510) 287-0644 becky.sharpe@ebmud.com
East Bay Municipal Utility District
P. O. Box 24055



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Proposals shall be accompanied by complete technical and descriptive data necessary to determine equality of the material, product, thing, or service. Samples shall be provided when requested. The burden of proof as to availability, comparative quality, suitability, and performance of the proposed substitution shall be upon the bidder. The bidder will not be reimbursed for any work and costs necessary for making the substitution workable. Proposals will be evaluated and deemed accepted, rejected, or incomplete by the District; the District will be the sole judge as to such matters. **If the substitution is accepted, bidders will be notified by addendum.**

RFQ responses based on equivalent products must use Exhibit A "Exceptions, Clarification and Amendments" to:

- a. Clearly describe the alternate offered and indicate specifically how it differs from the product specified in this RFQ
- b. Include complete descriptive literature and/or specifications as proof that the proposed alternate will be equal to or better than the product named in this RFQ

C. PRICING

1. All prices are to be F.O.B. destination. Any freight/delivery charges are to be included.
2. All prices quoted shall be in United States dollars.
3. Price quotes shall include any and all payment incentives available to the District.
4. Bidders are advised that in the evaluation of cost, if applicable, it will be assumed that the unit price quoted is correct in the case of a discrepancy between the unit price and extended price.

D. NOTICE OF INTENT TO AWARD AND PROTESTS

At the conclusion of the RFQ response evaluation process, all entities who submitted a bid package will be notified in writing by e-mail or USPS mail with the name of the



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Bidder being recommended for contract award. The document providing this notification is the Notice of Intent to Award.

Protests must be in writing and must be received no later than seven (7) work days after the District issues the Notice of Intent to Award. The District will reject the protest as untimely if it is received after this specified time frame. Protests will be accepted from bidders or potential bidders only.

If the protest is mailed and not received by the District, the protesting party bears the burden of proof to submit evidence (e.g., certified mail receipt) that the protest was sent in a timely manner so that it would be received by the District within the RFQ protest period.

Bid protests must contain a detailed and complete written statement describing the reason(s) for protest. The protest must include the name and/or number of the bid, the name of the firm protesting, and include a name, telephone number, email address and physical address of the protester. If a firm is representing the protester, they shall include their contact information in addition to that of the protesting firm.

Protests must be mailed, hand delivered, or emailed to the Manager of Purchasing, Mailstop 102, East Bay Municipal Utility District, 375 Eleventh Street, Oakland, CA 94607 or P.O. Box 24055, Oakland, California 94623. Facsimile and electronic mail protests must be followed by a mailed or hand delivered identical copy of the protest and must arrive within the seven work day time limit. Any bid protest filed with any other District office shall be forwarded immediately to the Manager of Purchasing.

The bid protester can appeal the determination to the requesting organization's Department Director. The appeal must be submitted to the Department Director no later than five work days from the date which the protest determination was transmitted by the District, to the protesting party. The appeal shall focus on the points raised in the original protest, and no new points shall be raised in the appeal.

Such an appeal must be made in writing and must include all grounds for the appeal and copies of the original protest and the District's response. The bid protester must also send the Purchasing Division a copy of all materials sent to the Department Director. The Department Director will make a determination of the appeal and respond to the protester by certified mail in a timely manner. If the appeal is denied, the letter will include the date, time, and location of the Board of Directors meeting at which staff will



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make a recommendation for award and inform the protester it may request to address the Board of Directors at that meeting.

The District may transmit copies of the protest and any attached documentation to all other parties who may be affected by the outcome of the protest. The decision of the District as to the validity of any protest is final. This District's final decision will be transmitted to all affected parties in a timely manner.

E. METHOD OF ORDERING

1. POs and payments for products and/or services will be issued only in the name of Contractor.
2. Any and all change orders shall be in writing and agreed upon, in advance, by Contractor and the District.

F. TERM / TERMINATION / RENEWAL

1. The term of the contract, which may be awarded pursuant to this RFQ, will be 2 years.
2. This Agreement may be terminated for convenience by the District provided the Contractor is given written notice of not less than 30 calendar days. Upon such termination, the District shall pay the Contractor the amount owing for the products ordered and satisfactorily received by the District. This shall be the sole and exclusive remedy to which the Contractor is properly entitled in the event of termination by the District.
3. This Agreement may be terminated for cause at any time, provided that the District notifies Contractor of impending action.

G. WARRANTY

1. For any contract awarded pursuant to this RFQ, Contractor expressly warrants that all goods furnished will conform strictly with the specifications and requirements contained herein and with all approved submittals, samples and/or models and information contained or referenced therein, all affirmations of fact or promises, and will be new, of merchantable quality, free from defects in materials and workmanship, including but not limited to leaks, breaks, penetrations, imperfections, corrosion, deterioration, or other kinds of product deficiencies. Contractor expressly warrants that all goods to be furnished will be



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fit and sufficient for the purpose(s) intended. Contractor expressly warrants that all goods shall be delivered free from any security interest, lien or encumbrance of any kind, and free from any claim of infringement, copyright or other intellectual property violation, or other violation of laws, statutes, regulations, ordinances, rules, treaties, import restrictions, embargoes or other legal requirements. Contractor guarantees all products and services against faulty or inadequate design, manufacture, negligent or improper transport, handling, assembly, installation or testing, and further guaranties that there shall be strict compliance with all manufacturer guidelines, recommendations, and requirements, and that Contractor guaranties that it will conform to all requirements necessary to keep all manufacturer warranties and guarantees in full force and effect. These warranties and guarantees are inclusive of all parts, labor and equipment necessary to achieve strict conformance, and shall take precedence over any conflicting warranty or guarantee. These warranties and guaranties shall not be affected, limited, discharged or waived by any examination, inspection, delivery, acceptance, payment, course of dealing, course of performance, usage of trade, or termination for any reason and to any extent. In the absence of any conflicting language as to duration, which conflicting language will take precedence as being more specific, Contractor's aforesaid warranties and guarantees shall be in full force and effect for a period of one year from the date of acceptance by the District, but shall continue in full force and effect following notice from District of any warranty or guarantee issue, until such issue has been fully resolved to the satisfaction of District.

H. INVOICING

1. Payment will be made within thirty (30) days following receipt of a correct invoice and upon complete satisfactory receipt of product and/or performance of services. The payment shall be made according to the following schedule:
 - a. Ten (10) percent upon approval of design submittals as outlined in Specification Section 40 05 59.34;
 - b. Seventy Five (75) percent upon successful factory observed inspection of the equipment as outlined in Specification Section 40 05 59.34;
 - c. Ten (10) percent upon delivery of equipment and acceptance by the District;



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- d. Five (5) percent upon receipt and District acceptance of all delivery O&M submittals and field assistance as outlined in Specification Section 40 05 59.34 ;
2. The District shall notify Contractor of any invoice adjustments required.
3. Invoices shall contain, at a minimum, District purchase order number, invoice number, remit to address, and itemized products and/or services description.
4. The District will pay Contractor in an amount not to exceed the total amount quoted in the RFQ response.

I. LIQUIDATED DAMAGES

1. A deduction for liquidated damages will be assessed for not meeting District-specified performance requirements as prescribed in this RFQ as follows:
 - a. Liquidated damages of \$500/day after 60 calendar days following award until all pre-fabrication submittals are approved by the District.
 - b. Liquidated damages of \$1500/day after October 3, 2022 until the entire equipment scheduled in this RFQ has been delivered
 - c. Liquidated damages shall be a maximum of 50 percent of the total bid PRICE.
2. It being impracticable or extremely difficult to fix the actual damage, the amount set forth above is hereby agreed upon as liquidated damages and will be deducted from any money due under the agreement arising from this RFQ.
3. In the event performance and/or deliverables have been deemed unsatisfactory, the District reserves the right to withhold future payments until the performance and/or deliverables are deemed satisfactory.

IV. RFQ RESPONSE SUBMITTAL INSTRUCTIONS AND INFORMATION

A. DISTRICT CONTACTS

All contact during the competitive process is to be through the contact listed on the first page of this RFQ. The following persons are to be contacted only for the purposes specified below.



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TECHNICAL SPECIFICATIONS:

Attn: Jeff Bandy, Associate Civil Engineer

EBMUD-Design Division

E-Mail: Jeff.Bandy@ebmud.com

PHONE: 510.287.1846

CONTRACT EQUITY PROGRAM:

Attn: Contract Equity Office

PHONE: 510.287.0114

AFTER AWARD:

Attn: Tim Karlstrand, Senior Civil Engineer

EBMUD-Construction Division

E-Mail: Tim.Karlstrand@ebmud.com

PHONE: 510.287.7205

B. SUBMITTAL OF RFQ RESPONSE

1. Responses must be submitted in accordance with Exhibit A – RFQ Response Packet, including all additional documentation stated in the “Required Documentation and Submittals” section of Exhibit A.
2. Late and/or unsealed responses will not be accepted.
3. RFQ responses submitted via electronic transmissions will not be accepted. Electronic transmissions include faxed RFQ responses or those sent by electronic mail (“e-mail”).
4. **EFFECTIVE IMMEDIATELY:** All bid submissions shall be mailed (USPS, FedEx, UPS, etc.) to the address or PO Box on the following page and must be received no later than 1:30 p.m. on the bid due date.
5. **NOTE:** Bids submissions delivered by hand via courier or vendor representative **will only be accepted from 12:30-1:30 p.m. on the bid due date** on the first floor at 375 Eleventh Street, Oakland, CA. No hand delivered bids will be accepted outside of this timeframe.
6. All RFQ responses must be SEALED and received by 1:30 p.m. on the due date specified in the Calendar of Events. Any RFQ response received after that



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time/date, or at a place other than the stated addresses, cannot be considered and will be returned to the bidder unopened. The EBMUD mailroom and Purchasing Division timestamp shall be considered the official timepiece for the purpose of establishing the actual receipt of RFQ responses.



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7. RFQ responses are to be addressed/delivered as follows:

Mailed (USPS):

East Bay Municipal Utility District
Briones Center and Orinda WTP Slide Gates
RFQ No. 2204
EBMUD–Purchasing Division
P.O. Box 24055
Oakland, CA 94623

Delivered by package delivery service (UPS, FedEx, DHL, etc.):

East Bay Municipal Utility District
Briones Center and Orinda WTP Slide Gates
RFQ No. 2204
EBMUD–Purchasing Division
375 Eleventh Street, First Floor
Oakland, CA 94607

Bidder's name, return address, and the RFQ number and title must also appear on the mailing package.

8. All costs required for the preparation and submission of an RFQ response shall be borne by the bidder.
9. California Government Code Section 4552: In submitting an RFQ response to a public purchasing body, the bidder offers and agrees that if the RFQ response is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2, commencing with Section 16700, of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the RFQ response. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.
10. Bidder expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms “claim” and “knowingly” are defined in the California False Claims Act, Cal. Gov. Code, §12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act.
11. The RFQ response shall remain open to acceptance and is irrevocable for a period of one hundred eighty (180) days, unless otherwise specified in the RFQ documents.
12. It is understood that the District reserves the right to reject any or all RFQ responses.

13. RFQ responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFQ response or part thereof so marked. RFQ responses submitted in response to this RFQ may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.



EXHIBIT A
RFQ RESPONSE PACKET
RFQ No. 2204 – Briones Center and Orinda WTP Slide Gates

To: The EAST BAY MUNICIPAL UTILITY District (“District”)

From: _____
(Official Name of Bidder)

RFQ RESPONSE PACKET GUIDELINES

- **BIDDERS ARE TO SUBMIT ONE (1) ORIGINAL HARDCOPY RFQ RESPONSE WITH ORIGINAL INK SIGNATURES, CONTAINING THE FOLLOWING IN THEIR ENTIRETY:**
 - **EXHIBIT A – RFQ RESPONSE PACKET**
 - **INCLUDING ALL REQUIRED DOCUMENTATION AS DESCRIBED IN “EXHIBIT A-REQUIRED DOCUMENTATION AND SUBMITTALS”**
- **ALL PRICES AND NOTATIONS MUST BE PRINTED IN INK OR TYPEWRITTEN; NO ERASURES ARE PERMITTED; ERRORS MAY BE CROSSED OUT AND CORRECTIONS PRINTED IN INK OR TYPEWRITTEN ADJACENT, AND MUST BE INITIALED IN INK BY PERSON SIGNING THE RFQ RESPONSE.**
- **BIDDERS THAT DO NOT COMPLY WITH THE REQUIREMENTS, AND/OR SUBMIT AN INCOMPLETE RFQ RESPONSE MAY BE SUBJECT TO DISQUALIFICATION AND THEIR RFQ RESPONSE REJECTED IN TOTAL.**
- **IF BIDDERS ARE MAKING ANY CLARIFICATIONS AND/OR AMENDMENTS, OR TAKING EXCEPTION TO ANY PART OF THIS RFQ, THESE MUST BE SUBMITTED IN THE EXCEPTIONS, CLARIFICATIONS, AND AMENDMENTS SECTION OF THIS EXHIBIT A – RFQ RESPONSE PACKET. THE DISTRICT, AT ITS SOLE DISCRETION, MAY ACCEPT AMENDMENTS/EXCEPTIONS, OR MAY DEEM THEM TO BE UNACCEPTABLE, THEREBY RENDERING THE RFQ RESPONSE DISQUALIFIED.**
- **BIDDERS SHALL NOT MODIFY DISTRICT LANGUAGE IN ANY PART OF THIS RFQ OR ITS EXHIBITS, NOR SHALL THEY QUALIFY THEIR RFQ RESPONSE BY INSERTING THEIR OWN LANGUAGE OR FALSE CLAIMS IN THEIR RESPONSE. ANY EXCEPTIONS AND CLARIFICATIONS MUST BE PLACED IN THE “EXCEPTIONS/ CLARIFICATIONS” PAGE, NOT BURIED IN THE PROPOSAL ITSELF.”**



BIDDER INFORMATION AND ACCEPTANCE

1. The undersigned declares that all RFQ documents, including, without limitation, the RFQ, Addenda, and Exhibits, have been read and that the terms, conditions, certifications, and requirements are agreed to.
2. The undersigned is authorized to offer, and agrees to furnish, the articles and services specified in accordance with the RFQ documents.
3. The undersigned acknowledges acceptance of all addenda related to this RFQ.
4. The undersigned hereby certifies to the District that all representations, certifications, and statements made by the bidder, as set forth in this RFQ Response Packet and attachments, are true and correct and are made under penalty of perjury pursuant to the laws of California.
5. The undersigned acknowledges that the bidder is, and will be, in good standing in the State of California, with all the necessary licenses, permits, certifications, approvals, and authorizations necessary to perform all obligations in connection with this RFQ and associated RFQ documents.
6. It is the responsibility of each bidder to be familiar with all of the specifications, terms, and conditions and, if applicable, the site condition. By the submission of an RFQ response, the bidder certifies that if awarded a contract it will make no claim against the District based upon ignorance of conditions or misunderstanding of the specifications.
7. Patent indemnity: Contractors who do business with the District shall hold the District, its Directors, officers, agents, and employees, harmless from liability of any nature or kind, including cost and expenses, for infringement or use of any patent, copyright, or other proprietary right, secret process, patented or unpatented invention, article, or appliance furnished or used in connection with the contract or purchase order.
8. Insurance certificates are not required at the time of submission. However, by signing Exhibit A – RFQ Response Packet, the bidder agrees to meet the minimum insurance requirements stated in the RFQ. This documentation must be provided to the District prior to execution of an agreement by the District, and shall include an insurance certificate which meets the minimum insurance requirements, as stated in the RFQ.
9. The undersigned acknowledges that RFQ responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFQ response or part thereof so marked. RFQ responses submitted in response to this RFQ may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.
10. The undersigned bidder hereby submits this RFQ response and binds itself on award to the District under this RFQ to execute in accordance with such award a contract and to furnish the bond or bonds and insurance required by the RFQ. The RFQ, subsequent Addenda, bidder's Response Packet, and any attachments, shall constitute the Contract, and all provisions thereof are hereby accepted.

11. The undersigned acknowledges **ONE** of the following (please check only one box):

- Bidder is not an SBE and is ineligible for any bid preference; **OR**
- Bidder is an SBE or DVBE as described in the Contract Equity Program (CEP) and Equal Employment Opportunity (EEO) Guidelines, is requesting a 7% bid preference, and has completed the CEP and EEO forms at the hyperlink contained in the CEP and EEO section of this Exhibit A.

For additional information on SBE bid preference, please refer to the Contract Equity Program and Equal Employment Opportunity Guidelines at the above referenced hyperlink.

Official Name of Bidder (exactly as it appears on Bidder's corporate seal and invoice): _____

Street Address Line 1: _____

Street Address Line 2: _____

City: _____ State: _____ Zip Code: _____

Webpage: _____

Type of Entity / Organizational Structure (check one):

- | | |
|--|--|
| <input type="checkbox"/> Corporation | <input type="checkbox"/> Joint Venture |
| <input type="checkbox"/> Limited Liability Partnership | <input type="checkbox"/> Partnership |
| <input type="checkbox"/> Limited Liability Corporation | <input type="checkbox"/> Non-Profit / Church |
| <input type="checkbox"/> Other: _____ | |

Jurisdiction of Organization Structure: _____

Date of Organization Structure: _____

Federal Tax Identification Number: _____

Department of Industrial Relations (DIR) Registration Number: _____

Primary Contact Information:

Name / Title: _____

Telephone Number: _____ Fax Number: _____

E-mail Address: _____

Street Address Line 1: _____

City: _____ State: _____ Zip Code: _____

SIGNATURE: _____

Name and Title of Signer (printed): _____

Dated this _____ day of _____ 20_____



BID FORM(S)

Cost shall be submitted on this Bid Form as is. The prices quoted shall not include Sales Tax or Use Tax; said tax, wherever applicable, will be paid by the District to the contractor, if licensed to collect, or otherwise directly to the State.

No alterations or changes of any kind to the Bid Form(s) are permitted. RFQ responses that do not comply may be subject to rejection in total. The cost quoted below shall be the cost the District will pay for the term of any contract that is a result of this RFQ process.

Quantities listed herein are annual estimates based on past usage and are not to be construed as a commitment. No minimum or maximum is guaranteed or implied.

Description	Manufacturer or Supplier	Unit of Measure	Estimated Quantity	Unit Cost	Extended Cost
114-in W x 114-in H Stainless Steel Slide Gate with Electric Motor Valve Actuator		EA	1	\$	\$
48-in W x 48-in H Stainless Steel Slide Gate with Electric Motor Valve Actuator		EA	1	\$	\$
72-in W x 84-in H Stainless Steel Slide Gate with Electric Motor Valve Actuator		EA	2	\$	\$
Travel Costs and Factory Inspection of Slide Gates and Electric Motor Valve Actuators		LS	1	\$	\$
Factory Representative Inspection and Commissioning of Slide Gates and Electric Motor Valve Actuators		LS	1		
				TOTAL COST	\$



REQUIRED DOCUMENTATION AND SUBMITTALS

All of the specific documentation listed below is required to be submitted with the Exhibit A – RFQ Response Packet. Bidders shall submit all documentation, in the order listed below, and clearly label each section of the RFQ response with the appropriate title (i.e. Table of Contents, Letter of Transmittal, Key Personnel, etc.).

1. **Description of the Proposed Equipment/System:** RFQ response shall include a description of the proposed equipment/system, as it will be finally configured during the term of the contract. The description shall specify how the proposed equipment/system will meet or exceed the requirements of the District and shall explain any advantages that this proposed equipment/system would have over other possible equipment/systems. The description shall include any disadvantages or limitations that the District should be aware of in evaluating the RFQ response. Finally, the description shall describe all product warranties provided by bidder.
2. **Implementation Plan and Schedule:** The RFQ response shall include an implementation plan and schedule. The plan for implementing the proposed equipment/system and services shall include an Acceptance Test Plan. In addition, the plan shall include a detailed schedule indicating how the bidder will ensure adherence to the timetables for the final equipment/system and/or services.
3. **Evidence of Qualification Testing:** RFQ response provides evidence that the proposed equipment/system has successfully completed the qualification test standard requirements defined in this RFQ. Evidence shall include a statement from an Independent Testing Authority (ITA) that both the hardware elements and the software elements of the proposed equipment/system comply with the requirements of the qualification standard. If the equipment/system specified requires the addition of components or features not previously tested by the ITA, the District will determine, in its sole discretion, whether qualification testing of such components or features will be required prior to the award of a contract.
4. **Sustainability Statement:** Contractors shall submit a statement regarding any sustainable or environmental initiatives or practices that they or their suppliers engage in. This information can be in relation to the specific products procured under this RFQ or in relation to the manufacture, delivery, or office practices of your firm.

If applicable, please also provide any information you have available on the below:

- a. Has your firm taken steps to enhance its ability to assess, track and address issues regarding Greenhouse Gas (GHG) Emissions in answer to recent legislations such as the [Buy Clean California Act](#)? If so, please attach any data you can on the embedded greenhouse gas emissions in the production and transport of the products and/or

services which will be provided via this RFQ. If this is not available, please describe the approach you plan to take in order to gather and report this information in the future. For further information in this topic, please see: <http://www.ghgprotocol.org/scope-3-technical-calculation-guidance>

5. **References:**

- (a) Bidders must use the templates in the “References” section of this Exhibit A – RFQ Response Packet to provide references.
- (b) References should have similar scope, volume, and requirements to those outlined in these specifications, terms, and conditions.
 - Bidders must verify the contact information for all references provided is current and valid.
 - Bidders are strongly encouraged to notify all references that the District may be contacting them to obtain a reference.
- (c) The District may contact some or all of the references provided in order to determine Bidder’s performance record on work similar to that described in this RFQ. The District reserves the right to contact references other than those provided in the RFQ response.

6. **Exceptions, Clarifications, Amendments:**

- (a) The RFQ response shall include a separate section calling out all clarifications, exceptions, and amendments, if any, to the RFQ and associated RFQ documents, which shall be submitted with Bidder’s RFQ response using the template in the “Exceptions, Clarifications, Amendments” section of this Exhibit A – RFQ Response Packet.
- (b) **THE DISTRICT IS UNDER NO OBLIGATION TO ACCEPT ANY EXCEPTIONS, AND SUCH EXCEPTIONS MAY BE A BASIS FOR RFQ RESPONSE DISQUALIFICATION.**

7. **Contract Equity Program:**

- (a) Every bidder must fill out, sign, and submit the appropriate sections of the Contract Equity Program and Equal Employment Opportunity documents located at the hyperlink contained in the last page of this Exhibit A. Special attention should be given to completing Form P-25, "Contractor Employment Data and Certification". Any bidder needing assistance in completing these forms should contact the District's Contract Equity Office at (510) 287-0114 prior to submitting an RFQ response.



REFERENCES

RFQ No. 2204 – Briones Center and Orinda WTP Slide Gates

Bidder Name: _____

Bidder must provide a minimum of five references.

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	

Company Name:	Contact Person:
Address:	Telephone Number:
City, State, Zip:	E-mail Address:
Services Provided / Date(s) of Service:	



EXCEPTIONS, CLARIFICATIONS, AMENDMENTS

RFQ No. 2204 - Briones Center and Orinda WTP Slide Gates

Bidder Name: _____

List below requests for clarifications, exceptions, and amendments, if any, to the RFQ and associated RFQ Documents, and submit with bidder’s RFQ response. **The District is under no obligation to accept any exceptions and such exceptions may be a basis for RFQ response disqualification.**

Reference to:			Description
Page No.	Section	Item No.	
p. 23	D	1.c.	<i>Bidder takes exception to...</i>

*Print additional pages as necessary



CONTRACT EQUITY PROGRAM & EQUAL EMPLOYMENT OPPORTUNITY

The District's Board of Directors adopted the Contract Equity Program (CEP) to enhance equal opportunities for business owners of all races, ethnicities, and genders who are interested in doing business with the District. The program has contracting objectives, serving as the minimum level of expected contract participation for the three availability groups: white-men owned businesses, white-women owned businesses, and ethnic minority owned businesses. The contracting objectives apply to all contracts that are determined to have subcontracting opportunities, and to all contractors regardless of their race, gender or ethnicity.

All Contractors and their subcontractors performing work for the District must be Equal Employment Opportunity (EEO) employers, and shall be bound by all laws prohibiting discrimination in employment. There shall be no discrimination against any person, or group of persons, on account of race, color, religion, creed, national origin, ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), genetic information, or sexual orientation.

Contractor and its subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

All Contractors shall include the nondiscrimination provisions above in all subcontracts.

Please include the required completed forms with your bid.

Non-compliance with the Guidelines may deem a bid non-responsive, and therefore, ineligible for contract award. Your firm is responsible for:

- 1) Reading and understanding the CEP guidelines.
- 2) Filling out and submitting with your bid the appropriate forms.

The CEP guidelines and forms can be found at the following direct link:

[**Contract Equity Guidelines and Forms**](#)

The CEP guidelines and forms can also be downloaded from the District website at the following link:

<http://ebmud.com/business-center/contract-equity-program/>

If you have questions regarding the Contract Equity Program please call (510) 287-0114.



EXHIBIT B

INSURANCE REQUIREMENTS

PROPOSER shall take out and maintain during the life of the Agreement all insurance required and PROPOSER shall not commence work until such insurance has been approved by DISTRICT. The proof of insurance shall be on forms provided by DISTRICT directly following these Insurance Requirements.

PROPOSERS are not required to submit completed insurance verification documents with their bid but will be required to submit them upon notification of award. By signing Exhibit A – RFP Response Packet, the Proposer agrees to meet the minimum insurance requirements stated in the RFP.

I. The following provisions applicable to all required insurance:

- A. Prior to the beginning of and throughout the duration of Services, and for any additional period of time as specified below, CONTRACTOR shall, at its sole cost and expense, maintain insurance in conformance with the requirements set forth below.
- B. CONTRACTOR shall provide Verification of Insurance as required by this Agreement by providing the completed Verification of Insurance as requested below signing and submitting this Exhibit B to the DISTRICT. The Exhibit B may be signed by an officer of the CONTRACTOR (Agent) or by the Insurance Broker for the CONTRACTOR. CONTRACTOR shall update Exhibit B throughout the specified term of the insurance required by this Agreement by resubmitting the completed Exhibit B prior to the expiration date of any of the required insurance. The updated Exhibit B shall become a part of the Agreement but shall not require a change order to the Agreement. The Notice to Proceed shall not be issued, and CONTRACTOR shall not commence Services until such insurance has been accepted by the DISTRICT.
- C. CONTRACTOR shall carry and maintain the minimum insurance requirements as defined in this Agreement. CONTRACTOR shall require any subcontractor to carry and maintain the minimum insurance required in this Agreement to the extent they apply to the scope of the services to be performed by subcontractor.
- D. Acceptance of verification of Insurance by the DISTRICT shall not relieve CONTRACTOR of any of the insurance requirements, nor decrease liability of CONTRACTOR.
- E. The insurance required hereunder may be obtained by a combination of primary, excess and/or umbrella insurance, and all coverage shall be at least as broad as the requirements listed in this Agreement.
- F. Any deductibles, self-insurance, or self-insured retentions (SIRs) applicable to the required insurance coverage must be declared to and accepted by the DISTRICT.
- G. At the option and request of the DISTRICT, CONTRACTOR shall provide documentation of its financial ability to pay the deductible, self-insurance, or SIR.
- H. Any policies with a SIR shall provide that any SIR may be satisfied, in whole or in part, by the DISTRICT or the additional insured at its sole and absolute discretion.

I. Unless otherwise accepted by the DISTRICT, all required insurance must be placed with insurers with a current A.M. Best's rating of no less than A- V.

J. CONTRACTOR shall defend the DISTRICT and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier.

K. For any coverage that is provided on a claims-made coverage form (which type of form is permitted only where specified) the retroactive date must be shown and must be before the date of this Agreement, and before the beginning of any Services related to this Agreement.

L. Insurance must be maintained, and updated Verification of Insurance be provided to the DISTRICT before the expiration of insurance by having CONTRACTOR's insurance broker or agent update, sign and return Exhibit B to the DISTRICT's contract manager. For all claims-made policies the updated Verification of Insurance must be provided to the DISTRICT for at least three (3) years after expiration of this Agreement.

M. If claims-made coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the effective date of this Agreement or the start of any Services related to this Agreement, CONTRACTOR must purchase an extended reporting period for a minimum of three (3) years after expiration of the Agreement.

N. If requested by the DISTRICT, a copy of the policies' claims reporting requirement must be submitted to the DISTRICT for review.

O. Where additional insured coverage is required, the additional insured coverage shall be "primary and non-contributory," and will not seek contribution from the DISTRICT's insurance or self-insurance.

P. CONTRACTOR agrees to provide immediate Notice to the DISTRICT of any loss or claim against CONTRACTOR arising out of, pertaining to, or in any way relating to this Agreement, or Services performed under this Agreement. The DISTRICT assumes no obligation or liability by such Notice but has the right (but not the duty) to monitor the handling of any such claim or claims if they are likely to involve the DISTRICT.

Q. CONTRACTOR agrees, upon request by the DISTRICT, to provide complete, certified copies of any policies and endorsements within 10 days of such request (copies of policies may be redacted to eliminate premium details.)

R. It is CONTRACTOR's responsibility to ensure its compliance with the insurance requirements. Any actual or alleged failure on the part of the DISTRICT to obtain proof of insurance required under this Agreement shall not in any way be construed to be a waiver of any right or remedy of the DISTRICT, in this or any regard.

S. Notice of Cancellation/Non-Renewal/Material Reduction The insurance requirements hereunder are mandatory, and the DISTRICT may, at its sole and absolute discretion, terminate the services provided by CONTRACTOR, should CONTRACTOR breach its obligations to maintain the required coverage and limits set forth in this Agreement. No coverage required hereunder shall be cancelled, non-renewed or materially reduced in coverage or limits without the DISTRICT being provided at least thirty (30) days prior written notice, other than cancellation for the non-payment of premiums, in which event the DISTRICT shall be provided ten (10) days prior written notice. Replacement of coverage with another policy or insurer, without any lapse in coverage or any reduction of the stated requirements does not require notice beyond submission to the DISTRICT of an updated Verification of Insurance which shall be met by having the CONTRACTOR's insurance broker or agent update, sign and return this EXHIBIT B.

INSURANCE VERIFICATION DOCUMENTS

II. Workers' Compensation and Employer's Liability Insurance Coverage

- A. Workers' Compensation insurance including Employer's Liability insurance with minimum limits as follows:
- Coverage A. Statutory Benefits Limits
 - Coverage B. Employer's Liability of not less than:
 - Bodily Injury by accident: \$1,000,000 each accident
 - Bodily Injury by disease: \$1,000,000 each employee
 - Bodily Injury by disease: \$1,000,000 policy limit
- B. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.
- C. If there is an onsite exposure of injury to CONTRACTOR, subcontractor, and/or subcontractor's employees under the U.S. Longshore and Harbor Workers' Compensation Act, the Jones Act, or under laws, regulations or statutes applicable to maritime employees, coverage is required for such injuries or claims.
- D. If CONTRACTOR is self-employed, a sole proprietorship or a partnership, with no employees, and is exempt from carrying Workers' Compensation Insurance, CONTRACTOR must return the completed Verification of Insurance confirming that CONTRACTOR has no employees and is exempt from the State of California Workers' Compensation requirements.
- E. If CONTRACTOR is self-insured with respect to Workers' Compensation coverage, CONTRACTOR shall provide to the DISTRICT a Certificate of Consent to Self-Insure from the California Department of Industrial Relations. Such self-insurance shall meet the minimum limit requirements and shall waive subrogation rights in favor of the DISTRICT as stated below in section "F."
- F. Waiver of Subrogation. Workers' Compensation policies, including any applicable excess and umbrella insurance, must contain a waiver of subrogation endorsement providing that CONTRACTOR and each insurer waive any and all rights of recovery by subrogation, or otherwise, against the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers. CONTRACTOR shall defend and pay any and all damages, fees, and costs, of any kind arising out of, pertaining to, or in any way relating to CONTRACTOR's failure to provide waiver of subrogation from the insurance carrier.

Verification of Workers' Compensation and Employer's Liability Insurance Coverage

By checking the box and signing below, I hereby verify that the CONTRACTOR is exempt from the State of California's requirement to carry workers' compensation insurance.

As the CONTRACTOR's insurance broker/agent, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries workers' compensation insurance as required by this Agreement, including the relevant provisions applicable to all required insurance.

Self-Insured Retention: Amount: \$ _____

Policy Limit: \$ _____

Policy Number: _____

Policy Period: from: _____ to: _____

Insurance Carrier Name: _____

Insurance Broker or Agent: Print Name: _____

Insurance Broker or Agent's Signature: _____

III. Commercial General Liability Insurance (“CGL”) Coverage

- A. CONTRACTOR’s insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.
- B. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.
- C. Minimum Requirements. CGL insurance with minimum per occurrence and aggregate limits as follows:
- | | |
|------------------------------------|--|
| Bodily Injury and Property Damage | \$2,000,000 per occurrence & aggregate |
| Personal Injury/Advertising Injury | \$2,000,000 per occurrence & aggregate |
| Products/Completed Operations | \$2,000,000 per occurrence & aggregate |
- D. Coverage must be on an occurrence basis.
- E. Coverage for Products, and Completed Operations, and Ongoing Operations must be included in the insurance policies and shall not contain any “prior work” coverage limitation or exclusion applicable to any Services performed by CONTRACTOR and/or subcontractor under this Agreement.
- F. Insurance policies and Additional Insured Endorsement(s) Coverage shall be included for all premises and operations in any way related to this Agreement.
- G. There will be no exclusion for explosions, collapse, or underground liability (XCU).
- H. Insurance policies and Additional Insured Endorsement(s) shall not exclude liability and damages to work arising out of, pertaining to, or in any way relating to services performed by Subcontractor on CONTRACTOR’s behalf.
- I. Contractual liability coverage shall be included and shall not limit, by any modification or endorsement, coverage for liabilities assumed by CONTRACTOR under this Agreement as an “insured contract.”
- J. Waiver of Subrogation. The policy shall be endorsed to include a Waiver of Subrogation ensuring that the CONTRACTOR and its insurer(s) waive any rights of recovery by subrogation, or otherwise, against the DISTRICT, its directors, board, and committee members, officers, officials, agents, volunteers, and employees. CONTRACTOR shall defend and pay any and all damages, fees, and costs, of any kind, arising out of, pertaining to, or in any way resulting from CONTRACTOR’s failure to provide the waiver of subrogation from its insurance carrier(s).

K. "Independent CONTRACTOR's Liability" shall not limit coverage for liability and/or damages arising out of, pertaining to, or in any way resulting from Services provided under this Agreement.

To the fullest extent permitted by law, the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers must be covered as Additional Insureds on a primary and noncontributory basis on all underlying, excess and umbrella policies that shall be evidenced in each case by an endorsement. The Additional Insureds must be covered for liability arising in whole, or in part, from any premises, Products, Ongoing Operations, and Completed Operations by or on behalf of CONTRACTOR, in any way related to Services performed under this Agreement.

L. A severability of interest provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made, or suit is brought, except with respect to the policies' limit(s).

Verification of Commercial General Liability (CGL) Insurance Coverage

As the CONTRACTOR'S insurance broker/agent, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Commercial General Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance:

Self-Insured: Amount: \$ _____

Policy Limit: Per Occurrence: \$ _____ **Aggregate: \$** _____

Policy Number: _____

Policy Period: from: _____ **to:** _____

Insurance Carrier Name: _____

Insurance Broker or Agent: Print Name: _____

Insurance Broker or Agent's Signature: _____

IV. Business Auto Liability Insurance Coverage

CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.

A. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.

B. Minimum Requirements. Auto insurance with minimum coverage and limits as follows:

Each Occurrence Limit (per accident) and in the Aggregate:	\$2,000,000
Bodily Injury and Property Damage:	\$2,000,000

C. Coverage must include either "owned, non-owned, and hired" autos or "any" automobile

This provision ensures the policy covers losses arising out of use of company-owned vehicles ("owned autos"), employee's personal autos ("non-owned autos" meaning not owned by company/insured) or autos that are rented or leased ("hired autos").

D. If CONTRACTOR is transporting hazardous materials or contaminants, evidence of the Motor Carrier Act Endorsement-hazardous materials clean-up (MCS-90, or its equivalent) must be provided.

E. If CONTRACTOR's Scope of Services under this Agreement exposes a potential pollution liability risk related to transport of potential pollutants, seepage, release, escape or discharge of any nature (threatened or actual) of pollutants into the environment arising out of, pertaining to, or in any way related to CONTRACTOR's and/or Subcontractor's performance under this Agreement, then Auto Liability Insurance policies must be endorsed to include Transportation Pollution Liability insurance. Alternatively, coverage may be provided under the CONTRACTOR's Pollution Liability Policies if such policy has no exclusions that would restrict coverage under this Agreement. Coverage shall also include leakage of fuel or other "pollutants" needed for the normal functioning of covered autos.

F. To the fullest extent permitted by law, the DISTRICT, its directors, board, and committee members, officers, officials, employees, agents, and volunteers must be covered as Additional Insureds on a primary and noncontributory basis on all underlying and excess and umbrella policies. The Additional Insureds must be covered for liability arising in whole, or in part, from any premises, Products, Ongoing Operations, and Completed Operations by or on behalf of CONTRACTOR, in any way related to Services performed under this Agreement.

G. A severability of interest provision must apply for all the Additional Insureds, ensuring that CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made, or suit is brought, except with respect to the insurer's limits of liability.

Verification of Business Auto Liability Insurance Coverage

As the CONTRACTOR'S insurance broker/agent, I hereby verify that I have reviewed and confirmed that the CONTRACTOR carries Business Automobile Liability insurance, as required by this Agreement, including the relevant provisions applicable to all required insurance:

Self-Insured: Amount: \$ _____

Policy Limit: Per Accident/Occurrence \$ _____ Aggregate: \$ _____

Policy Number: _____

Policy Period: from: _____ to: _____

Insurance Carrier Name: _____

Insurance Broker or Agent: Print Name: _____

Insurance Broker or Agent's Signature: _____

GENERAL REQUIREMENTS**CONTENTS**

1. DEFINITIONS
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27. WAIVER OF RIGHTS
28. CONFIDENTIALITY

1. DEFINITIONS

The following terms shall be given the meaning shown, unless context requires otherwise or a unique meaning is otherwise specified.

- a. **"Change Order"** A Change Order is a written instrument used for modifying the contract with regards to the scope of Work, contract sum, and/or Contract Time. An approved Change Order is a Change Order signed by the District. An executed Change Order is a Change Order signed by both the District and the Contractor.

- b. **“Contract”** means the agreement between the District and Contractor as memorialized in the Contract Documents.
- c. **“Business Entity”** means any individual, business, partnership, joint venture, corporation, sole proprietorship, or other private legal entity recognized by statute.
- d. **“Buyer”** means the District’s authorized contracting official.
- e. **“Contract Documents”** comprise the entire agreement between the District and the Contractor and can include the District’s contract form if used, any purchase order, RFP, RFQ or Contractor response packet, and any addenda, appendices and District approved changes or amendments. The Contract Documents are intended to be complementary and include all items necessary for the Contractor’s proper execution and completion of the Work. Any part of the Work not shown or mentioned in the Contract Documents that is reasonably implied, or is necessary or usual for proper performance of the Work, shall be provided by the Contractor at its expense.
- f. **“Contractor”** means the Business Entity with whom the District enters into a contractual agreement. Contractor shall be synonymous with “supplier”, “vendor”, “consultant” or other similar term.
- g. **“Day”** unless otherwise specified, days are calendar days, measured from midnight to the next midnight.
- h. **“District”** means the East Bay Municipal Utility District, its employees acting within the scope of their authority, and its authorized representatives.
- i. **“Goods”** means off the shelf software and all types of tangible personal property, including but not limited to materials, supplies, and equipment.
- j. **“Project Manager”** shall be the District designated individual responsible for administering and interpreting the terms and conditions of the Contract Documents, for matters relating to the Contractor’s performance under the Contract with the District, and for liaison and coordination between the District and Contractor.
- k. **“Work”** means all labor, tasks, materials, supplies, and equipment required to properly fulfill the Contractor’s obligations as required in the Contract Documents.
- l. **“Work Day”** Unless otherwise specified, work day includes all days of the year except Saturdays, Sundays and District holidays.

2. BOND

- a. When required in the District’s bid or proposal solicitation documents, the Contractor to whom award is made shall furnish a good and approved faithful performance bond and/or payment bond within ten business days after receiving the forms for execution.
- b. The bonds shall be executed by a sufficient, admitted surety insurer (i.e.: as listed on website [http://interactive.web.insurance.ca.gov/webuser/idb_co_list\\$.startup](http://interactive.web.insurance.ca.gov/webuser/idb_co_list$.startup)) admitted to transact such business in California by the California Department of Insurance. After acceptance of the bond(s) by the District, a copy of the bond(s) will be

returned to the Contractor.

- c. If, during the continuance of the Contract, any of the sureties, in the opinion of the District, are or become irresponsible, the District may require other or additional sureties, which the Contractor shall furnish to the satisfaction of the District within ten days after notice. If the Contractor fails to provide satisfactory sureties within the ten-day period, the Contract may be terminated for cause under Article 18.

3. CONTRACTOR'S FINANCIAL OBLIGATION

The Contractor shall promptly make payments to all persons supplying labor and materials used in the execution of the contract.

4. SAMPLES OR SPECIMENS

The Contractor shall submit samples or prepare test specimens of such materials to be furnished or used in the work as the Project Manager may require.

5. MATERIAL AND WORKMANSHIP

- a. All goods and materials must be new and of the specified quality and equal to approved sample, if samples have been required. In the event any goods or materials furnished or services provided by the Contractor in the performance of the Contract fail to conform to the requirements, or to the sample submitted by the Contractor, the District may reject the same, and it shall become the duty of the Contractor to reclaim and remove the item promptly or to correct the performance of services, without expense to the District, and immediately replace all such rejected items with others conforming to the Contract. All work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission from these specifications or the drawings, and it shall be the duty of the Contractor to call attention to apparent errors or omissions and request instructions before proceeding with the work. The Project Manager may, by appropriate instructions, correct errors and supply omissions, which instructions shall be binding upon the Contractor as though contained in the original Contract Documents.
- b. All materials furnished and all Work must be satisfactory to the Project Manager. Work, material, or machinery not in accordance with the Contract Documents, in the opinion of the Project Manager, shall be made to conform.

6. DEFECTIVE WORK

The Contractor shall replace at its own expense any part of the work that has been improperly executed, as determined by the Project Manager. If Contractor refuses or neglects to replace such defective work, it may be replaced by the District at the expense of the Contractor, and its sureties shall be liable therefor.

7. WARRANTY

Contractor expressly warrants that all goods furnished will conform strictly with the specifications and requirements contained herein and with all approved submittals, samples and/or models and information contained or referenced therein, all affirmations of fact or promises, and will be new, of merchantable quality, free from defects in materials and

workmanship, including but not limited to leaks, breaks, penetrations, imperfections, corrosion, deterioration, or other kinds of product deficiencies. Contractor expressly warrants that all goods to be furnished will be fit and sufficient for the purpose(s) intended. Contractor expressly warrants that all goods shall be delivered free from any security interest, lien or encumbrance of any kind, and free from any claim of infringement, copyright or other intellectual property violation, or other violation of laws, statutes, regulations, ordinances, rules, treaties, import restrictions, embargoes or other legal requirements. Contractor guarantees all products and services against faulty or inadequate design, manufacture, negligent or improper transport, handling, assembly, installation or testing, and further guaranties that there shall be strict compliance with all manufacturer guidelines, recommendations, and requirements, and that Contractor guaranties that it will conform to all requirements necessary to keep all manufacturer warranties and guarantees in full force and effect. These warranties and guarantees are inclusive of all parts, labor and equipment necessary to achieve strict conformance, and shall take precedence over any conflicting warranty or guarantee. These warranties and guarantees shall not be affected, limited, discharged or waived by any examination, inspection, delivery, acceptance, payment, course of dealing, course of performance, usage of trade, or termination for any reason and to any extent. In the absence of any conflicting language as to duration, which conflicting language will take precedence as being more specific, Contractor's aforesaid warranties and guarantees shall be in full force and effect for a period of **one** year from the date of acceptance by the District, but shall continue in full force and effect following notice from District of any warranty or guarantee issue, until such issue has been fully resolved to the satisfaction of District.

8. NOT USED

9. SAFETY AND ACCIDENT PREVENTION

In performing work under the Contract on District premises, Contractor shall conform to any specific safety requirements contained in the Contract or as required by law or regulation. Contractor shall take any additional precautions as the District may reasonably require for safety and accident prevention purposes. Any violation of such rules and requirements, unless promptly corrected, shall be grounds for termination of this Contract or Contractor's right to precede in accordance with the default provisions of the Contract Documents.

10. CHARACTER OF WORKFORCE

The Contractor shall employ none but skilled competent qualified personnel to perform the Work, and shall maintain discipline and order in the conduct of the Work at all times.

11. PREVAILING WAGES & DIR REGISTRATION

- a. Please see www.dir.ca.gov for further information regarding the below.
- b. All Contractors and Subcontractors of any tier bidding on, or offering to perform work on a public works project shall first be registered with the State Department of Industrial Relations (DIR) pursuant to Section 1725.5 of the Labor Code. No bid will be accepted nor any contract entered into without proof of the Contractor and Subcontractors' current registration with the DIR (LC § 1771.1).
- c. All public works projects awarded after January 1, 2015, are subject to compliance monitoring and enforcement by the DIR (LC § 1771.4) and all Contractors are required

to post job site notices, "as prescribed by regulation" (LC § 1771.4).

- d. To the extent applicable, pursuant to Section 1773 of the Labor Code, the District has obtained from the Director of Industrial Relations of the State of California, the general prevailing rates of per diem wages and the general prevailing rates for holiday and overtime work in the locality in which the Work is to be performed, for each craft, classification, or type of worker needed to execute the contract. Pursuant to Section 1773.2 of the Labor Code, a copy of the prevailing wage rates is on file with the District and available for inspection by any interested party at www.dir.ca.gov.
- e. The holidays upon which such rates shall be paid shall be all holidays recognized in the collective bargaining agreement applicable to the particular craft, classification, or type of worker employed on the Work.
- f. The Contractor shall post a copy of the general prevailing rate of per diem wages at the jobsite pursuant to Section 1773.2 of the Labor Code.
- g. Pursuant to Section 1774 of the Labor Code, the Contractor and any of its Subcontractors shall not pay less than the specified prevailing rate of wages to all workers employed in the execution of the contract.
- h. As set forth with more specificity in Section 1773.1 of the Labor Code, "per diem" wages include employer payments for health and welfare, pension, vacation, travel, subsistence and, in certain instances, apprenticeship or other training programs, and shall be paid at the rate and in the amount spelled out in the pertinent prevailing wage determinations issued by the Director of Industrial Relations.
- i. The Contractor shall, as a penalty to the State or the District, forfeit not more than the maximum set forth in Section 1775 of the Labor Code for each calendar day, or portion thereof, for each worker paid less than the prevailing rates for the work or craft in which the worker is employed under the contract by the Contractor or by any Subcontractor under him. The difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which such worker was paid less than the stipulated prevailing wage rate shall be paid to such worker by the Contractor.
- j. The specified wage rates are minimum rates only and the District will not consider and shall not be liable for any claims for additional compensation made by the Contractor because of its payment of any wage rate in excess of the general prevailing rates. All disputes in regard to the payment of wages in excess of those specified herein shall be adjusted by the Contractor at its own expense.
- k. General prevailing wage determinations have expiration dates with either a single asterisk or a double asterisk. Pursuant to California Code of Regulations, Title 8, Section 16204, the single asterisk means that the general prevailing wage determination shall be in effect for the specified contract duration. The double asterisk means that the predetermined wage modification shall be paid after the expiration date. No adjustment in the Contract Sum will be made for the Contractor's payment of these predetermined wage modifications.

12. PAYROLL RECORDS & ELECTRONIC SUBMISSION

- a. The Contractor and each Subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed in connection with the Work. The payroll records shall be certified and shall be available for inspection in accordance with the provisions of Section 1776 of the Labor Code. Certified payroll records shall be on the forms provided by the DIR or contain the same information required on the Department's form.
- b. The Contractor shall submit for each week in which any contract Work is performed a copy of all payroll records to the Project Manager. The Contractor shall be responsible for submission of copies of payroll records of all Subcontractors.
- c. The Contractor or Subcontractor shall certify the payroll records as shown on the DIR form. In addition, the records shall be accompanied by a statement signed by the Contractor or Subcontractor certifying that the classifications truly reflect the Work performed and that the wage rates are not less than those required to be paid.
- d. For public works projects awarded on or after April 1, 2015, or that are still ongoing after April 1, 2016, no matter when awarded, each Contractor and Subcontractor shall furnish the certified payroll related records as more specifically described above and in Labor Code section 1776 directly to the Labor Commissioner (see LC § 1771.4). These records shall be provided to the Labor Commissioner at least monthly or more frequently if required by the terms of the Contract. For exception on projects covered by collective bargaining agreements like a PLA, please see Labor Code section 1771.4.
- e. In the event of noncompliance with the requirements of Section 1776 of the Labor Code, the Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects such Contractor must comply with said Section. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1776 of the Labor Code for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due.
- f. The Contractor and every Subcontractor shall post at the workplace and comply with all required wage related workplace postings. Copies of the required postings may be downloaded or ordered electronically from the Department of Industrial Relations website at <http://www.dir.ca.gov/wpnodb.html>.

13. HOURS OF LABOR

Pursuant to the provisions of Sections 1810, et seq. of the Labor Code and any amendments thereof:

- a. Eight hours of labor constitutes a legal day's Work under the contract.

- b. The time of service of any worker employed upon the work shall be limited and restricted to eight hours during any one calendar day, and forty hours during any one calendar week except as provided in Article 13.iv below.
- c. The Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1813 of the Labor Code for each worker employed in the execution of the contract by the Contractor or by any Subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any calendar day and forty hours in any one calendar week in violation of this Article and the provisions of Labor Code, Sections 1810, et seq.
- d. Work performed by employees of the Contractor in excess of eight hours per day, and forty hours during any one calendar week, shall be permitted upon compensation for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay.
- e. The Contractor and every Subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the Work; the record shall be kept open at all reasonable hours to the inspection of the District and to the Division of Labor Standards Enforcement of the State of California.

14. EMPLOYMENT OF APPRENTICES

- a. In the performance of the contract, the Contractor and any Subcontractor shall comply with the provisions concerning the employment of apprentices in Section 1777.5 of the Labor Code and any amendments thereof.
- b. In the event the Contractor or any Subcontractor willfully fails to comply with the aforesaid section, such Contractor or Subcontractor shall be subject to the penalties for noncompliance in Labor Code, Section 1777.7.

15. CHANGES

- a. Changes in the Work can only be made in writing signed by an authorized employee of the District. If the change causes an increase or decrease in the contract sum, or a change in the time for performance under the Contract, an adjustment may be made as determined by the Project Manager.
- b. The District reserves the right to make changes in the design of materials, equipment, or machinery, to make alterations or additions to or deviations or subtractions from the Contract and any specifications and drawings, to increase or decrease the required quantity of any item or portion of the Work or to omit any item or portion of the Work, as may be deemed by the Project Manager to be necessary or advisable and to order such extra work as may be determined by the Project Manager to be required for the proper execution and completion of the whole Work contemplated. Any such changes will be ordered in writing by the Project Manager. The determination of the Project Manager on all questions relating to changes, including extra work, shall be conclusive and binding.

- c. Prior to issuing an amendment or change to the Contract, the Project Manager may request that the Contractor submit a proposal covering the changes. Within 10 business days of receiving the request, the Contractor shall submit its proposal to the Project Manager of all costs associated with the proposed amendment or change and any request for an extension of Contract time. Contractor's proposal shall include detailed estimates with cost breakdowns, including labor, material, equipment, overhead, and profit. Labor shall be broken down into hours and rate per hour. If applicable, the proposal shall include a breakdown for off-site labor (including factory labor, engineering, etc.). The Contractor's proposal shall include an analysis of schedule impact when the Contractor is requesting an adjustment in contract time. The Contractor shall be responsible for any delay associated with its failure to submit its change proposal within the time specified. If the Project Manager decides not to issue an amendment or change after requesting a proposal from the Contractor, the Contractor will be notified in writing. The Contractor is not entitled to reimbursement for Change Order preparation costs if the Contractor's proposal is not accepted by the Project Manager.

- d. If the Contractor agrees with the terms and conditions of the approved Change Order, the Contractor shall indicate its acceptance by signing the original copy and returning it to the Project Manager within 10 Work Days after receipt or with reasonable promptness and in such sequence as to not delay the Work or activities of the District or of separate contractors, whichever is sooner. If notice of any change is required to be given to a surety by the provisions of any bond, the Contractor shall provide notice and the amount of each applicable bond shall be adjusted separately. Payment in accordance with the terms and conditions set forth in the executed Change Order shall constitute full compensation for all Work included in the Change Order and the District will be released from any and all claims for direct, indirect, and impact expenses and additional time impact resulting from the Work. If the Contractor disagrees with the terms and conditions of the approved Change Order, the Contractor shall indicate specific areas of disagreement and return the approved Change Order to the Project Manager with a detailed written dispute. No payment will be made on the disputed work until the approved Change Order is returned to the Project Manager. However, whether or not the Contractor agrees with the terms and conditions of an approved Change Order, the Contractor shall immediately revise its sequence of operations as required to facilitate timely completion of the changed work and shall proceed with the revised work sequence.

- e. The Project Manager may, after having received a written cost quotation from the Contractor, order the Contractor, in writing, to proceed with the work prior to issuance of an approved Change Order through a change directive. The change directive will authorize the Contractor to proceed with the work subject to the cost quotation submitted by the Contractor. Within five days following receipt of the change directive, the Contractor shall submit a detailed change proposal documenting the amount of compensation. The Project Manager will review the change proposal and, at its option, will either issue an approved Change Order for the work or direct the Contractor to perform the work through Force Account. Until the method of compensation is determined and the approved Change Order is received, the Contractor shall keep full and complete time and material records of the cost of the ordered work and shall permit the Project Manager to have access to such records. An approved Change Order shall supersede any previously issued written change directive covering the same Work.

16. EFFECT OF EXTENSIONS OF TIME

The granting, or acceptance, of extensions of time to complete the Work or furnish the labor, supplies, materials or equipment, or any one of the aforementioned, will not operate as a release of Contractor or the surety on Contractor's faithful performance bond.

17. DELAYS

- a. The Contractor shall take reasonable precautions to foresee and prevent delays to the Work. When the Contractor foresees a delay event, and upon the occurrence of a delay event, the Contractor shall immediately notify the Project Manager of the probability or the actual occurrence of a delay, and its cause. With respect to all delays (compensable, excusable or inexcusable), the Contractor shall reschedule the Work and revise its operations, to the extent possible, to mitigate the effects of the delay. Within 15 days from the beginning of a delay the Contractor shall provide the Project Manager with a detailed written description of the delay, its cause, its impact and the Contractor's mitigation plans. Failure to provide the notification required above waives the Contractor's right to any additional time or compensation resulting from the delay for whatever cause. The Project Manager will investigate the facts and ascertain the extent of the delay, and the Project Manager's findings thereon shall be final and conclusive, except in the case of gross error. An extension of time must be approved by the Project Manager to be effective, but an extension of time, whether with or without consent of the sureties, shall not release the sureties from their obligations, which shall remain in full force until the discharge of the contract.
- b. For inexcusable delays (delays caused by circumstances within the Contractor's control, the control of its subcontractors or supplies of any tier, or within the scope of the Contractor's contract responsibilities) the Contractor shall not be entitled to an extension of time or additional compensation for any loss, cost, damage, expense or liability resulting directly or indirectly from the inexcusable delay.
- c. For excusable delays (delays to completion of the Work within the time limits set forth in the Contract Documents directly caused by events beyond the control of both the Contractor and the District, which delay is not concurrent with an inexcusable delay and which could not have been avoided by the Contractor through reasonable mitigation measures).
- d. For compensable delays (delays to completion of the Work within the time limits set forth in the Contract Documents that could not be avoided by Contractor mitigation, caused directly and solely by the District or by causes within the exclusive control of the District, and which were not concurrent with any other type of delay) the Project Manager will grant the Contractor an extension of the time to perform under the Contract and compensation in an amount that represents the Contractor's actual direct costs incurred as a direct result of the compensable delay. The Contractor may recover its direct costs only and may not recover (and waives) all other types of indirect, consequential, special and incidental damages.
- e. For concurrent delays (two or more independent causes of delay directly preventing the Contractor from completing the Work within the time limits set forth in the Contract Documents where the delays occur at the same time during all or a portion of the delay period being considered, and where each of the delays would have caused delay to the

Contractor even in the absence of any of the other delays, and none of the delays could have been avoided by Contractor mitigations) the following rules apply:

- i. One or more of the concurrent delays are excusable or compensable, then the period of concurrent delay will be treated as an excusable delay; and
- ii. All of the concurrent delays are inexcusable, then the period of concurrent delay will be inexcusable.

18. TERMINATION

a. Termination by the District for Cause:

- i. District may terminate the Contractor's right to proceed under the Contract, in whole or in part, for cause at any time after the occurrence of any of the following events, each of which constitutes a default:
 - 1. The Contractor becomes insolvent or files for relief under the bankruptcy laws of the United States.
 - 2. The Contractor makes a general assignment for the benefit of its creditors or fails to pay its debts as the same become due.
 - 3. A receiver is appointed to take charge of the Contractor's property.
 - 4. The Contractor fails to supply skilled supervisory personnel, an adequate number of properly skilled workers, proper materials, or necessary equipment to prosecute the Work in accordance with the Contract Documents.
 - 5. The Contractor fails to make progress so as to endanger performance of the Work within the contractually required time.
 - 6. The Contractor disregards legal requirements of agencies having jurisdiction over the Work, the Contractor, or the District.
 - 7. The Contractor fails to provide the District with a written plan to cure a District identified default within five business days after the District's request for a plan to cure; the District does not accept the Contractor's plan for curing its default; or the Contractor does not fully carry out an accepted plan to cure.
 - 8. The Contractor abandons the Work. Abandonment is conclusively presumed when the District requests a written plan to cure a default and the Contractor does not submit the plan within five business days of the District's request.

9. The Contractor materially fails to meet its obligations in accordance with the Contract Documents.
10. The Contractor is in default of any other material obligation under the Contract Documents.

- ii. If any of the above events occur, the District may, in its discretion, require that the Contractor submit a written plan to cure its default, which plan must be provided to the District within 5 business days of the request and must include a realistic, executable plan for curing the noted defaults.
- iii. Upon any of the occurrences referred to in Article 18.a.i. above, the District may, at its election and by notice to the Contractor, terminate the Contract in whole or in part; accept the assignment of any or all of the subcontracts; and then complete the Work by any method the District may deem expedient. If requested by the District, the Contractor shall remove any part or all of the Contractor's materials, supplies, equipment, tools, and machinery from the site of the Work within seven days of such request; and, if the Contractor fails to do so, the District may remove or store, and after 90 days sell, any of the same at the Contractor's expense.
- iv. No termination or action taken by the District after termination shall prejudice any other rights or remedies of the District provided by law or by the Contract Documents.
- v. Conversion: If, after termination for other than convenience, it is determined that the Contractor was not in default or material breach, or that the default or material breach was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for convenience pursuant to Article 18.b. below.

b. Termination by the District for Convenience:

- i. The District may, at its option, and for its convenience, terminate the Contract at any time by giving written notice to the Contractor specifying the effective date of termination. Upon such termination, the Contractor agrees to comply with the notice and further agrees to waive any claims for damages, including loss of anticipated profits, on account of the termination; and, as the sole right and remedy of the Contractor, the District shall pay the Contractor as set forth below.
- ii. Upon receipt of a notice of termination for convenience, the Contractor shall, unless the notice directs otherwise, do the following:

1. Immediately discontinue its performance of the Contract to the extent specified in the notice.
 2. Place no further orders or subcontracts for materials, equipment, services, or facilities, except as may be necessary for completion of a portion of the Work that is not discontinued or that is necessary for an orderly cessation of the Work.
 3. Promptly cancel, on the most favorable terms reasonably possible, all subcontracts to the extent they relate to the performance of the discontinued portion of the Work.
 4. Thereafter, do only such Work as may be necessary to preserve and protect Work already in progress and to protect materials, plants, and equipment in transit to or on the site of performance.
- iii. Upon such termination for convenience, the District will pay to the Contractor the sum of the following:
1. The amount of the contract sum allocable to the portion of the Work properly performed by the Contractor as of the effective date of termination, less sums previously paid to the Contractor.
 2. Previously unpaid costs of any items delivered to the project site that were already fabricated for subsequent incorporation into the Work.
 3. Any proven losses with respect to materials and equipment directly resulting from the termination.
 4. Reasonable demobilization costs.
- iv. The above reimbursement is the sole and exclusive remedy to which the Contractor is entitled in the event the contract is terminated for convenience; and the Contractor expressly waives any other claims, damages, demands, compensation or recovery related to this contract or project. The Contractor agrees to sign a general release incorporating this waiver.
- c. Effect of Termination: Upon termination, the obligations of the Contract shall continue as to portions of the Work already performed and, subject to the Contractor's obligations under Article 18.b.ii, as to bona fide obligations assumed by the Contractor prior to the date of termination.
- d. Force Majeure: If the contract is suspended or terminated by the District because Contractor's performance is prevented or delayed by an event including an irresistible, superhuman cause, or by the act of public enemies of the State of

California or of the United States (“Force Majeure”) , the Contractor will be paid for Work performed prior to the Force Majeure event at either (i) the unit prices named in the Contract; or (ii) in the event no unit prices are named, a sum equal to the percentage of the total contract amount that matches the percentage of the total contract Work performed prior to the Force Majeure event.

19. DAMAGES

All losses or damages to material or equipment to be furnished pursuant to the Contract Documents occurring prior to receipt and final acceptance of the Work shall be sustained by the Contractor. The Contractor shall sustain all losses arising from unforeseen obstructions or difficulties, either natural or artificial, encountered in the prosecution of the Work, or from any action of the elements prior to final acceptance of the work, or from an act or omission on the part of the Contractor not authorized by the Contract Documents.

20. ORDER OF PRECEDENCE

- a. In the case of conflicts, errors, or discrepancies in any of the Contract Documents, the order of precedence is as follows. Within the same order of precedence, specific requirements shall take precedence over general requirements.
 - i. Approved Change Orders.
 - ii. Addenda.
 - iii. RFQ or RFP.
 - iv. Referenced Standard Specifications and Drawings.
 - v. Contractor’s Response Packet.
- b. With reference to drawings:
 - i. Numerical dimensions govern over scaled dimensions.
 - ii. Detailed drawings govern over general drawings.
 - iii. Addenda/Change Order drawings govern over contract drawings.
 - iv. Contract drawings govern over standard drawings.
 - v. Notes apply only to the drawing where the notes appear, unless classified as “typical” or intended to apply elsewhere in which case they apply to all drawings where the conditions or circumstance noted occurs.
 - vi. Typical details apply to all drawings unless a specific different detail is shown.

21. INDEMNIFICATION/RESPONSIBILITY

- a. Contractor shall indemnify, keep and save harmless the District and each of its directors, officers, agents and employees against any and all suits, claims or actions arising out of

any of the following:

- i. Any injury to persons or property that may occur, or that may be alleged to have occurred, arising from the performance or implementation of this Contract; or
 - ii. Any allegation that materials or services developed, provided or used for this Contract infringe or violate any copyright, trademark, patent, trade secret, or any other intellectual-property or proprietary right of any third party.
- b. Contractor further agrees to defend any and all such actions, suits or claims and pay all charges of attorneys and all other costs and expenses of defenses as they are incurred. If any judgment is rendered, or settlement reached, against the District or any of the other agencies or individuals enumerated above in any such action, Contractor shall, at its expense, satisfy and discharge the same.
- c. This indemnification shall survive termination or expiration of the Contract.

22. PROHIBITION OF ASSIGNMENT

The Contractor shall not assign, transfer, or otherwise dispose of any of its rights, duties or obligations under this Contract. This prohibition does not apply to the District. The District retains the right to assign this Contract in whole or in part at any time upon reasonable terms.

23. NEWS RELEASES

The Contractor, its employees, subcontractors, and agents shall not refer to the District, or use any logos, images, or photographs of the District for any commercial purpose, including, but not limited to, advertising, promotion, or public relations, without the District's prior written consent. Such written consent shall not be required for the inclusion of the District's name on a customer list.

24. SEVERABILITY

Should any part of the Contract be declared by a final decision by a court or tribunal of competent jurisdiction to be unconstitutional, invalid or beyond the authority of either party to enter into or carry out, such decision shall not affect the validity of the remainder of the Contract, which shall continue in full force and effect, provided that the remainder of the Contract can be interpreted to give effect to the intentions of the parties.

25. COVENANT AGAINST GRATUITIES

The Contractor warrants that no gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor, to any officer or employee of the District with a view toward securing the Contract or securing favorable treatment with respect to any determinations concerning the performance of the Contract. For breach or violation of this warranty, the District shall have the right to terminate the Contract, either in whole or in part, and any loss or damage sustained by the District in procuring on the open market any items which Contractor agreed to supply shall be borne and paid for by the Contractor. The rights and remedies of the District provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or in

equity.

26. RIGHTS AND REMEDIES OF THE DISTRICT

The rights and remedies of the District provided herein shall not be exclusive and are in addition to any other rights and remedies provided by law or under the Contract.

27. WAIVER OF RIGHTS

Any action or inaction by the District or the failure of the District on any occasion, to enforce any right or provision of the Contract, shall not be construed to be a waiver by the District of its rights and shall not prevent the District from enforcing such provision or right on any future occasion. Rights and remedies are cumulative and are in addition to any other rights or remedies that the District may have at law or in equity.

28. CONFIDENTIALITY

Contractor agrees to maintain in confidence and not disclose to any person or entity, without the District's prior written consent, any trade secret or confidential information, knowledge or data relating to the products, process, or operation of the District. Contractor further agrees to maintain in confidence and not to disclose to any person or entity, any data, information, technology, or material developed or obtained by Contractor during the term of the Contract. The covenants contained in this paragraph shall survive the termination of this Contract for whatever cause.



EXHIBIT D IRAN CONTRACTING ACT CERTIFICATION

Pursuant to Public Contract Code (PCC) § 2204, an Iran Contracting Act Certification is required for solicitations of goods or services of \$1,000,000 or more.

To submit a bid or proposal to East Bay Municipal Utility District (District), you must complete **ONLY ONE** of the following two paragraphs. To complete paragraph 1, check the corresponding box **and** complete the certification for paragraph 1. To complete paragraph 2, check the corresponding box and attach a copy of the written permission from the District.

- 1. We are not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services (“DGS”) pursuant to PCC § 2203(b), and we are not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

CERTIFICATION FOR PARAGRAPH 1:

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the BIDDER/bidder to the clause in paragraph 1. This certification is made under the laws of the State of California.

Firm: _____

By: _____ Date: _____
(Signature of Bidder)

Title: _____

Signed at: _____ County, State of: _____

OR

- 2. We have received written permission from the District to submit a bid or proposal pursuant to PCC § 2203(c) or (d). *A copy of the written permission from the District is included with our bid or proposal.*

EXHIBIT E - TECHNICAL SPECIFICATIONS, DRAWINGS AND FORMS

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. The requirements of this section apply to all submittals in the Contract Documents.
2. Submit samples, drawings, and data for the Engineer's approval which demonstrate fully that the construction, and the materials and equipment to be furnished will comply with the provisions and intent of this Specification. All submittals shall be written in Standard American English and all numerical data, whether in drawings, test reports, engineering calculations, manufacturer's literature, or maintenance manuals, shall be in United States Customary System (USCS) measuring units (foot, pound, gallons, etc). If original design work was completed in metric units, their equivalent USCS dimension and unit shall be indicated. All submittals, in printed or electronic format, shall be original quality and completely legible. Any obfuscation or loss of clarity of original which may result in ambiguous interpretation is not acceptable.
3. Specific items to be covered by the submittals shall include, as a minimum, the following:
 - a. For mechanical equipment submit all data pertinent to the installation and maintenance of the equipment including shop drawings, manufacturer's recommended installation procedure, detailed installation drawings, test data and curves, maintenance manuals, and other details necessary.
 - b. Substitutions.

1.2 PRODUCT HANDLING

- A. Submittals shall be accompanied by a letter of transmittal and shall be in strict accordance with the provisions of this section.
- B. Compact disks or DVDs shall be packaged in a hard plastic case. The case and media, or the USB flash drive exterior, shall be labeled as to content.
- C. Submit materials to the EBMUD Materials Testing Laboratory when so specified. Submit other submittals to Construction Division, EBMUD, in accordance with Article 3.1 unless specified otherwise.

1.3 SUBMITTALS

- A. Submittals shall include the following information:
1. A copy of the applicable section(s), with addendum updates included as appropriate, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
 2. A check mark shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer is the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications.
- B. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
- C. Any deviation from the contract documents not specifically requested and clearly identified, although accepted through oversight, may be rejected at any stage of the Work. The Contractor shall, at his own expense, reconstruct all work affected by the later rejection of a contract deviation that was not specifically called and explained for review and acceptance by the District as detailed above.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

- A. Scale required:
1. Make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.
- B. Type of prints required:
1. Make all shop drawing prints in blue or black line on white background. Reproductions of District drawings are not acceptable.
- C. Size of drawings required:
1. The overall dimensions of each drawing submitted to the Engineer shall be equal to one of the District's standard sheet sizes as listed below. The title block shall be located in the lower right hand corner of each drawing and shall be clear of all linework, dimensions, details, and notes.

Sheet Sizes
Height x Width

11" x 8-1/2"
11" x 17"
22" x 34"

- D. Stamp or permanently print on each drawing “Reference EBMUD Drawing _____” and enter the pertinent drawing number.

2.2 MANUFACTURERS' LITERATURE

- A. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.
- B. Clearly mark the literature with the materials and options being provided to illustrate conformance with the specification details.
- C. Provide the complete part number and include the legend containing the descriptive details that define the meaning of each digit of the number.

2.3 SUBSTITUTIONS

- A. Engineer's approval required:
1. The contract is based on the materials, equipment, and methods described in the Contract Documents. Any Contractor-proposed substitutions are subject to the Engineer's approval.
 2. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data, and all other information required by the Engineer to evaluate the proposed substitution.
 3. Where substitutions are proposed for consideration, Contractor shall submit a written request for the substitution and shall show that it is equal to the specified item. The proposed substitution shall be identified separately and included with the required submittal for the item. When submitting a variation or substitution the Contractor warrants that:
 - a. The contract has been reviewed to establish that the substitution, when incorporated, will be compatible with other elements of work.
 - b. The Contractor shall perform all necessary work for making substitutions workable and shall bear any additional cost necessary because of the proposed substitution.

4. Substitutions not specifically requested, although accepted through oversight, may be rejected at any stage of the work. The Contractor shall, at his own expense, reconstruct all work affected by the later rejection of a substitution that was not specifically requested.
- B. Trade names and "or equal as approved by the Engineer" provision:
1. See Article 4.4 of the General Conditions.
 2. See Instructions To Bidders, Article 3, for proposals for "or equal" substitutions pursuant to PCC Section 3400.

2.4 OPERATIONS AND MAINTENANCE MANUALS

- A. See "Table 1: O&M Manual Summary" at the end of this section.
- B. The provisions of this article are considered minimal requirements and do not supersede any requirements in individual sections of this specification.
- C. When O&M manuals are required to be submitted covering items included in this work, prepare all such manuals in approximately 8-1/2" x 11" format in durable, three ring plastic binders. Each manual shall be identical and include at a minimum information identified on the O&M Manual Review Checklist attached in Appendix A. In addition, furnish the following:
1. Binder Cover: Identification on, or readable through, the front cover stating the District's specification (project) number and project title, District facility or facilities where the equipment will be installed, specification section number, and the system or equipment described in the manual.
 2. Binder Spine Label: Include the system or equipment name as shown on the binder cover along with the specification section number.
 3. Title page including applicable equipment tag numbers and equipment manufacturer's name, address, telephone number, and the submittal date. In addition, provide name, address and telephone number of the local manufacturer's representative.
 4. Table of contents organized and referenced to manual section dividers.
 5. Complete instructions regarding storage, handling, installation, operation, servicing, and maintenance of all equipment involved.
 6. Comprehensive replacement parts list, with complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.
 7. Detailed description of handling, replacement, and disposal of all fluids and replacement parts.

8. Copies of Safety Data Sheets (SDS) as required.
 9. Copies of all guarantees and warranties issued including the start and end dates for the warranty period or conditions for the initial start date and the duration.
 10. Copies of drawings with all data concerning changes made during construction.
 11. Copies of calculations or reports appropriately prepared including sketches, given or known information with the source of the data, equations with each variable defined and applicable units, cross-references, code/standard references, annotations and footnotes.
 12. All field and factory test data.
 13. Engineering calculations or reports pertinent to the content of the O&M manual. See Article 2.5 Engineering Calculations or Reports.
 14. Provide a separate section with tab divider for documents developed in the field after the O&M manual has been approved. These documents include, but not limited to the following: manufacturer's certificate of proper installation, field test results, etc.
- D. Materials shall be word-processed.
- E. For mechanical or electrical equipment that require O&M manuals: provide separate O&M manuals for each piece of equipment installed at each site. Title the O&M manuals to denote which site the equipment pertains to.
- F. Manufacturer's literature shall be originals, or original quality copies. Specifically identify all equipment models and features being provided. Delete or cross out any extra information provided in standard manufacturer's literature that does not apply to the equipment furnished.
- G. Operating and Testing Procedures, and Diagrams: All manufacturers' standard procedures shall be customized or rewritten as necessary to accurately describe the system as it is installed and operated for the project. Procedures shall include District device tag numbers (as shown on the P&IDs) whenever available. All diagrams illustrating the system shall be customized to show installed conditions, and shall include District device tag numbers whenever available.
- H. Three-hole punch shall not obliterate any information. Reduce original material as necessary to provide a suitable margin for three-hole punching or provide three-hole punched clear plastic pockets for inserting single sheet material.
- I. O&M Manual Review Checklist:
1. The manufacturer's representative shall fill out a minimum of one O&M Manual Review Checklist form per submittal (See Appendix A) and include a

copy in each submitted manual. Provide more than one checklist when specified in the technical specification sections. Clearly identify the location in the O&M Manual for each element in the Technical Content section (O&M tab number and page number). If the content is in multiple locations or on multiple pages, identify each location in the space provided or in the Comments column on the form.

2. All portions of the form shall be completed prior to submittal, or the submittal may be returned unreviewed. Submittals may also be returned unreviewed if the O&M Manual Checklist form contains multiple error and/or omissions.

J. O&M Manual Review Process:

1. Preliminary O&M Manuals: Submit preliminary O&M manuals as searchable Portable Document Format (PDF) per Section 01 31 23.10 for review. The District will return the submittals to the Contractor along with comments identifying necessary corrections or additions to the manuals. The District reserves the right to keep possession of all O&M manuals, and have the Contractor arrange to correct the manuals to comply with the reviewer comments.
 - a. Preliminary O&M manuals shall be submitted and accepted prior to the delivery of the respective equipment or system.
2. Final O&M Manuals:
 - a. The manuals shall not be considered final until the submittal has received an "Approved" review status.
 - 1) Submit the Final O&M Manuals per the requirements of Paragraph 2.6.C.
 - 2) Submit requested number of Final O&M Manual hard copies as shown in Table 1 at the end of this section.
 - 3) Final O&M manuals shall be submitted and approved, prior to Ready for Service milestone.

K. Electronic Files:

1. After the District has approved each O&M Manual, two copies of an electronic version shall be supplied in addition to the required number of hard copies.
2. Electronic files shall be created in both searchable Portable Document Format (PDF) compatible with Adobe Acrobat version XI and Word format compatible with Microsoft Word 2010. The security features (e.g., password protection) of all submitted files shall be disabled so that the District can perform future editing without restriction. Custom-developed drawings included in the O&M manuals (i.e., loop diagrams, system interconnection

diagrams, etc.) shall also be submitted electronically in both PDF and the native CAD file format for future editing of the drawings by the Engineer. For CAD files, the associated PDF files shall be saved such that all CAD layering is preserved in the PDF file.

3. Electronic versions shall match the hard copy page for page with blank pages deleted. Electronic files shall be converted to PDF directly rather than using optical scanning. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide searching capability in the document.
4. All electronic files shall be supplied to the Engineer on USB flash drives, along with the approved O&M manuals.

L. Maintenance Summary Forms:

1. Furnish a completed Maintenance Summary Form (see Appendix A for typical format) as part of the O&M Manual. Include all typical, routine, or preventive maintenance required to ensure satisfactory performance during warranty period and longevity of the equipment. Manufacturer's representative shall sign and date the form certifying accuracy of the information.
2. Briefly summarize each maintenance activity on the form. Specific references to more detailed maintenance information located elsewhere in the O&M manual may be placed in the "Comments" column. However, simply referencing other sections in the O&M manual without a brief description of the maintenance activity is not acceptable.
3. Information on the form shall be word-processed, or typewritten.
4. Maintenance Summary Forms shall be on 8-1/2 inch by 11-inch paper and may be as many pages as required to completely summarize the required maintenance. However, the order and format must be in accordance with the supplied form. The Maintenance Summary Forms will be provided in electronic format (MS Word) upon request.

2.5 ENGINEERING CALCULATIONS OR REPORTS

- A. Engineering calculations/reports required by this specification shall be based on well-established engineering theories and principles. Each calculation/report shall be a complete and independent package.
- B. The calculations/reports shall be comprehensive for each structure or item, in that all calculations/reports are contained within the individual structure or item's calculation/report document (i.e., no calculation/report references to other calculation documents).

- C. Presentation format shall be similar to that described in Article 2.6 – Operations and Maintenance Manuals. As a minimum, all calculations/reports shall be bound in an appropriately labeled binder, and contain the following elements:
1. Facility title, including substructure number, equipment description, applicable equipment tag number(s), and applicable specification section.
 2. Table of Contents.
 3. Introduction, including description of structure or item, purpose of calculation/report, design assumptions with justification, software utilized for the analysis including the version, and codes/standards used.
 4. A list of references used to provide the bases for assumptions, equations, or data used in the calculation/report.
 5. Calculations or reports appropriately prepared, including sketches, given or known information with the source of the data, equations with each variable defined and applicable units, cross-references, code/standard references, annotations and footnotes.
 6. Results shall be clearly identified. Summary tables shall be used for large amounts of data (especially if a software application is used).
 7. Final design details, ready for transmittal to design drawings or shop drawings.
 8. Professional Engineer’s Seal or signature, as appropriate, of the individual(s) who prepared the calculations/reports.
 9. Appendices, including input and output files from computer design, and photocopies of catalog sheets for any special material or equipment (e.g., manufacturer sheet for equipment, ICBO reports for anchors, etc.), and checker markups.
- D. When any part of the calculation/report has been prepared by computer software, a copy of the input and output files shall be included as part of the final design calculation.
- E. Shop drawings shall not be submitted until all design calculations/reports have been appropriately reviewed, checked and signed. The checker markups and comments shall also be included in an appendix to each calculation.

2.6 SUBMITTAL QUANTITIES

- A. Submit four (4) copies of all data and drawings unless specified otherwise.
- B. Submit one (1) electronic copy of the scanned data and drawings in searchable PDF (compatible with Adobe Acrobat version XI). Submit scanned copy on EADOC.

- C. Submit three (3) of each sample, unless specified otherwise.
- D. Submit five (5) copies of each manual unless specified otherwise.
- E. Submit quantity specified of materials submitted to the EBMUD Materials Testing Laboratory.

2.10 ELECTRONIC SUBMITTALS

- A. Provide electronic submittals in searchable PDF (compatible with Adobe Acrobat version XI). All portions of the electronic submittals shall be legible and shall be in full color identical to the original material. Provide manufacturer's literature in original electronic file, if available.
- B. Provide one electronic submittal file for each submittal except as noted hereinafter. The electronic submittal file name shall use the following format: submittal number – specification section number - description (e.g.: “001.1-01 33 00-Coating of Widgets”). Providing multiple electronic files for a single submittal (except as noted hereinafter) is not acceptable. The Contractor shall merge multiple files into a single electronic file.
- C. For larger submittals containing multiple volumes, submit one electronic file for each hardcopy volume and each electronic submittal file name shall include the corresponding hard copy volume number (e.g. “001.1-01 33 00-Coating of Widgets – Volume 3”).
- D. Upon acceptance of the electronic submittal (noted as Approved, Accepted, Approved as Noted, or Acknowledged Receipt), submit three (3) hardcopy sets of the submittal. The hardcopies shall be edited with highlighting, addressing/incorporating District review comments. A revised electronic file shall accompany the hardcopy submission, and shall match the hard copy submittal page for page including cover transmittal forms, title pages, and blank pages.
- E. Exceptions requiring hardcopy material initially, are:
 - 1. O&M processing, per Article 2.6.
 - 2. As-built processing, per Section 01 78 39 – As-Built Drawings.
 - 3. When hardcopy material is originally in a form larger than 11” x 17”; the material shall not only be included in the electronic submittal, but shall also be submitted in hardcopy form along with the original electronic submittal required in Paragraphs A and B above. Seven (7) submittal copies of the large materials shall be provided.
- F. The Contractor is solely responsible for verifying that the hardcopy submittal and accompanying electronic submittal are identical and address/incorporate prior Engineer review comments.

- G. All portions of the electronic submittals shall be provided with text searching capabilities whenever possible. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide text searching capability in the document.
- H. Electronic files shall be submitted to the Engineer on EADOC or in the following manner, if required by the Engineer:
 - 1. For files 10 MB or less, one copy via email, with the subject line matching the file name.
 - 2. For files more than 10 MB, provide three copies on USB flash drives.

2.11 REVIEW CHECKLISTS

- A. Review Checklists are required for some specification sections (when specified in the section) and for all O&M manual submittals.
- B. Each submittal requiring review checklists shall comply with the following:
 - 1. Each page of the submittal shall include a unique and sequential page number. The page numbers shall be located in the same general location on each page.
 - 2. Page numbering may include “point numbers” (10.1, 10.2, etc.) to facilitate inserting pages without renumbering an entire submittal. However, all pages in the submittal shall be in numerical order.
 - 3. The review checklists shall be completed in its entirety with accurate page number references for each checklist item. Submittals with inaccurate review checklists may be returned without review for correction.
 - 4. The review checklist shall be inserted at the beginning of the submittal.

PART 3 - EXECUTION

3.1 GENERAL

- A. Prepare and use a transmittal form for submittals that includes the following information:
 - 1. *Project name and specification number
 - 2. *Date of submittal
 - 3. *"To: Construction Division, MS #62
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055
ATTN: Office Engineer”

4. *"From:" Name and address of Contractor
5. Name and address of subcontractor
6. Name and address of supplier
7. Name of manufacturer
8. *Spec. Section, Article Number, Paragraph and Subparagraph Number and/or drawing number and detail references
9. Location of use
10. *Submittal number
11. *Signature and title of transmitter
12. *Original submittal or resubmittal

Note: All transmittals shall include asterisked items as a minimum to be acceptable for review.

- B. Use the "Item Number" on the Schedule of the Submittal for the corresponding submittal number. On a resubmittal, add a numerical suffix to the original submittal number. For example, 6.1 indicates the first resubmittal of submittal Number 6.
- C. Use a separate transmittal form for each specific item or class of material or equipment within a division for which a submittal is required. Transmittal of a submittal of multiple items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or when items are so functionally related that review of the group as a whole is appropriate.
- D. If a submittal contains multiple items, then each item shall be clearly labeled throughout the submittal, or indexed in a manner eliminating confusion in identifying how each item relates to the whole. When submittal items have been assigned a "District equipment tag number" in the contract documents, each tag number shall be included throughout the submittal to clearly associate the specific submittal information to specific tag numbers.
- E. Stamp or permanently print on each submittal the following certification statement.

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated into Specification Number **Error!** **Reference source not found.** is in compliance with the Contract drawings and specifications, can be installed in the allocated spaces, and is submitted for District (record/approval).

Certified by _____ Date _____ "

3.2 TIMING OF SUBMITTALS

A. General:

1. Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
2. In scheduling, unless otherwise noted, allow at least twenty (20) work days for the Engineer's review, plus the transit time to and from the District office.
3. Timing of the submittal of As-Built drawings shall conform to Article **Error! Reference source not found.**

3.3 APPROVAL BY ENGINEER

A. Approval of each submittal by the Engineer will be general only and shall not be construed as:

1. Permitting any departures from the contract requirements.
2. Relieving the Contractor of the responsibility for any errors and omissions in details, dimensions, or of other nature that may exist.
3. Approving departures from additional details or instructions previously furnished by the Engineer.

B. One copy of each submittal, except manuals and as-built drawings, will be returned to the Contractor marked "Approved", "Approved as Noted", "Revise and Resubmit", or "Acknowledged Receipt", except that in some cases, all copies of a submittal may be returned to the Contractor marked "Returned without Review".

1. "Approved" indicates that item covered by the submittal may proceed provided it complies with requirements of the specifications. Final acceptance will depend upon that compliance.
2. "Approved as Noted" indicates that item covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the specifications. Final acceptance will depend on that compliance.
3. "Revise and Resubmit" indicates that the Contractor shall not proceed with any phase of the item covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations and requirements of the specifications.

4. "Acknowledged Receipt" indicates that the item is required to be submitted to the Engineer primarily for information or record purposes, and is not subject to Engineer's review.
 5. "Returned without Review" indicates that the submittal was not reviewed by the Engineer due to the submittal being incomplete, illegible, inadequate, or otherwise failing to conform to the requirements of the specification. Contractor shall prepare a new submittal for this item.
- C. Resubmit revised drawings or data as indicated, in seven (7) copies unless otherwise specified.
 - D. Work requiring the Engineer's approval shall not begin until the submittals for that work have been returned as "Approved" or "Approved as Noted".
 - E. Proposals for "or equal" substitutions shall be made in accordance with Section 01 61 00 – Common Product Requirements, Article 1.3.

3.4 CHANGES TO APPROVED SUBMITTALS

- A. A resubmittal is required for any proposed change to a submittal that has been "Approved" or "Approved as Noted". Changes which require resubmittal include, but are not limited to, drawing revisions, changes in materials and equipment, changes to installation procedures and test data. All resubmittals shall include an explanation of the necessity for the change.
- B. Minor corrections to an approved submittal may be accomplished by submitting a "Corrected Copy".

3.5 O&M MANUAL SUMMARY LIST

- A. Table 1 is a summary of equipment/systems that require O&M manuals. Additional O&M manuals might be required when specified elsewhere.

Table 1: O&M Manual Summary (Additional O&M manuals might be required in other Sections)		
Section	System / Equipment, or Facility	No. of Hard Copy(ies) to Print
40 05 59.34	Fabricated Stainless Steel Slide Gates	2

END OF SECTION

SECTION 01 42 19

REFERENCE STANDARDS

1.1 GENERAL

A. Referenced Standards:

The standards referred to, except as modified, shall have full force and effect as though printed in this Specification, and shall be the latest edition or revision thereof in effect on the bid opening date, unless a particular edition or issue is indicated. Copies of these standards are not available from the District. Abbreviations and terms, or pronouns in place of them, shall be interpreted as follows:

AASHTO:	American Association of State Highway and Transportation Officials, Standard Specifications
ACI:	American Concrete Institute, Standards
AEIC:	Association of Edison Illuminating Companies
AISC:	American Institute of Steel Construction, Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings, and the AISC Code of Standard Practice
AITC:	American Institute of Timber Construction
AMCA:	Air Movement and Control Association International, Standards
ANSI:	American National Standards Institute
APA:	American Plywood Association
API:	American Petroleum Institute
APWA:	American Public Works Association, Standard Specifications for Public Works Construction
ASA:	Acoustical Society of America
ASCE:	American Society of Civil Engineers
ASHRAE:	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME:	American Society of Mechanical Engineers
ASTM:	ASTM International, Standards
ASNT:	American Society for Nondestructive Testing Standards

ATIS:	Alliance for Telecommunications Industry Solutions
AWPA:	American Wood-Preservers' Association, Standards
AWS:	American Welding Society
AWWA:	American Water Works Association, Standards
CARB:	California Air Resources Board
CBC:	California Building Code
CCR:	California Code of Regulations
CEC:	California Electrical Code, California Energy Commission
CFR:	Code of Federal Regulations
CISPI:	Cast Iron Soil Pipe Institute, Standards
CMAA:	Crane Manufacturers' Association of America
CRSI:	Concrete Reinforcing Steel Institute, Standards
CSA:	Canadian Standards Association
CSS:	CalTrans Standard Specifications, State of California, Department of Transportation
DOSH:	Division of Occupational Safety and Health, State of California, Department of Industrial Relations
EIA	Electronic Industries Alliance
EUSERC	Electric Utility Service Equipment Requirements Committee
FS:	Federal Specification
GSA:	United States General Services Administration
HI:	Hydraulic Institute
IBC:	International Building Code
ICC:	International Code Council
ICEA:	Insulated Cable Engineers Association
IEC:	International Electrotechnical Commission
IEEE:	Institute of Electrical and Electronic Engineers

ISA:	The International Society of Automation
ISO:	International Organization for Standardization
LIA:	Laser Institute of America
MSS:	Manufacturers Standardization Society
NAAMM:	National Association of Architectural Metal Manufacturers
NACE:	NACE International, Standards
NEC:	National Electrical Code
NECA:	National Electrical Contractors Association
NEMA:	National Electrical Manufacturers' Association, Standards
NERC:	North American Electric Reliability Corporation
NESC:	National Electrical Safety Code
NETA:	International Electrical Testing Association
NFPA:	National Fire Protection Association
NSF:	National Sanitation Foundation/NSF International
OSHA	U.S. Department of Labor, Occupational Safety and Health Administration.
PG&E:	Pacific Gas and Electric Company
PUC:	Public Utilities Commission of the State of California
RIS:	Redwood Inspection Service, Standard Specifications
RUS:	United States Department of Agriculture, Rural Utilities Service
SAMA	Scientific Apparatus Makers Association
SDI:	Steel Door Institute
SEI:	Structural Engineering Institute
SMACNA:	Sheet Metal and Air Conditioning Contractors National Association
SSPC:	Society for Protective Coatings
TIA:	Telecommunications Industry Association

UBC: Uniform Building Code of the International Conference of Building Officials

UL: Underwriters Laboratories

WCLIB: West Coast Lumber Inspection Bureau, Standard Grading and Dressing Rules

END OF SECTION

SECTION 01 45 27

SHOP INSPECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes:

1. Provide the District's Plant Inspection Section with advanced notification for Short Term (three consecutive weeks or less at one facility), and Long Term (more than three consecutive weeks at one facility) inspection assignments, and reimburse the District and/or the District's agents for travel expenses described in this Section. Also see General Conditions Article 3.2.
 2. Provide notification to the District's Plant Inspection Section of all work performed off the project site in fabrication, assembly, and coating plants; provide safe access to all areas where work is being performed.
 3. The District reserves the right to use Third Party Inspectors in lieu of District personnel. All aspects of this section shall also apply to District contracted Third Party Inspectors.
 4. For Long Term assignments provide the following:
 - a. Adequate office space including desk, office chair, lighting, and climate control.
 - b. A large format (up to 11 X 17 paper size) printer/scanner/copier and paper and printer supplies for the duration of the assignment.
- B. Contractor and its Material Suppliers shall ensure that there shall be adequate lighting, ventilation, and safety procedures in place to permit safe and thorough inspection at all times.
- C. All inspection and measurement tools and equipment employed by Contractor or Material Suppliers shall be made available to the District and remain in the area for inspection, and shall be subject to regular inspection and verification by the Contractor that such tools and equipment are properly calibrated and in an operable condition.
- D. Contractor and its Material Suppliers shall identify in writing the person responsible for the receipt and coordination of all Inspector communications. A representative from the Material Supplier responsible for Quality Control shall be present and available to the Engineer at all times during the course of inspections.

- E. Contractor and its Material Suppliers shall respond promptly to address and correct all fabrication and inspection processes to comply with the Contract Documents. Corrective measures undertaken by the Contractor and/or Material Supplier shall be documented and the documentation made available for review, inspection and copying by the Engineer at all times.
- F. See individual sections, listed in Article 1.4, for specific processes requiring shop inspection.

1.2 WITNESS NOTIFICATION

- A. The Contractor shall provide advanced written notification including the following information:
 - 1. The related specification section(s);
 - 2. Details of materials, parts or components to be inspected/tested;
 - 3. Name and location of shop to be visited;
 - 4. Shop's contact information;
 - 5. Approved submittal number; and,
 - 6. Proposed dates for those processes described in this and related Sections (Quality Control) for each shop location.
- B. The shop where the inspections and tests will occur shall contact the District Plant Inspection Section at (510) 287-1132 to schedule all shop inspections. Visits will be scheduled based on Engineer’s availability.
- C. Notification Schedule:

ONE-WAY DISTANCE FROM OAKLAND	SHORT TERM ASSIGNMENTS	LONG TERM ASSIGNMENTS
less than 75 miles	5 work days in advance	15 work days in advance
75 to 200 miles	10 work days in advance	15 work days in advance
greater than 200 miles	15 work days in advance	20 work days in advance
International	30 work days in advance	30 work days in advance

- D. Shift work outside of standard first shift work hours (7 AM to 5 PM), including changes to previously staffed shift work (excluding cancellation of shift work), require advanced approval by the Engineer. Following approval by the Engineer, shift work shall start no sooner than the first Monday following 10 work days' notice for locations up to 200 miles from Oakland, and the first Monday following 15 work days' notice for locations over 200 miles from Oakland.
- E. If the required notification is not given, the District will schedule the witness inspection at its convenience and the activity to be witnessed shall not proceed until the Engineer arrives or the Engineer notifies the Contractor that it is choosing to waive its witness inspections. In the event that the required notification is not given and the activity has occurred in the absence of the Engineer, the Engineer may reject the processes completed to date and require the activity to be redone.
 - 1. Delays resulting from failure to provide the required notification will be non-excusable. Expenses incurred by delays; repeat of the work process; or to correct unacceptable work shall be borne by the Contractor.
- F. Out of Country Inspection and Witnessing:
 - 1. Equipment and items of supply that are subject to witness inspection by the District as identified in Article 1.4, "Witness Schedule" and other contractually required work and all places to be used for their production or testing, shall be available to District personnel. The District's decision that such equipment, items, or work cannot be safely inspected or observed, including a decision that the country, area, or facility in which production or testing is to occur may not be safe for District personnel shall be final and shall preclude the Contractor's utilization of such country, area or facility. The District will consult the US Department of State website (<https://travel.state.gov/content/passports/en/alertswarnings.html>) for "Travel Advisories" to countries and regions to determine the safety of international travel. Areas with travel advisories shall not be considered for procurement of items that require District inspection.
- G. Confidentiality or Non-Disclosure Agreements:
 - 1. Facilities that require execution of a Confidentiality or Nondisclosure Agreement (NDA) shall submit a copy of the agreement for review to the District through the submittal process for the project or purchase agreement prior to requesting District inspection. The NDA will be considered an agreement between the District (not individual inspectors) and the requesting company. The requirements of the

California Public Records Act shall supersede the terms of any NDA and language to that effect will be included in the NDA by the District.

1.3 TRAVEL EXPENSES

- A. The Contractor shall include in the bid price all travel expenses for the Engineer to conduct the witness inspections noted if any of the inspections are to be performed at a locality exceeding 125 miles one way from Oakland, CA.
- B. Travel expenses include hotel lodging at an establishment rated three diamond or better by American Automobile Association (AAA), or comparable listing, and a minimum \$66 meal and incidental expenses allowance per day, or at the rate established by US General Services Administration (for domestic) or US Department of State (for international), whichever is greater, for the duration of the trip.
- C. If travel exceeds 200 miles one way from Oakland, CA, in addition to the expenses described in 1.3.B, travel expenses shall also include round trip direct route coach airfare from Oakland, CA; San Francisco, CA; Sacramento, CA; or San Jose, CA Airports to manufacturer's plant or testing facility, mid-sized car rental or taxi services, fuel, tolls, ground transportation to and from the airport, and airport parking at the departing airport; the following expenses shall apply as determined by the Engineer:
 - 1. For international or travel outside the continental United States, per diem rates are those established by the US Department of State for the specific location and dates of travel. Travel expenses may include the direct cost of securing passports, visas, language interpreters, document translators, communications, and internet access.
 - 2. If weekend stays are requested to defray transportation costs, reimbursement for the Engineers' stay over the weekend will include meal allowance, hotel expenses, phone and internet access charges, rental car or transportation charges to and from eating establishments, laundry service, language interpreters, or other necessary business expenses or services.
 - 3. Reimburse the District for any inspection that has to be repeated due to repair or rework of unacceptable work. Reimbursement shall include District Engineers' wages, or if done by a District agent, the agent's complete invoice for the needed inspection.
- D. All fees incurred such as airline reservation change fees, loss of fare due to purchase of nonrefundable tickets, hotel cancellation/rebooking fees, etc., due to Contractor-requested changes to the inspection schedule after the initial notification shall be borne by the Contractor.

1.4 WITNESS SCHEDULE

- A. The District will witness the following processes as specified in the applicable specification sections listed below or as required elsewhere in the Contract Documents. For purposes of estimating, anticipate that one Engineer will cover only one shift of shop inspection work per plant site. The costs for additional inspection required by the operation of more than one work shift per day or by more than one shop inspection site per day shall be included in the bid costs.

- B. For pipeline projects, one additional Engineer is required at pipe manufacturing facilities for the sole purpose of reviewing radiographs.

Spec. Section	Section Title and Description
40 05 59.34	Fabricated Stainless Steel Slide Gates

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 75 17

FIELD TESTING AND STARTUP

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section includes: Requirements for the Planning, Commissioning, and Process Start-up phases for the Project equipment/system and/or facility. The Contractor shall be responsible for providing services and participating in activities specified herein and coordinating with the Engineer, Subcontractors, Vendors and other manufacturers working under the Contractor for the Project.
- B. All field testing shall comply with the requirements of this section. Additional field and factory acceptance testing requirements are specified in the technical specification sections.
- C. District Furnished Services: The District will furnish potable water required for testing unless otherwise specified.
- D. District will designate and provide a Commissioning and Startup Coordinator (CSC) for this project. The approved Contractor Project Manager and start-up personnel shall coordinate all Work specified in this Section through the CSC. In addition to coordination of all commissioning work as specified in Section 01 75 17 with the Contractor, the CSC may witness all factory acceptance tests as specified in the contract documents; review all commissioning related schedules, submittals, test results and reports; and witness and approve all instrumentation and control, electrical, and mechanical field testing.
- E. Related Sections shall include but not limited to:
 - 1. Section 01 33 00 – Submittal Procedures.
 - 2. Section 01 45 27 – Shop Inspection.
 - 3. Section 01 79 00 – Demonstration and Training.
 - 4. Section 33 12 01 – Basic Mechanical Materials and Methods.
 - 5. Section 33 12 16.32 – Electronic Motor Valve Actuators.
 - 6. Section 40 05 59.34 – Heavy Duty Fabricated Stainless Steel Slide Gates.

1.2 DEFINITIONS

- A. Commissioning – The process of testing the installation for compliance with contract requirements and demonstrating, through documented verification, that the project has successfully met the Contractual requirements and the Project is ready for Operational Start-up.

- B. Factory Acceptance Testing (FAT) – Quality control testing conducted at the Manufacturer’s facility to demonstrate components, devices, equipment/systems, and software meets specified performance requirements prior to shipment. Also referred to as Factory Demonstration Test (FDT) or source testing.
- C. Functional Testing: The field testing required to determine if installed equipment or system will operate in a satisfactory manner and as specified. The Functional Test is a point-by-point test to confirm that all components associated with the equipment or system is operating properly. Functional testing is not intended to measure efficiency and performance.
- D. Performance Test: The field testing required to demonstrate the individual equipment or system meets all of the performance requirements specified in technical specifications.
- E. Control Systems Functional Test (CSFT): System testing to demonstrate the proper interaction of the facility control systems (SCADA or Experian DCS based) with all field equipment. This primarily includes the electrical power control and monitoring system and SCADA RTU-based instrumentation and process control system, as well as all related equipment. Unlike other field tests, the District conducts this testing with the Contractor’s assistance.
- F. Operational Startup Testing: A test of all systems operating together to demonstrate satisfactory operation of the facility as a whole for a continuous period. Unlike other field tests, the District Operations staff conducts this testing with the Contractor’s assistance.
- G. Equipment: An assembly of component(s) and devices(s) that requires installation or functional testing. (Examples: MCC breaker, pumps and motor, VFD, valves, etc.).
- H. Test Procedures: Test procedures shall include testing methods, acceptance criteria, procedures, and test data forms for functional and performance tests.
- I. Manufacturer’s Certificate of Factory Acceptance (FAT) Testing: When applicable, the form is used during FAT for the manufacturer to confirm that the applicable factory tests have been performed and results conform to the Contract Documents. The form is provided at the end of this Section.
- J. Manufacturer’s Certificate of Proper Installation: The form is submitted to the District Engineer prior to Functional Testing to confirm that the equipment/system is installed in conformance with the Contract Documents. The form is provided at the end of this Section.
- K. System: A grouping of subsystems, equipment, components, and devices that perform a definable function. (Examples: UV disinfection, Chlorine Contact Basin, HVAC).
- L. UV System Supplier (UVSS) - The Supplier providing the UV system equipment.

1.3 FIELD TESTING INSTRUMENTS

- A. The Contractor or its qualified subcontractors/vendors shall provide all instruments and materials necessary to complete the field tests unless otherwise specified. If required calibration instruments and materials are not provided on the day of test, the Engineer may postpone witnessing and sign off of instrument testing.
- B. All instruments shall be calibrated prior to the start of testing. Certificates of calibration for all instruments used for testing shall be current, and shall be at the job site during testing. If an uncalibrated instrument was used in a test, the entire test shall be redone with calibrated instruments at the Contractor's sole expense including labor costs and other expenses incurred by District staff to witness the retest.

1.4 QUALITY ASSURANCE

- A. All tests shall be subject to approval of the Engineer, and shall be witnessed by the District. No testing shall be scheduled by the Contractor without Engineer approved test submittals. The Contractor shall provide a minimum of 5 work days' written notice confirming testing dates to the District to enable witnessing of the testing.

1.5 SUBMITTALS

- A. Submit the following at least 60 calendar days prior to factory and field testing:
 - 1. Test procedures for all field tests
 - 2. Manufacturer's representative's resume demonstrating their qualifications and ability to perform the specified services
- B. Prior to field testing, submit Calibration certificates for all instruments to be used

1.6 DURING TESTING.

- A. Test Reports:
 - 1. Test Reports shall be submitted for complete systems; which is typically by specification section. Submitting partial test reports is not acceptable. Test submittals shall include the Specification Section number and Equipment Name in the title.
 - 2. Upon completion of testing for each equipment item or system, the Contractor shall submit typewritten or word processed test reports and forms for review and acceptance within 10 calendar days of completed testing. Submit test results with signed statement by manufacturer's representative that results meet specification requirements and manufacturer standards; when a manufacturer's representative is not required to be present during testing, this signed statement shall be provided by the Contractor. Upon acceptance, all test reports (including all factory and field testing) shall be inserted by the Contractor into their respective O&M manuals.

1.7 MANUFACTURERS' SERVICES

- A. A manufacturer's authorized representative shall perform all services when manufacturer's services are specified in the technical sections. The authorized representative shall be factory trained and experienced in the technical applications, installation, operation, and maintenance of the equipment, subsystem, or system. Additional qualifications may be specified elsewhere.
- B. Any system, material, or workmanship which is found defective on the basis of acceptance tests shall be reported, corrected and retested all at no additional cost to the District.
- C. The manufacturer's representatives shall be subject to acceptance by the Engineer. No substitute representatives will be allowed without prior written approval by the Engineer.
- D. The Manufacturer's on-site services as specified in the Contract Documents include the following:
 - 1. Assistance during Commissioning and Process Start-up. The manufacturer's representatives shall be regularly engaged and experienced in all aspects of commissioning and process start-up, equipment/systems of similar size, type, and capacity as this project.
 - 2. Provide daily copies of manufacturers' representatives field notes and data to District.
 - 3. Provide technical instruction for commissioning and process start-up.
 - 4. Carefully review the additional testing requirements in the Contract Documents and coordinate with requirements specified in this Section.

1.8 TEST PROCEDURES

- A. The Contractor shall compose test procedures and Field Functional Test Data Forms for each section-required Functional and Performance test and for all equipment specified in the individual equipment specifications.
- B. Unless otherwise noted, submit individual Field Test Procedures and Field Functional Test Data forms by specification section. Grouping test procedures for multiple specification sections into a single submittal is not acceptable.
- C. Coordinate with the Engineer to determine the operating requirements of adjacent or related systems that may be required to complete any Functional, Performance or Operational Startup testing.
- D. Prior to submitting for Engineer review, the Contractor shall review all test procedures to verify completeness and compliance with the specifications, addendums, request for information, as-builts, and change orders.

- E. All test procedures shall be comprehensive, neatly organized, and word-processed. Test procedures shall include the following:
1. Approach to testing including procedures, schedule, and details of support to be provided by the District.
 2. Test objective: Demonstrate subsystem meets the design requirements as specified in the technical sections.
 3. Test Procedures: Testing procedures and manufacturer representative's resumes shall be approved by the District prior to performing any tests.
 4. Appendix B includes UV/CCB and CSSIP startup and commissioning plans. Table 1 – Summary of Startup and Commissioning Plans in this Section includes all processes to be tested. Each process includes a correlating Startup and Commissioning plan guidance document in Appendix B.

1.9 FACTORY ACCEPTANCE TESTS (FAT)

- A. Test components, devices, and equipment/system for proper performance at point of manufacture or assembly as described in the approved FAT plan.
- B. Notify the Engineer in writing when the equipment/system is ready for inspection and FAT.
- C. FAT requirements are specified in technical sections and include:
1. Non-witnessed: Provide Manufacturer's Certificate of FAT.
 2. Witnessed: District's representatives present during testing.
- D. As a minimum, any FAT test procedure submittal shall include:
1. Purpose and goals of the test.
 2. Identification of each item of equipment/system, including system designation, location, tag number, control loop identifier, etc.
 3. Description of the pass/fail criteria that will be used.
 4. Listing of pertinent reference documents (Contract Documents and industry standards or specifications applicable to the testing).
 5. Complete description, including drawings or photographs, of test stands and/or test apparatus.
 6. Credentials of test personnel.
 7. Descriptions of test equipment to be used, product information and all appropriate calibration records for the test equipment.

8. Detailed, step-by-step test procedures:
 - a. The level of detail shall be sufficient for any witness with a rudimentary technical aptitude to be able to follow the steps and develop confidence that the tests were being performed as planned.
 - b. All steps are significant and all steps shall be included in the procedures.
 9. Sample data logs and data recording forms. Sample computations or analyses with the results in the same format as the final report to demonstrate how data collected will be used to generate final results
 10. Detailed outline of the FAT report.
- E. Prepare and submit FAT report including the approved submittal test forms. FAT report shall be approved by District prior to shipment of equipment to job site.

1.10 FUNCTIONAL TESTS

- A. All functional testing shall be witnessed by the Engineer.
- B. Functional Test Pre-requisites: Functional tests shall not proceed until the District has received, reviewed and approved the items listed below.
 1. Contractor shall ensure that copies of these materials are on-site during testing:
 - a. Interconnection diagrams.
 - b. As-builts marked up drawings.
 - c. Manufacturer's Certificate of Proper Installation.
 - d. District approved equipment or system technical submittal.
 - e. Approved draft O&M Manuals with all factory test results and certificates.
 - f. All factory test reports.
 - g. Calibration certificates (for all instruments used during testing).
 - h. District approved Functional Test Procedures and Field Functional Test Data Forms.
 - i. Appendix B Startup and Commissioning Plans.
 2. All ID tags on equipment, piping, valves, instruments, conduits, and other devices or systems directly or indirectly related to the functional test shall be installed by the Contractor and verified by the District prior to conducting the functional test.

3. Contractor or Vendor Representative has:
 - a. Completed an initial un-witnessed loop or point-to-point test.
 - b. Properly pulled, terminated, and labeled all field cables and wires per contract requirements and matched to the latest drawings and interconnects.
- C. Functional tests include:
 1. Installation Inspection: Check for proper rotation, adjustment, alignment, mechanical and electrical connections, wire labeling, proper lubrication, and any other conditions which may damage or impair functioning.
 2. Operation Check: Check for the proper operation of all system components.
 3. Controls Check: Demonstrate proper function of all local and remote controls, instrumentation, and other equipment functions.
 4. Alarms Check: Simulate alarm conditions and verify the proper operation of each alarm at the specified set point. Simulations shall be by means of direct element stimulation whenever possible, or by other means when direct element stimulation is not practical as determined by the District.
 5. Run Check: Each system or equipment item shall be operated continuously for 1 hour, minimum, to verify satisfactory operation. Additional operating time may be required as specified in the individual technical specifications, or as recommended by the manufacturer.
 6. If any part of a unit shows evidence of unsatisfactory or improper operation during the one-hour test period, or the test period specified by equipment technical specifications, correction or repairs shall be made, and the full test operation, as specified herein, shall be repeated after all parts operate satisfactorily.

1.11 PERFORMANCE TESTS

- A. Performance tests shall not proceed until the Functional Test has been successfully completed.
- B. Copies of all prior test results (factory, and field functional tests) shall be available on-site, prior to proceeding with performance tests.
- C. Performance tests shall demonstrate that the equipment or system meets all performance requirements as specified in technical specification sections.

1.12 OPERATIONAL STARTUP TEST

- A. The operational startup test shall not proceed until the District has successfully completed all control systems functional testing work specified in this Section during the designated period allotted for CSFT.
- B. The test shall demonstrate satisfactory performance of all project system components for a continuous period of the calendar day duration (24 hours per day).
- C. District Operations staff conducts the operational startup test. The Contractor, subcontractors and Vendor shall provide qualified personnel to support startup and testing, and appropriate construction trade personnel to correct malfunctions and deficiencies at any time during the test. Only District Operations personnel shall operate the equipment and systems.
- D. The Contractor shall maintain the qualified staff, system integrator and vendor representatives (on call) to be able to respond immediately (24-hours per day) to system or equipment related questions and to correct deficiencies. The Contractor shall provide a list of qualified staff, system integrator and vendor representatives to perform troubleshooting services during the Operational Startup period. On-call staff shall report to the site within 2 hours of being informed of a deficiency.
- E. The District will determine facility operating parameters such as plant flow rates, chemical dosages, and which systems or equipment will be operated at any given time. All systems and equipment will be operated within their normal operating ranges.
- F. All defects in operation, materials, or workmanship that appear during the test shall be immediately corrected by the Contractor. In case of a system interruption, the Contractor shall repeat the Startup Test of the affected systems and any other system directly related to the operation of the affected system. The test shall not be accepted as complete until all systems have successfully operated together to the satisfaction of the District for a continuous period specified . All costs for corrective work and retesting shall be borne by the Contractor.
- G. System interruptions include the following:
 - 1. Malfunction or deficiency that results in a shut down or partial shutdown of any system.
 - 2. Malfunction or deficiency in any backup system that cannot be corrected by the Contractor within 4 hours after notification of the problem.
 - 3. Malfunction or deficiency that results in system or equipment performance that is less than specified.
- H. The Engineer will maintain a log of equipment or system deficiencies along with the date and time when the Contractor was notified of the deficiency and the date and time when the Contractor notifies the District that the deficiency has been corrected. All corrected deficiencies must be inspected and approved by the Engineer.

- I. The Contractor shall maintain a log of equipment or system deficiencies along with a description of the required repairs necessary to correct the problem. The Contractor shall furnish up-to-date copies of this log to the District upon request.
- J. If the Operational Startup Test is interrupted through no fault of the Contractor, the test may resume at the earliest mutually agreeable time at no additional cost to the District.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor or its qualified equipment manufacturer representative shall perform all functional and performance testing of installed equipment unless otherwise specified. The Contractor shall be present during all testing, even if the specific functional or performance test is performed by its equipment manufacturer representative.
- B. The Contractor shall complete all testing in accordance with the Engineer-approved test procedures.
- C. The Contractor, at a minimum, shall maintain and provide to the Engineer the following records:
 - 1. Daily logs indicating all equipment testing and startup activities and activities of all manufacturer's representatives.
 - 2. Records of all tests, calibrations, inspections, adjustments, services and corrective actions taken.
 - 3. Copies of all test data collected at the end of each day of testing.
- D. In addition to the tests specified in the individual technical specifications, the Contractor shall perform additional tests as required by the District to demonstrate to the District's satisfaction that all equipment and systems required by the specifications will operate as intended.
- E. If the testing of any equipment may affect the operation of existing District facilities, the testing shall be done under direct supervision of the District. The Contractor shall comply with directions given by the District.
- F. Table 1 is a summary of equipment/systems that require functional and performance tests. Additional testing may be required when specified elsewhere.

<p style="text-align: center;">Table 1: Startup and Commissioning Tests (Additional tests may be required in other specification sections.)</p>		
Startup and Commissioning Plan	Functional Test Required	Performance Test Required
Briones Diversion Works Gates and North Raw Water Channel Isolation Gate	Yes	Yes
<p><i>Equipment listed in specifications and plans but not listed in Table 1 shall be functionally tested per applicable technical spec section. Contractor may add equipment to startup and commissioning plans per section 1.5 Submittals.</i></p>		

3.2 FIELD TESTING COORDINATION MEETINGS

- A. The Contractor, Commissioning and Startup Coordinator (CSC) and shall prepare materials for and attend periodic testing coordination meetings at the project site.
- B. During periods when field testing occurs regularly, the CSC will schedule weekly or biweekly field testing coordination meetings. The Contractor’s Testing Coordinator shall attend all meetings, and the Contractor shall provide suitable representation from each subcontractor having testing responsibilities so that informed decisions can be made during the meetings.

END OF SECTION

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes:

1. Perform training of District personnel for furnished or installed equipment, systems and facilities operation. Develop training program including scheduling, and coordination of training activities and training materials. Specific training procedures and requirements found in the technical sections shall also apply.

B. Related Sections:

1. Section 01 75 17 – Field Testing and Startup.

1.2 PLAN

- A. Prior to delivery of training, equipment and systems for which training is specified shall successfully pass Functional Testing and all related submittals, including the O&M Manuals shall have been submitted and approved by the District.

Contractor Training Coordinator shall initiate contact with and arrange to meet with the Engineer to review training requirements, plans, schedules, and other details as determined by the Contractor or the Engineer. The training meeting shall occur prior to commencement of Functional Testing. Training shall be completed prior to Startup Testing and “Ready for Service” handoffs.

Unless otherwise stated, the meeting shall be held at the Orinda Water Treatment Plant’s Lime Tower Conference Room (190 Camino Pablo, Oakland), or at other location as determined by the Engineer. Subsequent meetings may be required until all issues are adequately addressed.

Approved training representatives of the manufacturer(s) shall be present at the training meeting; however if unable to attend, the Contractor shall make an effort to include them via teleconference. The Contractor shall submit Operations & Maintenance (O&M) Manuals for District review and approval prior to the meeting for all equipment and systems for which technical training is specified. The final approved O&M Manuals shall be provided to the District (in print and electronic format) prior to the meeting.

- B. Training shall include a thorough review of the final approved O&M manual, project maps, drawings, and diagrams (e.g., single-line). Topics shall specifically address the maintenance and operation of applicable equipment/systems/facilities.

1. Review of O&M manual contents including:
 - a. Procedures for contacting the manufacturer's representative for equipment field service.
 - b. Procedures for ordering parts.
 - c. Discussion of equipment warranty.
2. Maintenance of applicable equipment/system/facility including:
 - a. Learning objectives.
 - b. Routine and preventive maintenance procedures.
 - c. Adjustment procedures.
 - d. Overhaul procedures.
 - e. Identify lubrication and adjustment locations.
 - f. Maintenance access locations.
 - g. Maintenance safety precautions.
 - h. Troubleshooting guide.
 - i. Field test procedures.
3. Operations of applicable equipment/system/facility including:
 - a. Learning objectives.
 - b. Principles of operation.
 - c. Discussion of all design features.
 - d. Startup, shutdown, and emergency operating procedures.
 - e. Operational safety precautions.

1.3 TRAINING COORDINATOR

- A. The Contractor Training Coordinator shall coordinate with equipment vendors to prepare and submit a training agenda and a schedule to the Engineer. See Submittals for document requirements.
- B. The Contractor Training Coordinator shall coordinate with the Engineer and vendors to organize and plan training sessions in advance.

1.4 MANUFACTURER'S FIELD SERVICES

- A. **Manufacturer's Representative:** The Contractor shall furnish the services of a factory trained field representative designated by the equipment/system manufacturer, who shall be present at the project site to provide the services listed below. The manufacturer's representative shall have superior knowledge of all aspects of the equipment/system being furnished in this section. The manufacturer through their field representative shall advise the Contractor and the Engineer of the proper procedures for each of the services listed.

Manufacturer's Service
Installation assistance and certification.
Field testing and startup (see Section 01 75 17 for additional requirements)
Training of District personnel: See Section 01 79 00 for additional requirements.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 DESCRIPTION

- A. Table 1 summarizes the equipment, systems, or facilities for which training is required. Table 1 may not be all-inclusive. Contractor shall fulfill all training indicated in the Contract Documents whether or not it is listed in Table 1.
- B. Training, as specified in Table 1 of this section or referenced in the other sections of the contract documents, shall include both classroom instruction and hands-on field demonstrations. With Engineer approval, classroom instruction may be conducted in the field.
- C. The Coordinator shall ensure that all equipment and materials required to properly train and demonstrate operational and maintenance procedures as specified in the corresponding section and paragraph are provided.
- D. The Training Coordinator shall ensure that the training room is returned to original condition after each training session is finished.
- E. **Training Acceptance:** Training shall meet the criteria listed below. Training not meeting the criteria shall be corrected and re-delivered at the Contractor's expense inclusive of District labor costs.
1. All information necessary to properly operate and maintain the system or equipment shall be presented and demonstrated.

2. Training delivered shall be consistent with the submitted and approved training lesson plan.
3. The trainer's expertise shall be sufficient to accurately respond to District questions related to system or equipment operation, maintenance, or principles of operation.
4. The trainer shall demonstrate strong presentation skills and English language proficiency.
5. Training shall be efficient and without unrelated or irrelevant discussion. Breaks during training sessions shall be limited to 10 minutes per two hours of instruction, or one 15-minute break per four hours of instruction.
6. Training Evaluation: Attendees will evaluate the training at the end of each session. The evaluations are one means the District uses to determine if the training adequately instructed District personnel on the proper operation and maintenance of the systems and equipment provided. A typical training evaluation form is included in Appendix A.

F. Table 1 is a summary of equipment/systems that require training. Additional training might be required when specified elsewhere.

Table 1: Training Summary (Additional Training may be required in other Sections)	
Specification Section	System / Equipment, or Facility
40 05 59.34	Fabricated Stainless Steel Slide Gates

END OF SECTION

SECTION 01 81 02

SEISMIC DESIGN CRITERIA

PART 1 - GENERAL

1.1 REFERENCES

- A. ASCE 7-16, American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures.

1.2 RELATED SECTIONS

- A. Section 01 42 19 – Reference Standards.
- B. Section 05 05 24A – Mechanical Anchoring and Fastening to Concrete and Masonry.

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

- 1. Architectural elements, mechanical and electrical components, equipment housings and their attachments, piping, ductwork, supporting structures, and anchorages shall comply with the requirements of ASCE 7, using the following values:

a. Design spectral accelerations:

Location	Short period acceleration, S_{DS}	Long period acceleration, S_{D1}
Maintenance and UV Electrical Building (510.64), UV Disinfection Facility (510.61), and Chlorine Contact Basin (510.28)	1.211g	0.408g
All other structures	1.359g	0.831g

- b. Seismic Design Category (SDC): F.
- c. Component importance Factor, $I_p = 1.50$.
- d. Component amplification factor, a_p : In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
- e. Component response modification factor, R_p : In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
- f. Overstrength Factor, Ω : In accordance with ASCE 7, Tables 13.5-1 and 13.6-1 for anchorage in concrete.

2. Do not use friction to resist sliding due to seismic forces.
3. Do not use more than 90 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
4. Do not use more than 60 percent of the weight of the tanks for resisting overturning due to seismic forces.
5. Resist seismic forces through direct bearing on anchors and fasteners. Do not design or provide connections that use friction from gravity to resist seismic loads.
6. Anchoring and fastening to concrete and masonry:
 - a. Provide anchors specified in Section 05 05 24A.
 - b. Use cast-in anchors (anchor bolts or welded studs) whenever possible for anchors at connections that resist seismic forces.
 - c. Do not use concrete anchors, flush shells, sleeve anchors, screw anchors, powder actuated fasteners, or other types of post-installed anchors unless indicated on the Drawings or accepted in writing by the Engineer.

1.4 SUBMITTALS

- A. Shop drawings and calculations: Complete shop drawings and seismic calculations signed and sealed by a Civil or Structural Engineer registered in the State of California.
- B. Contractor shall submit for review and approval test data or calculations, and shop drawings signed and sealed by a Civil or Structural Engineer registered in the State of California to show compliance with the above requirements.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 05 05 24A

MECHANICAL ANCHORING AND FASTENING TO CONCRETE AND MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Cast-in anchors and fasteners:
 - a. Anchor bolts.
 - b. Anchor rods.
 - c. Welded studs.
2. Post-installed steel anchors and fasteners:
 - a. Concrete anchors.
 - b. Screw anchors.
 - c. Undercut concrete anchors.
3. Appurtenances for anchoring and fastening:
 - a. Anchor bolt sleeves.
 - b. Isolating sleeves and washers.
 - c. Thread coating for threaded stainless steel fasteners.

1.2 REFERENCES

A. American Concrete Institute (ACI):

1. 355.2 - Qualification of Post-Installed Mechanical Anchors in Concrete & Commentary.

B. American National Standards Institute (ANSI):

1. B212.15 - Cutting Tools - Carbide-tipped Masonry Drills and Blanks for Carbide-tipped Masonry Drills.

C. American Welding Society (AWS):

1. D1.1 - Structural Welding Code - Steel.
2. D1.6 - Structural Welding Code - Stainless Steel.

D. ASTM International (ASTM):

1. A36 - Standard Specification for Carbon Structural Steel.
2. A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. A108 - Standard Specification for Steel Bars, Carbon and Alloy, Cold Finished.
4. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
5. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
6. A240 - Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
7. A380 - Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
8. A563 - Standard Specification for Carbon and Alloy Steel Nuts.
9. B633 - Standard Specification for *Electrodeposited* Coatings of Zinc on Iron and Steel.
10. B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
11. E488 - Standard Test Methods for Strength of Anchors in Concrete Elements.
12. F436 - Standard Specification for Hardened Steel Washers.
13. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.
14. F594 - Standard Specification for Stainless Steel Nuts.
15. F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength.
16. F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

E. International Code Council Evaluation Service, Inc. (ICC-ES):

1. AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements.

1.3 DEFINITIONS

- A. Built-in anchor: Headed bolt or assembly installed in position before filling surrounding masonry units with grout.
- B. Cast-in anchor: Headed bolt or assembly installed in position before placing plastic concrete around.
- C. Overhead installations: Fasteners installed on overhead surfaces where the longitudinal axis of the fastener is more than 60 degrees above a horizontal line so that the fastener resists sustained tension loads.
- D. Passivation: Chemical treatment of stainless steel with a mild oxidant for the purpose of enhancing the spontaneous formation of the steel's protective passive film.
- E. Post-installed anchor: Fastener or assembly installed in hardened concrete or finished masonry construction, typically by drilling into the structure and inserting a steel anchor assembly.
- F. Terms relating to structures or building environments as used with reference to anchors and fasteners:
 - 1. Corrosive locations: Describes interior and exterior locations as follows:
 - a. Locations used for delivery, storage, transfer, or containment (including spill containment) of chemicals used for plant treatment processes.
 - b. Exterior and interior locations at the following treatment structures:
 - 1) Water treatment facilities:
 - a) Briones Center
 - b) Orinda WTP North Raw Water Channel
 - 2. Wet and moist locations: Describes locations, other than "corrosive locations," that are submerged, are immediately above liquid containment structures, or are subject to frequent wetting, splashing, or wash down. Includes:
 - a. Exterior portions of buildings and structures.
 - b. Liquid-containing structures:
 - 1) Locations at and below the maximum operating liquid surface elevation.
 - 2) Locations above the maximum operating liquid surface elevation and:

- a) Below the top of the walls containing the liquid.
 - b) At the inside faces and underside surfaces of a structure enclosing or spanning over the liquid (including walls, roofs, slabs, beams, or walkways enclosing the open top of the structure).
 - c. Liquid handling equipment:
 - 1) Bases of pumps and other equipment that handles liquids.
 - d. Indoor locations exposed to moisture, splashing, or routine wash down during normal operations, including floors with slopes toward drains or gutters.
 - e. Other locations indicated on the Drawings.
3. Other locations:
- a. Interior dry areas where the surfaces are not exposed to moisture or humidity in excess of typical local environmental conditions.

1.4 SUBMITTALS

A. General:

- 1. Submit as specified in Section 01 33 00 - Submittal Procedures.
- 2. Submit information listed for each type of anchor or fastener to be used.

B. Action submittals:

1. Product data:

a. Cast-in anchors:

- 1) Manufacturer's data including catalog cuts showing anchor sizes and configuration, materials, and finishes.

b. Post-installed anchors:

- 1) For each anchor type, manufacturer's data including catalog cuts showing anchor sizes and construction, materials and finishes, and load ratings.

2. Samples:

- a. Samples of each type of anchor, including representative diameters and lengths, if requested by the Engineer.

3. Certificates:

- a. Cast-in anchors:
 - 1) Mill certificates for steel anchors that will be supplied to the site.
 - b. Post-installed anchors:
 - 1) Manufacturer's statement or certified test reports demonstrating that anchors that will be supplied to the site comply with the materials properties specified.
4. Test reports:
- a. Post-installed anchors: For each anchor type used for the Work:
 - 1) Current ICC-ES Report (ESR) demonstrating:
 - a) Acceptance of that anchor for use under the 2019 California Building Code.
 - b) That testing of the concrete anchor included the simulated seismic tension and shear tests of AC193, and that the anchor is accepted for use in Seismic Design Categories C, D, E, or F and with cracked concrete.
5. Manufacturer's instructions:
- a. Requirements for storage and handling.
 - b. Recommended installation procedures including details on drilling, hole size (diameter and depth), hole cleaning and preparation procedures, anchor insertion, and anchor tightening.
 - c. Requirements for inspection or observation during installation.
6. Qualification statements:
- a. Post-installed anchors: Installer qualifications:
 - 1) Submit list of personnel performing installations and include date of manufacturer's training for each.

1.5 QUALITY ASSURANCE

A. Qualifications:

- 1. Post installed anchors shall be in accordance with 2019 California Building Code.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver post-installed anchors in manufacturer's standard packaging with labels visible and intact. Include manufacturer's installation instructions.
- B. Handle and store anchors and fasteners in accordance with manufacturer's recommendations and as required to prevent damage.
- C. Protect anchors from weather and moisture until installation.

1.7 PROJECT CONDITIONS

- A. As specified in Section 01 81 02 - Seismic Design Criteria

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. General:

- 1. Furnish threaded fasteners with flat washers and hex nuts fabricated from materials corresponding to the material used for threaded portion of the anchor:
 - a. Cast-in anchors: Provide flat washers and nuts as listed in the ASTM standard for the anchor materials specified.
 - b. Post-installed anchors: Provide flat washers and nuts supplied for that product by the manufacturer of each anchor.
- 2. Size of anchors and fasteners, including diameter and length or minimum effective embedment depth: As indicated on the Drawings or as specified in this Section. In the event of conflicts, contact Engineer for clarification.
- 3. Where anchors and connections are not specifically indicated on the Drawings or specified, their material, size and form shall be equivalent in quality and workmanship to items specified.

B. Materials:

- 1. Provide and install anchors of materials as in this Section.

2.2 CAST-IN ANCHORS AND FASTENERS

A. Anchor bolts:

- 1. Description:
 - a. Straight steel rod having one end with an integrally forged head, and one threaded end. Embedded into concrete with the headed end cast into concrete at the effective embedment depth indicated on the Drawings or

specified, and with the threaded end left to project clear of concrete face as required for the connection to be made.

- b. Furnish anchor bolts with heavy hex forged head or equivalent acceptable to Engineer.
 - 1) Rods or bars with angle bend for embedment in concrete (i.e., “L” or “J” shaped anchor bolts) are not permitted in the Work.

2. Materials:

- a. Ship anchor bolts with properly fitting nuts attached.
- b. Type 316 stainless steel:
 - 1) Surfaces descaled, pickled, and passivated in accordance with ASTM A380.
 - 2) Bolts: ASTM F593, Group 2, Condition CW, coarse threads.
 - 3) Nuts: ASTM F594. Match alloy (group and UNS designation) and threads of bolts.
 - 4) Washers: Type 316 stainless steel.
- c. Type 304 stainless steel:
 - 1) Surfaces descaled, pickled, and passivated in accordance with ASTM A380.
 - 2) Bolts: ASTM F593, Group 1, Condition CW, coarse threads.
 - 3) Nuts: ASTM F594. Match alloy (group and UNS designation) and threads of bolts.
 - 4) Washers: Type 304 stainless steel.
- d. Galvanized steel:
 - 1) Hot-dip galvanized coating in accordance with ASTM F2329.
 - 2) Bolt: ASTM F1554, Grade 36 or Grade 55, heavy hex, coarse thread.
 - 3) Nuts: ASTM A563, Grade A, heavy hex, threads to match bolt.
 - 4) Washers: ASTM F436, Type 1.

B. Anchor rods:

1. Description: Straight steel rod having threads on each end or continuously threaded from end to end. One threaded end is fitted with nuts or plates and embedded in concrete to the effective depth indicated on the Drawings, leaving the opposite threaded end to project clear of the concrete face as required for the connection to be made at that location.
2. Materials:
 - a. Stainless steel: Type 316:
 - 1) Surfaces descaled, pickled, and passivated in accordance with ASTM A380.
 - 2) Rod: ASTM F593, Group 2, Condition CW, coarse threads.
 - 3) Nuts: ASTM F594. Match alloy (group and UNS designation) and threads of rods.
 - 4) Washers: Type 316 stainless steel.
 - 5) Plates (embedded): ASTM A240.
 - b. Stainless steel: Type 304:
 - 1) Surfaces descaled, pickled, and passivated in accordance with ASTM A380.
 - 2) Rod: ASTM F593, Group 1, Condition CW, coarse threads.
 - 3) Nuts: ASTM F594. Match alloy (group and UNS designation) and threads or rods.
 - 4) Washers: Type 304 stainless steel.
 - 5) Plates (embedded): ASTM A240.
 - c. Galvanized: steel:
 - 1) Hot-dip galvanized with coating in accordance with ASTM F2329.
 - 2) Rod: ASTM F1554, Grade 36 or Grade 55, coarse thread.
 - 3) Nuts: ASTM A563, Grade A, threads to match rod.
 - 4) Washers: ASTM F436, Type 1.
 - 5) Plates (embedded): ASTM A36.

C. Welded studs:

1. Description: Anchor with forged head for embedment into concrete on one end, and welding ferrule for attachment to steel on the other. Welded to steel members or plates to provide anchorage for steel connections to concrete.
 2. Acceptance criteria:
 - a. Welded studs in accordance with AWS D1.1, Type B.
 3. Manufacturers: One of the following or equal as approved by the Engineer:
 - a. Nelson Stud Welding Co., H4L Concrete Anchors or S3L Shear Connectors as indicated on the Drawings.
 - b. Stud Welding Products, Headed Concrete Anchors (HCA) or Headed Shear Connectors (HSC) as indicated on the Drawings.
 4. Materials:
 - a. Stainless steel: Type 316L:
 - 1) Yield strength: 35 kips per square inch (ksi).
- D. Steel plates or shapes for fabrications including assemblies with welded studs or deformed bar anchors:
1. Stainless steel: Type 316L or Type 304L:
 - a. Plates (embedded): ASTM A240.

2.3 POST-INSTALLED ANCHORS AND FASTENERS - ADHESIVE

- A. Epoxy bonding of reinforcing bars, all thread rods, and threaded inserts in concrete: As specified in Section 03 21 17 - Adhesive-Bonded Reinforcing Bars and All Thread Rods in Concrete.

2.4 POST-INSTALLED ANCHORS AND FASTENERS - MECHANICAL

A. General:

1. Post-installed anchors used for the Work shall hold a current ICC Evaluation Service Report demonstrating acceptance for use under the 2019 California Building Code.
 - a. Conditions of use: The acceptance report shall indicate acceptance of the product for use under the following conditions:
 - 1) In regions of concrete where cracking has occurred or may occur.
 - 2) To resist short-term loads due to wind forces.

- 3) To resist short-term loading due to seismic forces for the Seismic Design Category of the structure where the product will be used.
 2. Substitutions: When requesting product substitutions, submit calculations, indicating the diameter, effective embedment depth and spacing of the proposed anchors, and demonstrating that the substituted product will provide load resistance that is equal to or greater than that provided by the anchors listed in this Section:
 - a. Calculations shall be prepared by and shall bear the signature and seal of a Civil or Structural Engineer licensed in the State of California.
 - b. Decisions regarding the acceptability of proposed substitutions shall be at the discretion of the Engineer.
- B. Concrete anchors:
1. Description. Post-installed anchor assembly consisting of a threaded stud and a surrounding wedge expansion sleeve that is forced outward by torquing the center stud to transfer loads from the stud to the concrete through bearing, friction, or both. (Sometimes referred to as “expansion anchors” or “wedge anchors.”):
 - a. Do not use slug-in, lead cinch, and similar systems relying on deformation of lead alloy or similar materials to develop holding power.
 2. Concrete anchors for anchorage to concrete:
 - a. Acceptance criteria:
 - 1) Concrete anchors shall have a current ICC-ES Report demonstrating that the anchors have been tested and qualified for performance in both cracked and un-cracked concrete, and for short-term loading due to wind and seismic forces for Seismic Design Categories A through F in accordance with ACI 355.2 and with ICC-ES AC193 (including all mandatory tests and optional tests for seismic tension and shear in cracked concrete).
 - 2) Concrete anchor performance in the current ICC-ES Report shall be “Category 1” as defined in ACI 355.2.
 - b. Manufacturers: One of the following or equal as approved by the Engineer:
 - 1) Hilti, Kwik Bolt TZ Expansion Anchor.
 - 2) DEWALT/Powers, PowerStud.
 - 3) Simpson Strong-Tie, Strong Bolt 2 Wedge Anchor.

c. Materials. Integrally threaded stud, wedge, washer, and nut:

- 1) Stainless steel: Type 316.
- 2) Galvanized: Carbon steel, zinc plated in accordance with ASTM B633, minimum 5 microns (Fe/Zn 5).

C. Screw anchors:

1. Description: Post-installed concrete anchor that develops tensile strength from mechanical interlock provided by creating a helical “key” that is larger than the diameter of the bolt itself along the length of the anchor shaft.

2. Screw anchors for anchorage to concrete:

a. Acceptance criteria:

- 1) Screw anchors shall have a current ICC-ES Report demonstrating that the anchors have been tested and qualified for performance in both cracked and un-cracked concrete, and for short-term loading due to wind and seismic forces for Seismic Design Categories A through F in accordance with ACI 355.2 and ICC ES AC193 (including all mandatory tests and optional tests for seismic tension and shear in cracked concrete).
- 2) Screw anchor performance in the current ICC-ES Report shall be “Category 1” as defined in ACI 355.2.

b. Manufacturers: Screw anchor: The following or equal as approved by the Engineer:

- 1) Simpson Strong-Tie, Stainless-Steel Titen® HD Screw Anchor:

c. Materials:

- 1) Stainless steel: Type 316.

D. Undercut concrete anchors:

1. Description: Post-installed concrete anchor that develops tensile strength from mechanical interlock provided by creation of an undercut “key” at the embedded end of the anchor. The undercut may be achieved with a special drill before anchor installation, or by the anchor itself during installation.

2. Acceptance criteria:

a. Acceptance criteria:

- 1) Undercut concrete anchors shall have a current ICC-ES Report demonstrating that the anchors have been tested and qualified for

performance in both cracked and un-cracked concrete, and for short-term loading due to wind and seismic forces for Seismic Design Categories A through F in accordance with ACI 355.2 and ICC ES AC193 (including all mandatory tests and optional tests for seismic tension and shear in cracked concrete).

- 2) Undercut anchor performance in the current ICC-ES Report shall be “Category 1” as defined in ACI 355.2.
 - b. Use pre-setting units. Through-setting units are not allowed unless prior written acceptance for specific locations is obtained from the Engineer.
3. Manufacturers: One of the following or equal as approved by the Engineer:
 - a. Hilti, HDA (carbon steel) or HDA-R (stainless steel) Undercut Anchor.
 - b. Powers Fasteners, Atomic+ Undercut Anchor.
 - c. Simpson Strong-Tie, Torq-Cut Anchor.
 - d. USP Structural Connectors, DUC-L Undercut Anchors.
4. Materials:
 - a. Stainless steel: Corrosive, wet, and moist and locations: Type 316.
 - b. Galvanized: Carbon steel, zinc plated in accordance with ASTM B633, minimum 5 microns (Fe/Zn 5).

2.5 APPURTENANCES FOR ANCHORING AND FASTENING

A. Anchor bolt sleeves:

1. Having inside diameter approximately 2 inches greater than bolt diameter and minimum 10-bolt diameters long.
2. Plastic sleeves:
 - a. High-density polyethylene, corrugated sleeve, threaded to provide adjustment of location on the anchor bolt.
 - b. Manufacturers: The following or equal as approved by the Engineer:
 - 1) Portland Bolt & Manufacturing Co.
3. Fabricated steel sleeves: Construct as specified in Section 05 50 00 - Metal Fabrications:
 - a. At galvanized carbon steel anchor bolts, provide galvanized carbon steel sleeves.

- b. At stainless steel anchor bolts, provide stainless steel sleeves of same Type (304 or 316) as bolt, except that sleeves shall be constructed from low carbon stainless steel for welding (Type 304L or 316L).
4. Fabricated steel sleeves:
- a. Fabricate to the following dimensions unless otherwise indicated on the Drawings:
 - 1) Inside diameter: At least 2 inches greater than bolt diameter.
 - 2) Inside length: Not less than 10 bolt diameters.
 - 3) Bottom plate:
 - a) Square plate with dimensions equal to the outside diameter of the sleeve plus 1/2 inch each side.
 - b) Thickness equal to or greater than one-half of the anchor bolt diameter.
 - b. Carbon steel anchor bolts:
 - 1) Fabricated from ASTM A36 plate and ASTM A53, Grade B pipe.
 - 2) Welded connections: Conform to requirements of AWS D1.1.
 - 3) Hot dip galvanized in accordance with ASTM A153.
 - c. Stainless steel anchor bolts:
 - 1) Fabricated from ASTM A240 plate and pipe. Type 304L or Type 316L to match Type of the anchor bolt.
 - 2) Welded connections: In accordance with AWS D1.6.
- B. Isolating sleeves and washers:
- 1. Manufacturers: One of the following or equal as approved by the Engineer:
 - a. Central Plastics Co.
 - b. Allied Corrosion Industries.
 - 2. Sleeves: Mylar, 1/32-inch thick, 4,000 volts per mil dielectric strength, of proper size to fit bolts and extending half way into both steel washers.
 - 3. One sleeve required for each bolt.

4. Washers: The inside diameter of all washers shall fit over the isolating sleeve, and both the steel and isolating washers shall have the same inside diameter and outside diameter:
 - a. Proper size to fit bolts.
 - b. Two 1/8-inch thick steel washers for each bolt.
 - c. G3 Phenolic: 2 insulating washers are required for each bolt:
 - 1) Thickness: 1/8 inch.
 - 2) Base material: Glass.
 - 3) Resin: Phenolic.
 - 4) Water absorption: 2 percent.
 - 5) Hardness (Rockwell): 100.
 - 6) Dielectric strength: 450 volts per mil.
 - 7) Compression strength: 50,000 pounds per square inch.
 - 8) Tensile strength: 20,000 pounds per square inch.
 - 9) Maximum operating temperature: 350 degrees Fahrenheit.
- C. Coating for repair of galvanized surfaces:
 1. Manufacturers: The following or equal as approved by the Engineer:
 - a. Jelt, Galvinox.
- D. Thread coating: For use with threaded stainless steel fasteners:
 1. Manufacturers: One of the following or equal as approved by the Engineer:
 - a. Bostik, Never-Seez.
 - b. Oil Research, Inc., WLR No. 111.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine Work in place to verify that it is satisfactory to receive the Work of this Section. If unsatisfactory conditions exist, do not begin this Work until such conditions have been corrected.

3.2 INSTALLATION: GENERAL

- A. Where anchors and fasteners are not specifically indicated on the Drawings or specified, make attachments with materials specified in this Section.
- B. Substitution of anchor types:
 - 1. Post-installed anchors may not be used as an alternative to cast-in/built-in anchors at locations where the latter are indicated on the Drawings.
 - 2. Cast-in/built-in anchors may be used as an alternative to post-installed mechanical anchors at locations where the latter are indicated on the Drawings.
- C. Protect products from damage during installation. Take special care to protect threads and threaded ends.
- D. Accurately locate and position anchors and fasteners:
 - 1. Unless otherwise indicated on the Drawings, install anchors perpendicular to the surfaces from which they project.
 - 2. Install anchors so that at least 2 threads, but not more than 1/2 inch of threaded rod, projects past the top nut.
- E. Interface with other products:
 - 1. Where steel anchors come in contact with dissimilar metals (aluminum, stainless steel, etc.), use stainless steel anchors and separate or isolate dissimilar metals using isolating sleeves and washers.
 - 2. Prior to installing nuts, coat threads of stainless steel fasteners with thread coating to prevent galling of threads.

3.3 INSTALLATION: CAST-IN ANCHORS

- A. General:
 - 1. Accurately locate cast-in and built-in anchors.
 - a. Provide anchor setting templates to locate anchor bolts and anchor rods. Secure templates to formwork.
 - b. Brace or tie off embedments as necessary to prevent displacement during placement of plastic concrete or of surrounding masonry construction.
 - c. Position and tie cast-in and built-in anchors in place before beginning placement of concrete or grout. Do not “stab” anchors into plastic concrete, mortar, or grout.

- d. Do not allow cast-in anchors to touch reinforcing steel. Where cast-in anchors are within 1/4 inch of reinforcing steel, isolate the metals by wrapping the anchors with a minimum of 4 wraps of 10-mil polyvinyl chloride tape in area adjacent to reinforcing steel.
 2. For anchoring at machinery bases subject to vibration, use 2 nuts, with 1 serving as a locknut.
 3. Where anchor bolts or anchor rods are indicated on the Drawings as being for future use, thoroughly coat exposed surfaces that project from concrete or masonry with non-oxidizing wax. Turn nuts down full length of the threads, and neatly wrap the exposed thread and nut with a minimum of 4 wraps of 10-mil waterproof polyvinyl tape.
- B. Anchor bolts:
1. Minimum effective embedment: 10-bolt diameters, unless a longer embedment is indicated on the Drawings.
 2. Where indicated on the Drawings, set anchor bolts in plastic, galvanized steel or stainless steel sleeves to allow for adjustment. Seal top of sleeve to prevent grout from filling sleeve.
- C. Anchor rods:
1. Install as specified for anchor bolts.
- D. Welded studs:
1. Butt weld to steel fabrications with automatic stud welding gun as recommended by the manufacturer.
 2. Ensure that butt weld develops full strength of the stud.

3.4 INSTALLATION: POST-INSTALLED ADHESIVE ANCHORS

- A. Epoxy and acrylic adhesive bonding of reinforcing bars, all thread rods, and internally threaded inserts in concrete: As specified in Section 03 21 17 - Adhesive-Bonded Reinforcing Bars and All Thread Rods in Concrete.

3.5 INSTALLATION: POST-INSTALLED MECHANICAL ANCHORS

A. General:

1. Install anchors in accordance with the manufacturer's instructions, ACI 355.2, the anchor's ICC-ES Report. Where conflict exists between the ICC-ES Report and the requirements in this Section, the requirements of the ICC-ES Report shall control.

2. Where anchor manufacturer recommends the use of special tools and/or specific drill bits for installation, provide and use such tools.
3. After anchors have been positioned and inserted into concrete or masonry, do not:
 - a. Remove and reuse/reinstall anchors.
 - b. Loosen or remove bolts or studs.

B. Holes drilled into concrete:

1. Do not drill holes in concrete until the material has achieved its minimum specified compression strength (f'_c or f'_m).
2. Accurately locate holes:
 - a. Before drilling holes, use a reinforcing bar locator to identify the position of all reinforcing steel, conduit, and other embedded items within a 6-inch radius of each proposed hole.
 - b. If the hole depth exceeds the range of detection for the rebar locator, the Engineer may require radiographs of the area designated for investigation before drilling commences.
3. Exercise care to avoid damaging existing reinforcement and other items embedded in concrete:
 - a. If embedments are encountered during drilling, immediately stop work and notify the Engineer. Await Engineer's instructions before proceeding.
4. Unless otherwise indicated on the Drawings, drill holes perpendicular to the concrete surface into which they are placed.
5. Drill using anchor manufacturer's recommended equipment and procedures:
 - a. Unless otherwise recommended by the manufacturer, drill in accordance with the following:
 - 1) Drilling equipment: Electric or pneumatic rotary type with light or medium impact. Where edge distances are less than 2 inches, use lighter impact equipment to prevent micro-cracking and concrete spalling during drilling process.
 - 2) Drill bits: Carbide-tipped in accordance with ANSI B212-15. Hollow drills with flushing air systems are preferred.
6. Drill holes at manufacturer's recommended diameter and to depth required to provide the effective embedment indicated.

7. Clean and prepare holes as recommended by the manufacturer and as required by the ICC-ES Report for that anchor:
 - a. Unless otherwise recommended by anchor manufacturer, remove dust and debris using brushes and clean compressed air.
 - b. Repeat cleaning process as required by the manufacturer's installation instructions.
 - c. When cleaning holes for stainless steel anchors, use only stainless steel or non-metallic brushes.

- C. Insert and tighten (or torque) anchors in full compliance with the manufacturer's installation instructions:
 1. Once anchor is tightened (torque), do not attempt to loosen or remove its bolt or stud.

- D. Concrete anchors: Minimum effective embedment lengths unless otherwise indicated on the Drawings:

Concrete Anchors			
Nominal Diameter	Minimum Effective Embedment Length		Minimum Member Thickness
	In Concrete	In Grouted Masonry	
3/8 inch	2 1/2 inch	2 5/8 inch	8 inch
1/2 inch	3 1/2 inch	3 1/2 inch	8 inch
5/8 inch	4 1/2 inch	4 1/2 inch	10 inch
3/4 inch	5 inch	5 1/4 inch	12 inch

1. Install with the sleeve fully engaged in the base material.

E. Screw anchors:

1. Minimum effective embedment lengths unless otherwise indicated on the Drawings:

Screw Anchors			
Nominal Diameter	Minimum Effective Embedment Length		Minimum Member Thickness
	In Concrete	In Grouted Masonry	
3/8 inch	2 1/2 inch	3 1/4 inch	8 inch
1/2 inch	3 1/4 inch	4 1/2 inch	8 inch
5/8 inch	4 inch	5 inch	10 inch

Screw Anchors			
Nominal Diameter	Minimum Effective Embedment Length		Minimum Member Thickness
	In Concrete	In Grouted Masonry	
3/4 inch	5 1/2 inch	6 1/4 inch	12 inch

2. Install screw anchors using equipment and methods recommended by the manufacturer. Continue driving into hole until the washer head is flush against the item being fastened.

F. Undercut concrete anchors:

1. Minimum effective embedment lengths unless otherwise indicated on the Drawings:

Undercut Anchors			
Nominal Diameter (bolt)	Minimum Effective Embedment Length		Minimum Member Thickness⁽¹⁾
	In Concrete	In Grouted Masonry	
M10 (3/8 inch)	100 mm (4 inch)	Not accepted	200 mm (8 inch)
M12 (1/2 inch)	125 mm (5 inch)	Not accepted	350 mm (14 inch)
M16 (5/8 inch)	190 mm (7 1/2 inch)	Not accepted	460 mm (18 inch)
M20 (7/8 inch)	250 mm (10 inch)	Not accepted	510 mm (20 inch)

Notes:

- (1) Thickness indicated is for pre-set units. If through-set units are accepted, obtain minimum member thickness requirements from the Engineer.

2. Installations of undercut anchors shall not be allowed where edge distances are less than 12 times the nominal diameter of the anchor stud.
3. Undercut bottom of hole using cutting tools manufactured for this purpose by the manufacturer of the undercut anchors being placed.

3.6 FIELD QUALITY CONTROL

A. Contractor shall provide quality control over the Work of this Section as specified in Section 01 45 00 - Quality Control:

1. Expenses associated with work described by the following paragraphs shall be paid by the Contractor.

B. Post-installed anchors:

1. Review anchor manufacturer's installation instructions and requirements of the Evaluation Service Report (hereafter referred to as "installation documents") for each anchor type and material.
2. Observe hole-drilling and cleaning operations for conformance with the installation documents.
3. Certify in writing to the Engineer that the depth and location of anchor holes, and the torque applied for setting the anchors conforms to the requirements of the installation documents.

3.7 FIELD QUALITY ASSURANCE

A. The Engineer will provide on-site observation and field quality assurance for the Work of this Section:

1. Expenses associated with work described by the following paragraphs shall be paid by the District.

B. Field inspections and special inspections:

1. Required inspections: Observe construction for conformance to the approved Contract Documents, the accepted submittals, and manufacturer's installation instructions for the products used.
2. Record of inspections:
 - a. Maintain record of each inspection.
 - b. Submit copies to Engineer upon request.
3. Statement of special inspections: At the end of the project, prepare and submit to the Engineer inspector's statement that the Work was constructed in general conformance with the approved Contract Documents, and that deficiencies observed during construction were resolved.

C. Special inspections: Anchors cast into concrete:

1. Provide special inspection during positioning of anchors and placement of concrete around the following anchors:
 - a. Anchor bolts.
 - b. Anchor rods.
 - c. Welded studs.
2. During placement, provide continuous special inspection at each anchor location to verify that the following elements of the installation conform to the requirements of the Contract Documents:

- a. Anchor:
 - 1) Type and dimensions.
 - 2) Material: Galvanized steel, Type 304 stainless steel, or Type 316 stainless steel as specified in this Section or indicated on the Drawings.
 - 3) Positioning: Spacing, edge distances, effective embedment, and projection beyond the surface of the construction.
 - 4) Reinforcement at anchor: Presence, positioning, and size of additional reinforcement at anchors indicated on the Drawings.
 3. Following hardening and curing of the concrete surrounding the anchors, provide periodic special inspection to observe and confirm the following:
 - a. Base material (concrete):
 - 1) Solid and dense concrete within required distances surrounding anchor.
 - 2) Material encapsulating embedment is dense and well-consolidated.
- D. Special Inspections: Post-installed mechanical anchors placed in hardened concrete:
1. Provide special inspection during installation of the following anchors:
 - a. Concrete anchors.
 - b. Screw anchors.
 - c. Undercut concrete anchors.
 2. Unless otherwise noted, provide periodic special inspection during positioning, drilling, placing, and torquing of anchors:
 - a. Provide continuous special inspection for post-installed anchors in “overhead installations” as defined in this Section.
 3. Requirements for periodic special inspection:
 - a. Verify items listed in the following paragraphs for conformance to the requirements of the Contract Documents and the Evaluation Report for the anchor being used. Observe the initial installation of each type and size of anchor, and subsequent installation of the same anchor at intervals of not more than 4 hours.

- 1) Any change in the anchors used, in the personnel performing the installation, or in procedures used to install a given type of anchor shall require a new “initial inspection.”
- b. Substrate: Concrete surfaces receiving the anchor are sound and of a condition that will develop the anchor’s rated strength.
- c. Anchor:
 - 1) Manufacturer, type, and dimensions (diameter and length).
 - 2) Material (galvanized, Type 304 stainless steel, or Type 316 stainless steel).
- d. Hole:
 - 1) Positioning: Spacing and edge distances.
 - 2) Drill bit type and diameter.
 - 3) Diameter, and depth.
 - 4) Hole cleaned in accordance with manufacturer’s required procedures. Confirm multiple repetitions of cleaning when recommended by the manufacturer.
 - 5) Anchor’s minimum effective embedment.
 - 6) Anchor tightening/installation torque.
4. Requirements for continuous special inspection:
 - a. The special inspector shall observe all aspects of anchor installation, except that holes may be drilled in his/her absence provided that he/she confirms the use of acceptable drill bits before drilling, and later confirms the diameter, depth, and cleaning of drilled holes.

E. Field tests:

1. The Engineer may, at any time, request testing to confirm that materials being delivered and installed conform to the requirements of the Specifications:
 - a. If such additional testing shows that the materials do not conform to the specified requirements, the Contractor shall pay the costs of these tests.
 - b. If such additional testing shows that the materials do conform to the specified requirements, the District shall pay the costs of these tests.
2. Field testing: Post-installed anchors:
 - a. Proof load testing:

- 1) In addition to performing special inspections, the Engineer may select up to 10 percent of each type and size of post-installed mechanical anchor for proof-load testing for pullout or shear. Tests shall be non-destructive whenever possible.
 - 2) Perform tension testing in accordance with ASTM E488. Apply proof loads using a calibrated hydraulic ram.
- b. Torque load testing:
- 1) Using a calibrated torque wrench, apply manufacturer's recommended installation torque.
- c. Acceptance criteria:
- 1) Minimum anchor embedment, proof load for pullout and shear, and torque shall be as specified in this Section.
 - 2) Anchors that fail to resist their designated proof load or installation torque requirements shall be regarded as non-performing.
 - 3) If more than 10 percent of the tested anchors fail to achieve their specified torque or proof load, all anchors of the same diameter and type as the failed anchors shall be tested.
 - 4) Remediate non-performing anchors as specified in "non-conforming work."

3.8 NON-CONFORMING WORK

- A. Remove misaligned or non-performing anchors.
- B. Fill empty anchor holes and repair failed anchor locations as specified in Section 03 60 00 - Grouting using high-strength, non-shrink, non-metallic grout.
- C. If more than 10 percent of all tested anchors of a given diameter and type fail to achieve their specified torque or proof load, the Engineer will provide directions for required modifications. Make such modifications, up to and including replacement of all anchors, at no additional cost to the District.

3.9 SCHEDULES

A. Provide and install anchor materials as scheduled in the following Table:

Table - Required Anchoring Materials by Location			
Location/Exposure		Materials	Notes
1.	Anchors into concrete for attachment of carbon steel, including structural steel and other steel fabrications:		
a)	Interior dry areas	Carbon steel - galvanized	
b)	Locations with galvanized steel structures or fabrications	Stainless steel - Type 304 or 316	1
c)	Exterior and interior wet and moist locations	Stainless steel - Type 316	1
d)	Corrosive locations	Stainless steel - Type 316	1
2.	Anchors into concrete for attachment of aluminum, stainless steel, or fiber-reinforced plastic (FRP) shapes and fabrications:		
a)	Interior dry areas	Stainless steel - Type 304 or 316	1
b)	Exterior and interior wet and moist locations	Stainless steel - Type 316	1
c)	Corrosive locations	Stainless steel - Type 316	1
3.	Anchors for attaching equipment and its appurtenances:		
a)	All locations	Stainless steel - Type 316 (unless Type 304 is specifically indicated in the specifications for the equipment.)	1
<u>Notes:</u>			
(1) Where anchors are in contact with a metal that differs from that of the anchor, provide isolation sleeves and washers.			

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Miscellaneous metals.

1.2 REFERENCES

A. Aluminum Association (AA):

1. DAF-45: Designations from Start to Finish.
 - a. M12-C22-A41.

B. American Association of State Highway and Transportation Officials (AASHTO):

1. Standard Specifications for Highway Bridges.

C. ASTM International (ASTM):

1. A36 - Standard Specification for Carbon Structural Steel.
2. A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded, and Seamless.
3. A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels for General Applications.
4. A276 - Standard Specification for Stainless Steel Bars and Shapes.
5. A992 - Standard Specification for Structural Steel Shapes.
6. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.
7. F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength.

D. American Welding Society (AWS):

1. A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. D1.1 – Structural welding Code.

E. National Association of Architectural Metal Manufacturers (NAAMM):

1. Metal Finishes Manual.

F. Occupational Safety and Health Administration (OSHA).

1.3 DEFINITIONS

A. Passivation: Removal of exogenous iron or iron compounds from the surface of a stainless steel by means of chemical dissolution resulting from treatment with an acid solution that removes the surface contamination but does not significantly affect the stainless steel itself.

1.4 SUBMITTALS

A. Shop drawings:

1. Miscellaneous metals.

B. Quality control submittals:

1. Design data.

2. Test reports.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Unless otherwise specified or indicated on the Drawings, structural and miscellaneous metals in accordance with the standards of the ASTM, including the following:

1. Stainless steels are designated by type or series defined by ASTM.

2. Where stainless steel is welded, use low-carbon stainless steel.

2.2 MANUFACTURED UNITS

A. Miscellaneous stainless steel:

1. Provide miscellaneous stainless steel items not specified in this Section as indicated on the Drawings or specified elsewhere.

a. Fabricate and install in accordance with the best practices of the trade.

2. Cleaning and passivation:

a. Following shop fabrication of stainless steel members, clean and passivate fabrications.

- b. Finish requirements: Remove free iron, heat tint oxides, weld scale and other impurities, and obtain a passive finished surface.
- c. Provide quality control testing to verify effectiveness of cleaning agents and procedures and to confirm that finished surfaces are clean and passivated.
 - 1) Conduct sample runs using test specimens with proposed cleaning agents and procedures as required to avoid adverse effects on surface finishes and base materials.
- d. Pre-clean, chemically descale (pickle), and final clean fabrications in accordance with the requirements of ASTM A380 to remove deposited contaminants before shipping.
 - 1) Passivation by citric acid treatment is not allowed.
 - a) If degreasing is required before cleaning to remove scale or iron oxide, cleaning (pickling) treatments with citric acid are permissible; however, these treatments shall be followed by inorganic cleaners such as nitric-hydrofluoric acid.
 - 2) Provide acid descaling (pickling) in accordance with Table A1.1 of Annex A1 of ASTM A380.
 - 3) After pickling, final cleaning of stainless steel shall conform to Part II of Table A2.1 of Annex A2 of ASTM A380.
- e. After cleaning, inspect using methods specified for “gross inspection” in ASTM A380.
- f. Improperly or poorly cleaned and passivated materials shall not be shipped and will not be accepted at the job site.

B. Miscellaneous structural steel:

- 1. Provide miscellaneous steel items not specified in this Section as indicated on the Drawings or specified elsewhere.
 - a. Fabricate and install in accordance with the best practices of the trade.

C. Isolating sleeves and washers:

- 1. As indicated on the Drawings and as specified in Section 05 05 24A - Mechanical Anchoring and Fastening to Concrete and Masonry.

END OF SECTION

SECTION 33 12 01

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Basic design and performance requirements for all mechanical equipment and systems.
- B. Related Sections:
 - 1. Section 01 33 00 – Submittals Procedures.
 - 2. Section 01 43 11 – Seismic Qualification and Certification.
 - 3. Section 01 75 17 – Field Testing and Startup.
 - 4. Section 01 77 00 – Closeout Procedures.
 - 5. Section 01 81 02 – Seismic Design Criteria.
 - 6. Section 01 91 13.10 – Asset Identification Tags.
 - 7. Section 03 60 00 – Grouting.
 - 8. Section 05 05 26 – Flange Bolting.
 - 9. Section 05 12 00 – Structural Steel Framing.
 - 10. Section 05 50 00 – Metal Fabrications.
 - 11. Section 09 96 35 – Chemical Resistant Coatings.
 - 12. Section 09 96 56.05 – High Build Epoxy Coatings.
 - 13. Section 09 96 57 – Mechanical, Structural, and Electrical Coating Systems.
 - 14. Section 09 96 56.10 – Fusion Bonded Epoxy Coatings.
 - 15. Section 22 05 53.05 – Pipe Identification.
 - 16. All Sections in Division 26 – Electrical.
 - 17. All Sections in Division 33 – Utilities.
 - 18. Section 40 20 20 – Mechanical Piping.
 - 19. Section 40 42 13.10 – Processing Piping Insulation.

- 20. Section 41 22 13.13 – Overhead Bridge Crane.
 - 21. All Sections in Division 43 – Process Gas and Liquid Handling, Purification and Storage Equipment.
 - 22. All Sections in Division 44 – Pollution Control Equipment.
- C. Provisions specified under each individual technical equipment specification section prevail over and supersede conflicting provisions as specified in this section.
- 1.2 REFERENCE STANDARDS FOR DESIGN, INSTALLATION & TESTING
- A. Reference the latest versions of the following standards unless otherwise specified.
 - B. Associated Air Balance Council (AABC): Various.
 - C. American Bearing Manufacturers Association (ABMA):
 - 1. ABMA 9 – Load Ratings and Fatigue Life for Ball Bearings.
 - 2. ABMA 11 – Load Ratings and Fatigue Life for Roller Bearings.
 - 3. Various.
 - D. American Gas Association (AGA): Various.
 - E. American Gear Manufacturer's Association (AGMA) Standards:
 - 1. ANSI/AGMA 2001-D – Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth.
 - 2. ANSI/AGMA 6000-B – Specification for Measurement of Linear Vibration on Gear Units.
 - 3. ANSI/AGMA 6010-F – Standard for Spur, Helical, Herringbone, and Bevel Enclosed Drives.
 - 4. ANSI/AGMA 6019-B – Standard for Gear motors using Spur, Helical, Herringbone, Straight Bevel or Spiral Bevel Gears.
 - 5. ANSI/AGMA 6025-D – Sound for enclosed Helical, Herringbone and Spiral Bevel Gear Drives.
 - 6. Various.
 - F. Air Movement and Control Association (AMCA) Manual:
 - 1. 200-3 Fans Application Manual.
 - 2. Various.

G. American National Standards Institute (ANSI) Standards:

1. Z535.1 – Safety Color Code.
2. Various.

H. American Petroleum Institute (API) Standards:

1. 5L – Specification for Line Pipe.
2. 541 – Form-wound Squirrel-Cage Induction Motors - 500 Horsepower and Larger.
3. 598 – Valve Inspection and Testing.
4. 609 – Butterfly Valves.
5. 610 – Centrifugal Pumps.
6. 617 – Centrifugal Compressors.
7. 618 – Reciprocating Compressors.
8. 619 – Rotary-Type Positive Displacement Compressors.
9. 650 – Welded Steel Tanks for Oil Storage.
10. 686 – Machinery Installation and Installation Design (Recommended Practice).
11. Various.

I. American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) Standards: Various.

J. American Society of Mechanical Engineers (ASME):

1. B16.1 – Cast Iron Pipe Flanges and Flanged Fittings.
2. B16.3 – Malleable Iron Threaded Fittings.
3. B16.5 – Pipe Flanges and Flanged Fittings.
4. B16.9 – Factory-Made Wrought Buttwelding Fittings.
5. B16.11 – Forged Fittings, Socket-Welding and Threaded.
6. B16.14 – Cast Bronze Threaded Fittings.
7. B16.18 – Cast Copper Alloy Solder Joint Pressure Fittings.
8. B16.22 – Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

9. B16.24 – Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 400, 600, 900, 1500, and 2500.
 10. B16.28 – Wrought Steel Buttwelding Short Radius Elbows and Returns.
 11. B16.34 – Valves, Flanged, Threaded and Welding End.
 12. B16.36 – Orifice Flanges.
 13. B16.42 – Ductile Iron Pipe Flanges and Flanged Fittings, Class 150 and 300.
 14. B16.47 – Large Diameter Steel Flanges.
 15. B31.1 – Power Piping.
 16. B31.9 – Building Services Piping.
 17. B31.2 – Fuel Gas Piping.
 18. B31.3 – Process Piping.
 19. B36.10M – Welded and Seamless Wrought Steel Pipe.
 20. B36.19M – Stainless Steel Piping.
 21. PTC 9 – Displacement Compressors, Vacuum Pumps and Blowers.
 22. ASME PTC 8.2 – Performance Test Code for Centrifugal Pumps.
 23. ANSI/ASME PTC 10 – Performance Test Code - Compressors and Exhausters.
 24. ANSI/ASME PTC 17 – Performance Test Code - Reciprocating Internal-Combustion Engines.
 25. ANSI/ASME PTC 11 – Performance Test Code - Measurement of Shaft Horsepower - Instruments and Apparatus.
 26. Boiler and Pressure Vessel Code – Section VIII.
 27. Various.
- K. ASTM International (ASTM):
1. A36 – Standard Specification for Structural Steel.
 2. A53 – Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless.
 3. A48 – Standard Specification for Gray Iron Castings.

4. A106 – Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
 5. A526 – Standard Specification for Steel Sheet, Zinc Coated by the Hot Dip Process, Commercial Quality.
 6. A802-2006, “Standard Practice for Steel Castings, Surface Acceptance Standards, Visual Examination”.
 7. A834-2006, “Standard Specification for Common Requirements for Iron Castings for General Industrial Use”.
 8. A903-2007, “Standard Specification for Steel Castings, Surface Acceptance Standards, Magnetic Particle and Liquid Penetrant Inspection”.
 9. A1011 – Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low Alloy with Improved Formability.
 10. A1018 – Standard Specification for Steel, Sheet and Strip, Heavy Thickness Coils, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, Columbium or Vanadium, and High-Strength Low-Alloy with Improved Formability.
 11. B61 – Standard Specification for Steam or Valve Bronze Castings.
 12. B62 – Standard specification for Composition Bronze or Ounce Metal Castings.
 13. E527 – Standard Practice for Numbering Alloys and Metals (UNS).
 14. D3370-95a – Standard Practices for Sampling Water from Closed Conduits.
 15. D6284-02 Standard Test Method for Rubber Property - Effect of Aqueous Solutions with Available Chlorine and Chloramine.
 16. Various.
- L. American Water Works Association (AWWA) Standards:
1. C207 – Steel Pipe Flanges.
 2. C208 – Dimensions for Fabricated Steel Water Pipe Fittings.
 3. C504 – Rubber-Seated Butterfly Valves.
 4. C507 – Ball Valves.
 5. C508 – Swing Check Valves.
 6. C509 – Resilient Seated Gate Valves.

7. C512 – Air Release, Air/Vacuum and Combination Air Valves.
 8. C515 – Reduced –Wall, Resilient-Seated Gate Valves.
 9. C518 – Dual-Disc Swing Check Valves.
 10. C540 – Power-Actuating Devices for Valves and Slide Gates.
 11. Various.
- M. American Welding Society (AWS) Standards:
1. A2.4 – Standard Symbols for Welding, Brazing and NDE.
 2. A3.0 – Standard Welding Terms and Definitions.
 3. D1.1 – Structural Welding Code.
 4. Various.
- N. Compressed Gas Association (CGA) Standards: Various.
- O. Crane Manufacturers Association of America (CMAA) Specifications:
1. CMAA No. 70 – Specifications for Top-Running Bridge and Gantry Type Multiple Girder Electric, Overhead Traveling Cranes.
 2. CMAA No. 74 – Specifications for Top Running & Under Running Single Girder Electric Traveling Cranes Utilizing Under Running Trolley Hoist.
- P. Ductile Iron Pipe Research Association (DIPRA) Publications: Various.
- Q. EBMUD Engineering Standard Practices (ESPs).
- R. EBMUD Engineering Standard Drawings.
1. 9492-G-000.1 thru 3, Abbreviations for Water Facilities.
 2. 9492-G-001 thru 007.
 3. Various.
- S. Hydraulic Institute Standards (HI):
1. 1.1-1.5 – Centrifugal Pumps - Nomenclature, Definitions, Application and Operation.
 2. 1.6 – Centrifugal Pump Tests.
 3. 2.1-2.5 – Vertical Pumps - Nomenclature, Definitions, Application and Operation.

4. 2.6 – Vertical Pump Tests.
 5. 3.1-1.5 – Rotary Pumps - Nomenclature, Definitions, Application and Operation.
 6. 3.6 – Rotary Pump Tests.
 7. 4.1-4.6 – Sealless Rotary Pumps - Nomenclature, Definitions, Application, Operation and Test.
 8. 5.1-1.6 – Sealless Centrifugal Pumps - Nomenclature, Definitions, Application, Operation and Test.
 9. 6.1-6.5 – Reciprocating Power Pumps - Nomenclature, Definitions, Application and Operation.
 10. 7.1-7.5 – Controlled Volume Pumps - Nomenclature, Definitions, Application and Operation.
 11. 9.1-9.5 – Pumps - General Guidelines for Types, Definitions, Application and Sound Measurement.
 12. Various.
- T. Institute of Electrical and Electronic Engineers (IEEE):
1. 803.1 – Recommended Practice for Unique Identification in Power Plants and Related Facilities — Component Function Identifiers.
 2. Various.
- U. Instrumentation, Systems, and Automation Society (ISA) Standards:
1. S5.1 – Instrumentation Symbols and Identification.
 2. S20 – Specification Forms for Process Measurement and Control Instruments, Primary Elements, and Control Valves.
 3. S75.11 – Inherent Flow Characteristics and Rangeability of Control Valves.
 4. Various.
- V. Manufacturers Standardization Society (MSS) Standards:
1. SP-54 – Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components – Radiographic Examination Method.
 2. SP-55 – Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components – Visual Method for Evaluation of Surface Irregularities.

3. SP-58 – Pipe Hangers and Supports – Materials, Design and Manufacture.
 4. SP-68 – High Pressure Offset Seat Butterfly Valves.
 5. SP-69 – Pipe Hangers and Supports – Selection and Application.
 6. SP-89 – Pipe Hangers and Supports – Fabrication and Installation Practices.
 7. SP-91 – Guidelines for Manual Operation of Valves.
 8. SP-101 – Part-Turn Valve Actuator Attachment.
 9. SP-108 – Resilient-Seated Cast-Iron Eccentric Plug Valves.
 10. Various.
- W. National Electrical Testing Association (NETA):
1. MG-1 – Motors and Generators.
 2. Various.
- X. National Fire Code.
- Y. National Fire Protection Association (NFPA) Standards:
1. Fire Prevention Code Handbook, 2012 Edition.
 2. NFPA13 – Installation of Sprinkler Systems.
 3. NFPA30 – Flammable & Combustible Liquids Code.
 4. NFPA54 – National Fuel Gas Code.
 5. NFPA58 – Liquefied Petroleum Gas Code.
 6. Various.
- Z. National Sanitation Foundation (NSF) Standards:
1. 61G – Drinking Water System Components – Health Effects and Lead Content.
 2. 372 – Drinking Water System Components – Lead Content.
 3. Various.
- AA. Overhead Electrical Crane Institute (OECI): Various.
- BB. Occupational Safety and Health Act (OSHA): Various.

CC. Pipe Fabrication Institute (PFI):

1. ES-3 – Fabricating Tolerances.
2. ES-4 – Hydrostatic Testing of Fabricated Piping.
3. ES-24 – Pipe Bending Methods, Tolerances, Process and Material Requirements.

DD. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):

1. HVAC Systems Duct Design.
2. Various.

EE. State and Local Codes:

1. CEC-400-2012-004-CMF-Rev 2 – Energy Efficiency Standards for Residential and Nonresidential Buildings, published by California Energy Commission (CEC).
2. California Mechanical Code, published by the International Association of Plumbing & Mechanical Officials (IAPMO), 2013 Edition.
3. California Plumbing Code, published by the International Association of Plumbing & Mechanical Officials (IAPMO), 2013 Edition.
4. Various.

FF. Ten States Standards:

1. Recommended Standards for Water Works.
2. Recommended Standards for Wastewater Facilities.

GG. Underwriters' Laboratories, Inc. (UL) Approvals: Various.

1.3 DEFINITIONS

- A. Special Tools: Tools that have been specifically made for use on unit of equipment for assembly, disassembly, repair, or maintenance.
- B. Resonant Frequency: That frequency at which a small driving force produces an ever-larger vibration if no dampening exists.
- C. Rotational Frequency: The revolutions per unit of time usually expressed as revolutions per minute.
- D. Critical Frequency: Same as resonant frequency for the rotating elements or the installed machine and base.

- E. Peak Vibration Velocity: The root mean square average of the peak velocity of the vibrational movement times the square root of 2 in inches per second.
- F. Rotational Speed: Same as rotational frequency.
- G. Maximum Excitation Frequency: The excitation frequency with the highest vibration velocity of several excitation frequencies that are a function of the design of a particular machine.
- H. Critical Speed: Same as critical frequency.
- I. Free Field Noise Level: Noise measured without any reflective surfaces (an idealized situation); sound pressure levels at 3 feet from the source unless specified otherwise.

1.4 MECHANICAL DESIGN DRAWINGS

- A. Material Lists in Contract Drawings: The material lists included in the mechanical contract drawings are intended to provide general identification of the devices shown on the mechanical drawings. The material lists do not completely show all required devices, and quantities shown are approximate. Some pipe fittings, gaskets, bolting, miscellaneous hardware, and other items may not be included in the material lists, but are required. The Contractor shall furnish and install all materials necessary for a complete and operable system.
- B. Mechanical Drawings Developed for the District: Mechanical drawings and material lists developed for the District shall comply with the requirements specified hereinafter in MECHANICAL DESIGN REQUIREMENTS.

1.5 MECHANICAL DESIGN REQUIREMENTS

- A. Site Climatic Conditions:

Summer (0.5%)	97° F DB 68° F WB
Winter	21° F
Mean Daily Range:	30° F

- B. Environmental Conditions:

1. Site Elevations (above mean sea level): 370 +/- feet.
2. Design Flood Elevation: 376.00 NGVD29.
3. Max Cooling Water Temperature: 66° F.

C. Noise Limits and Abatement:

1. The design of any equipment installations shall conform to the maximum acceptable noise level and duration as defined by OSHA, city codes and applicable CEQA documentation. Noise shall be within both workplace limits for personnel exposure and property line limits. Insulation, sound traps, sound enclosures, and silencers shall be used as required to obtain acceptable levels.

D. Drawings:

1. All drawings prepared for the District shall comply with the following requirements.
2. Prepare all project drawings utilizing District standard drawing symbols, identification systems, equipment ID tagging systems, and abbreviations. The following is a list of District Standard Drawings, which shall be used as a guideline for drawing preparation; these drawings will also be included in the project drawing list:

Drawing Number	Description
9492-G-000.1	Abbreviations for Water Facilities Design Drawings, A Thru F
9492-G-000.2	Abbreviations for Water Facilities Design Drawings, G Thru R
9492-G-000.3	Abbreviations for Water Facilities Design Drawings, S Thru Z
9492-G-002	General Legend, Symbols, and Abbreviations For P&ID Drawings
9492-G-003	Symbols for P&ID Drawings – Valves, Fittings, and Miscellaneous Symbols, Sheet 1 of 3
9492-G-004	Symbols for P&ID Drawings – Sensing Elements, Sheet 2 of 3
9492-G-005	Symbols for P&ID Drawings – Equipment, Sheet 3 of 3
9492-G-006	Equipment Tag Number Codes and Colors, Sheet 1 of 2
9492-G-007	Equipment Tag Number Codes and Colors, Sheet 2 of 2

3. Abbreviations: Definitions of any abbreviations used in this document can be found on EBMUD Standard Drawings 9494-G-1 & 2, “Abbreviations for Water Facilities”. Use these abbreviations on all drawings.
4. System and Equipment Codes: Definitions of these codes can be found on EBMUD Standard Drawing 9492-G-001.2, G-006 and G-007, “Equipment Tag Number Codes and Colors”. Use these codes in all equipment, valve and instrumentation references in drawings and specifications.
5. Drafting Symbols: Definitions of the symbols for the P&ID drawings can be found on EBMUD Standard Drawings 9492-G-001 thru G-005. Use these

symbols on all P&ID drawings and as appropriate on schematic and isometric style drawings and details. Welding symbols shall conform to AWS 2.4.

6. Drawing Detail: Drawings shall contain scale plan, section and detail views. Schematics and isometric drawings may be used for additional detail. Provide sufficient detail to fabricate and install the design. Components shall be called out with sequentially numbered item bubbles. All piping and fittings that are over 2" nominal size shall be drawn to scale in a two-line format. Piping that is 2" and smaller may be shown with a single line representation. Use Standard District symbols, abbreviations and codes.
7. Piping Dimensions: Drawings shall contain complete piping dimensions for the fabrication of all piping sections over 2" nominal size. Dimensions shall be tiered, with the distance between flanges, tee centerlines and elbow centerlines shall be given on the outer dimension. Provide additional dimensions to the inside of this dimension in order to define the position of other process connections or components. Provide a dimensional reference to a corner of the structure. Define the position of any wall, roof and floor penetrations with dimensions. Vertical dimensions may be given as elevations, in feet, to the nearest hundredth foot.
8. Drawings Material Lists: The "ITEM" column shall match the individual bubble call-outs. The "REQUIRED" column shall indicate exact quantities of major components. Provide lengths (rounded up) for pipe sizes 3" and larger. Quantities of minor components may be indicated with "AS REQD". The "description" column has the following required format:

Component, Size, Material, Ratings, Configuration(s), End Type

Examples:

PIPE, 2", PVC, SCH 80

FLANGE, 8", STL, 150 LB, SLIP-ON, FF

ELBOW, 6", STL, STD WT, 45 DEG, BWE

THREADED OUTLET, 1" NPT OUTLET X 12" RUN, STL, 3000 LB

BALL VALVE, 1", BRONZE BODY, 150 LB, SST BALL, TFE SEATS,
THRD

9. Equipment ID Tagging: Conform the equipment tagging system on P&IDs to Drawing 9492-G-006. Install equipment tags per Section 01 91 13.10, "Asset Identification Tags". Install piping identification per Section 22 05 53.05, "Pipe Identification".

1.6 SYSTEM DESCRIPTION

A. General:

1. Provide equipment and parts that are suitable for stresses, which may occur during fabrication, transportation, erection, and operation.

2. Provide equipment that has not been in service prior to delivery, except as required by tests.
 3. Like parts of duplicate units are to be interchangeable.
 4. When 2 or more units of equipment for the same purpose are required, provide products of same manufacturer.
 5. Equipment manufacturer's responsibility extends to selection and mounting of gear drive units, motors or other prime movers, accessories, and auxiliaries required for proper operation.
 6. When necessary, modify manufacturer's standard product to conform to the specified requirements or requirements indicated on the drawings and contained in laws and regulations.
- B. Material Requirements:
1. Materials: Suitable for superior corrosion resistance and for services under conditions normally encountered in similar installations.
 2. Dissimilar Metals: Separate contacting surfaces with dielectric material.
- C. Power Transmission Systems:
1. Power Transmission Equipment: V-belts, sheaves, shaft couplings, chains, sprockets, mechanical variable-speed drives, variable frequency drives, gear reducers, open and enclosed gearing, clutches, brakes, intermediate shafting, intermediate bearings, and U-joints are to be rated for 24 hour-a-day continuous service or frequent stops-and-starts intermittent service, whichever is most severe, and sized with a minimum service factor of 1.5.
 - a. Apply a 1.5 service factor to nameplate horsepower and torque of prime source of power and not to actual equipment loading.
 - b. Apply service factors higher than 1.5 when recommended for continuous 24 hour-per-day operation and shock loadings specified in AGMA 6010-E88, other applicable AGMA standards, or other applicable referenced standards.
 - c. When manufacturer recommends service factor greater than 1.5, manufacturer's recommendation takes precedence.
- D. Vibration:
1. Resonant Frequency: Ensure there are no natural resonant torsional, radial, or axial frequencies within 25 percent above or below the operating rotational frequencies or multiples of the operating rotational frequencies that may be excited by the equipment design.

2. Design, balance and align equipment to meet the vibration criteria specified in individual equipment specification sections.
- E. Equipment Mounting and Anchoring:
1. Mount equipment on cast iron or welded steel bases with structural steel support frames. Utilize continuous welds to seal seams and contact edges between steel members. Grind welds smooth.
 2. Provide bases and supports with machined support pads, dowels for alignment or mating of adjacent items, adequate openings to facilitate grouting, and openings for electrical conduits.
 3. Provide jacking screws in bases and supports for equipment weighing over 1,000 pounds.
 4. Anchor equipment base to concrete pad. Determine number, size, type, and location of bolts, anchor bolts, or other connections.
 5. Provide bolt sleeves for anchor bolts for heavy equipment. Adjust bolts to final location and fill sleeve with non-shrink grout per API 686-96, Machinery Installation and Installation Design (Recommended Practice).
- F. Structural Design:
1. Design connections and related details for seismic design criteria as specified in Section 01 81 02.
 2. For equipment with operating weight of 400 pounds or more provide calculations for:
 - a. Determination of operating weight and centroid of equipment.
 - 1) Operating weight is to be weight of unit plus weight of fluids or solids normally contained in unit during operation.
 - b. Determination of seismic forces and overturning moments.
 - c. Determination of shear and tension forces in connections.
 - d. Design of connection details based on calculated shear and tension forces.
- G. Equipment Units Weighing 50 pounds or more: Provide with lifting lugs or eyes to allow removal with hoist or other lifting device.

1.7 SUBMITTALS

- A. General: The following submittal requirements are in addition to the submittal requirements specified under each individual technical specification section.

B. Product Data:

1. For each item of Equipment:

- a. Design features.
- b. Load capacities.
- c. Efficiency ratings.
- d. Material designations by UNS alloy number and ASTM Specification and Grade.
- e. Data needed to verify compliance with the Specifications.
- f. Catalog data.
- g. Name plate data.
- h. Clearly mark submittal information to show specific items, materials and accessories or options being furnished.

2. Gear Reduction Units:

- a. Engineering information per applicable AGMA standards.
- b. Gear mesh frequencies.

C. Shop Drawings:

1. Drawings for Equipment:

- a. Drawings that include outline drawings, cut-away drawings, parts lists, material specification lists, and other information required to substantiate that proposed equipment complies with specified requirements.

2. Outline drawings showing equipment, driver, driven equipment, pumps, seal, motor(s) or other specified drivers, variable frequency drive, shafting, U-joints, couplings, drive arrangement, gears, baseplate or support dimensions, anchor bolt sizes and locations, bearings, and other furnished components.

3. Installation and checkout instructions including leveling and alignment tolerances, grouting, lubrication requirements, and initial start-up procedures.

4. Wiring, control schematics, control logic diagrams and ladder logic or similar for computer based controls.

5. Recommended or normal operating parameters such as temperatures and pressures.

6. Alarm and shutdown setpoints for all controls furnished.

D. Calculations:

1. Calculations and other information to substantiate base plates, supports, and anchor bolts meet minimum design strength requirements and seismic design criteria specified in Section 01 81 02.
2. Bearing L10 life calculations in accordance with ABMA 9 or ABMA 11 calculation methods for drivers, pumps, gears, shafts, motors, and other drive line components with bearings.
3. Calculations and other information to substantiate that operating rotational frequencies meet the requirements of this Section.
4. Torsional Analysis of Power Transmission Systems: When torsional analysis is specified in the equipment Sections, provide:
 - a. Sketch of system components identifying physical characteristics including mass, diameter, thickness, and stiffness.
 - b. Results of analysis including first and second critical frequencies of system components and complete system.
5. Calculations for connection details demonstrating compliance with specified structural design requirements.
6. Professional Engineer registered in the State of California is required to stamp and sign calculations.

E. Quality Control Submittals:

1. Source quality control reports and certified test data as specified in Section 01 75 17.
2. Submit factory test reports before shipment.
3. Certified static and dynamic balancing reports for rotating equipment.
4. Final field alignment values (signed and dated by journeyman millwright).
5. Field quality control reports and test data as specified in Section 01 75 17.
6. Start-up Plan: Proposed plan for field testing equipment as specified in Section 01 75 17.
7. Certificate of Proper Installation: Provide as required in the individual technical specification sections.
8. Submit material test reports as specified in the equipment sections.

9. Submit NSF/ANSI 61 certification for all materials in contact with drinking water. If NSF certified before January 4, 2014 the material must be certified as meeting CA low lead requirement (NSF/ANSI 61 Annex G or NSF/ANSI 372).
10. References: Provide references from a minimum of 3 installations currently operating the same model equipment in continuous service for a minimum of 2 years under similar operating conditions. Reference information shall include location, service, contact person, and contact phone number.

F. Operation and Maintenance Manuals:

1. As specified in Section 01 33 00.
2. Provide at project site complete and final manuals for use by field personnel and Engineer prior to equipment delivery to the site.
3. Include manufacturer and model number of every bearing; include calculated ball pass frequencies of the installed equipment for both the inner and outer raceways.
4. Include motor rotor bar pass frequencies.
5. Factory and Field Settings: Include a complete and detailed list of all final factory and field settings for all instruments and devices. Insert this information into the final O&M manuals when available. This information shall also be included in all electronic versions of the O&M manuals.

1.8 QUALITY ASSURANCE

A. Qualifications: Equipment manufacturer and system component manufacturers to have a minimum of 5 years experience in the design, manufacture, and assembly of the specified equipment and components with an established record of successful operation of such equipment and components.

B. Manufacturer's Field Services:

1. Provide as required in the individual technical specification sections.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping:

1. Equipment: Pack in boxes, crates, or otherwise protect from damage and moisture, dust, or dirt during shipment, handling, and storage.
 - a. Include vendors name, model number, and equipment tag number.

2. Bearings: Separately pack or otherwise suitably protect during transport in accordance with manufacturer's instructions.
 3. Spare Parts: Deliver spare parts in accordance with Section 01 77 00 and deliver in boxes labeled with contents name, part number, equipment to which spare parts belong, and name of Contractor.
- B. Storage:
1. Equipment Having Bearings: Store in enclosed facilities. Rotate units at least once per month or more often as recommended by the manufacturer to protect rotating elements and bearings.
 2. Gear Boxes: Oil filled or sprayed with rust preventive protective coating.
- C. Protection:
1. Equipment: Protect equipment from deleterious exposure.
 2. Painted Surfaces: Protect against impact, abrasion, discoloration, and other damage.

1.10 SEQUENCING AND SCHEDULING

- A. Equipment Anchoring: Obtain from equipment manufacturers' anchoring material and templates or setting drawings in time for anchors to be cast-in-place when concrete is placed.
- B. Coordinate details of equipment with other related parts of the work, including verification that structures, piping, wiring, and equipment components are compatible.
- C. General Start-up and Testing of Equipment:
1. Perform general start-up and testing procedures after operation and maintenance manuals for equipment have been received.
 2. Conduct functional testing of mechanical or electrical systems when each system is substantially complete and after general start-up and testing procedures have been successfully completed.
 3. Functional testing requirements as specified in Sections 01 75 17, 33 09 11, and 26 08 00 and other individual equipment specification sections.

1.11 MAINTENANCE

A. Special Tools:

1. Provide any and all special tools required for operation and maintenance.
2. Mark or tag and list such tools in maintenance and operations instructions. Describe use of each tool.

B. Spare Belts:

1. When spare belts are specified, furnish a minimum of 1 spare belt for every different type and size of belt-driven unit, unless otherwise indicated.
 - a. Where 2 or more belts are involved, furnish matched sets.
 - b. Identify as to equipment, design, horsepower, speed, length, sheave size, and use.
 - c. Package in boxes labeled with identification of contents.

C. Spare Parts:

1. Assume responsibility until turned over to District.
2. Store in enclosed facilities.
3. Furnish itemized list and match identification tag attached to every part.
4. List parts by generic title and identification number.
5. Furnish name, address, and telephone number of supplier and spare parts warehouse.

1.12 SERVICE CONDITIONS

- A. Treated Water (Potable) Chemistry: Unless otherwise noted materials that contact water covered by this specification will be subjected to water that promotes galvanic corrosion. Materials and coatings shall be suitable for soft water (less than 50 ppm total dissolved solids) with pH from 6.5 to 9.5 and maximum total chlorine residual of 2.5 ppm (in chloramine or free chlorine form). The presence of chloramines in the water shall not have any effect on the manufacturer's warranty.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Bronze that contacts with water:
 - a. All bronze parts furnished that contact with water shall contain no more than 0.25 percent lead. Stainless steel or Monel might be considered an acceptable substitute for bronze as approved by the Engineer.
 - b. All bronze parts furnished that will contact with water shall contain no more than 16 percent zinc unless otherwise approved by the Engineer. Components made of UNS C87850 (Eco Brass), which contains more than 16 percent zinc, is an exception and is acceptable.
2. Elastomeric Linings, Seals and Gaskets that Contact Water:
 - a. The material for all elastomeric linings, seals and gaskets furnished that contact water shall be certified by the manufacturer to be chloramine resistant.
 - b. EPDM: When the Elastomeric material EPDM is specified for water service, it shall be peroxide-cured type and shall be certified by the manufacturer to be chloramine resistant. Sulfur-cured type EPDM is not acceptable.
3. The material for all bolting in chemical environments shall be 316 stainless steel. This includes but is not limited to flange bolts, assembly bolts and anchor bolts. Refer to section 05 05 26 for flange bolting and 05 50 00 for anchor bolts.

B. Materials in Contact with Drinking Water:

1. All materials in contact with untreated or treated drinking water (potable water) or in contact with substances injected into untreated or treated drinking water shall be tested and certified as meeting the specifications of NSF/ANSI 61-2013 in accordance with California Code of Regulations, Title 22, Section 64591. .
2. All materials in contact with drinking water (potable water) shall conform to the "Reduction of Lead in Drinking Water Act" of 2014.

2.2 BEARINGS

- #### A. Type: Oil or grease lubricated, ball or roller antifriction type, of standard manufacture.

- B. Oil Lubricated Bearings: Provide either pressure lubricating system or separate oil reservoir splash type system.
 - 1. Oil Lubrication Systems: Sized to safely absorb heat energy normally generated in bearings under maximum ambient temperature of 50 degrees Celsius; provide external cooler when required, air cooled if water cooling source not indicated on the drawings. Equip with filler pipe and external level gauge.
- C. Grease Lubricated Bearings, Except Those Specified to Be Factory Sealed: Fit with easily accessible grease supply, flush, drain, and relief fittings.
 - 1. Lubrication Lines and Fittings:
 - a. Lines: Minimum 1/4 inch diameter stainless steel tubing.
 - b. Multiple Fitting Assemblies: Mount fittings together in easily accessible location.
 - c. Use standard hydraulic type grease supply fittings.
 - 1) Manufacturer:
 - a) Alenite.
 - b) Zurk.
 - c) Or equal as approved by the Engineer.
- D. Ratings: Rated in accordance with ABMA 9 or ABMA 11 for L10 rating life of not less than 50,000 hours.
 - 1. Higher ratings, when specified in other Sections, supersede preceding requirement.

2.3 SAFETY GUARDS

- A. Drive Assemblies: Enclose sprockets, belts, drive chains, gearings, couplings, and other moving parts on drive assemblies in safety enclosures that are in compliance with applicable Laws and Regulations.
- B. Shafts: Provide guards that protect personnel from rotating shafts or components within 7.5 feet of floors or operating platforms.
- C. Hot Surfaces: Insulate all surfaces with normal operating temperatures above 120 degrees Fahrenheit when surface is within 7.5 feet height from any operating floor or level; insulation thickness such that temperature is below 120 degrees; cover insulation with moisture-proof protective jacket; insulation Type 3 and cover Type 5 as specified in Section 40 42 13.10, Processing Piping Insulation.

D. Guard Requirements:

1. Allow visual inspection of moving parts without removal.
2. Allow access to lubrication fittings.
3. Prevent entrance of rain or dripping water for outdoor locations.
4. Size belt and sheave guards to allow for installation of sheaves 15 percent larger and addition of one belt.

E. Materials:

1. Sheet Metal: Carbon steel, 12-gauge minimum thickness, hot-dip galvanized after fabrication.
2. Fasteners: Type 304 stainless steel.

2.4 SPRING VIBRATION ISOLATORS

A. Design Requirements:

1. Telescopic top and bottom housing with vertical stabilizers to resist lateral and vertical forces.
2. Use steel coil springs.
3. Design vibration isolators in accordance with seismic design criteria as specified in Section 01 81 02.

B. Performance Requirements: Minimum spring deflection of 1 inch under static load and capable of limiting transmissibility to 10 percent maximum at design operating load.

C. Manufacturers: One of the following or equal as approved by the Engineer:

1. California Dynamics Corporation, Type RJSD.
2. Mason Industries, equivalent product.

D. Materials:

1. Fabricate isolators using welded steel or shatterproof ductile iron in accordance with ASTM A536 Grade CS-45-12.
2. Spring Steel: ASTM A125.

2.5 FABRICATION

A. Nameplates:

1. Engraved or stamped on Type 304 or 316 stainless steel and fastened to equipment at factory in an accessible and visible location.
2. Indicate Following Information as Applicable:
 - a. Manufacturer's name.
 - b. Equipment model number and serial number.
 - c. Maximum and Normal rotating speed.
 - d. Horsepower.
 - e. Rated capacity.
 - f. Service class per applicable standards.
3. Nameplates for Pumps: Include:
 - a. Rated total dynamic head in feet of fluid.
 - b. Rated flow in gallons per minute.
 - c. Impeller, gear, screw, diaphragm, or piston size.
4. Gear Reduction Units: Include:
 - a. AGMA Class of service.
 - b. Service factor.
 - c. Input and output speeds.

B. Bolt Holes in Equipment Support Frames: Do not exceed bolt diameter by more than 25 percent, up to limiting maximum diameter oversize of 1/4 inch.

C. Coating:

1. Provide factory and field finish coatings with the system and color specified on the "Finish, Coating and Color Schedule" on the Drawings.

2.6 OILS, GREASE AND LUBRICANTS

A. All oils, grease and lubricants used in association with potable water equipment shall be suitable for the intended service and NSF approved for potable water service.

B. Acceptable Products:

1. Wise Solutions (<http://www.wisesolutions.net/index.php/>).
2. Renewable Lubricants (www.renewablelube.com).
3. Or equal as approved by the Engineer.

2.7 RUST INHIBITOR

- A. Carbon steel flange faces shall be coated with a lubricant or rust inhibitor conforming to an NSF 116-2000 class H1 (acceptable for incidental food contact) as approved by the Engineer. This inhibitor shall be applied only after application and curing of all other coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect all components for shipping damage, conformance to specifications, and proper torques and tightness of fasteners.

3.2 PREPARATION

A. Metal Work Embedded in Concrete:

1. Accurately place and hold in correct position while concrete is being placed.
2. Clean surface of ferrous metal in contact with concrete immediately before concrete is placed.
3. Embedded metal shall not touch rebar unless otherwise directed by the design documents.

B. Concrete Surfaces Designated to Receive Grout:

1. Give surfaces heavy sandblasting treatment.
2. Clean surfaces of sandblasting sand, grease, oil, dirt, and other foreign material that may reduce bonding of grout.
3. Concrete Saturation: Saturate concrete with water. Concrete surface shall be damp concrete at time grout is placed.

3.3 FIELD MEASUREMENTS:

- A. Prior to fabrication of equipment, take measurements for installation of equipment and verify dimensions indicated on the drawings. Ensure equipment and ancillary appurtenances fit within available space. Tolerance for horizontal and vertical positioning of equipment shall within $\pm 1/8$ " of the dimensions shown on the drawings, unless otherwise shown.

- B. Piping positioning tolerances shall be per Section 40 20 20.
- C. Positioning accuracy:
 - 1. Horizontal, vertical elevation and true plumb positioning of piping and equipment shall be accurately measured using a Total Station Theodolite (TST), which is an electronic theodolite with an integrated Electronic Distance Meter (EDM).
 - 2. The TST used shall be construction grade having a minimum accuracy of:
 - a. Angle: 3-seconds.
 - b. Distance: $\pm 3\text{-mm} + 2\text{-ppm}$.
 - 3. The TST shall be operated by a qualified surveyor or technician trained and certified for the instrument. Documentation of operator qualifications shall be provided to the Engineer upon request. Acceptance or rejection of the qualifications shall be determined by the Engineer.
 - 4. The use of string lines and measuring tapes is not acceptable for final positioning.

3.4 INSTALLATION

- A. Install pumps, generators & other equipment in accordance with manufacturer's installation instructions and recommendations, and the related specification sections.
- B. Install and commissioning of piping: in accordance with Section 40 20 20 – Mechanical Piping.
- C. Install and commission instrumentation: in accordance with manufacturer's installation instructions and recommendations, and Section 33 09 11 – Instruments and Recorders.
- D. Valve Access: Valves that can be operated manually and are mounted 6-feet or higher above the finished floor shall be furnished with chain assist mechanisms.
 - 1. Multiturn valves shall be furnished with chain wheel system, and quarter turn valves shall be furnished with a chain bar wrench system.
 - 2. Chain pull shall be a maximum of 40 pounds under any operating condition.
 - 3. Chains shall extend to 3 feet above the floor and shall be provided with holdback devices when the normal chain fall is in a walkway.
- E. Lubrication Lines and Fittings:
 - 1. Lines from Fittings to Point of Use: Support and protect.

2. Fittings:
 - a. Bring fittings to outside of equipment in manner such that they are readily accessible from outside without necessity of removing covers, plates, housings, or guards.
 - b. Fittings shall have a minimum of 18-inches clear space directly in front of the fitting for easy grease-gun access.
 - c. Mount fittings together wherever possible using factory-mounted multiple fitting assemblies securely mounted, parallel with equipment lines, and protected from damage.
 - d. Fittings for Underwater Bearings: Bring fittings above water surface and mount on edge of structure above.

F. Alignment of Drivers and Equipment:

1. All alignment procedures shall be completed by a journeyman millwright, or factory machinist.
2. Where drive motors or other drivers are connected to driven equipment by flexible coupling, disconnect coupling halves and align driver and equipment after complete unit has been leveled on its foundation.
3. Comply with procedures of appropriate Hydraulic Institute Standards, AGMA Standards, alignment tolerances of equipment manufacturers and the following requirements to bring components into angular and parallel alignment:
 - a. Maximum Offset Misalignment: 2.0 mils Total Indicator Runout (TIR) in any plane, or per manufacturer's recommendations; whichever value is smaller.
 - b. Maximum Angular Misalignment: 0.5 mils/inch (mils gap differential per instrument travel diameter), or per manufacturer's recommendations; whichever value is smaller.
 - c. Utilize jacking screws, wedges, or shims as recommended by the equipment manufacturer and as specified in the equipment sections.
4. Use Reverse-indicator Arrangement Dial Type or Laser Type Alignment Indicators: Mount indicators on the driver/coupling flange and equipment/coupling flange. Alignment instrumentation accuracy to be sufficient to read angular and offset misalignment at 10 percent or less of the acceptable misalignment.
5. Alignment and calculations to include measurement and allowance for thermal growth, spacer coupling length, indicator separation and axial spacing tolerances of the coupling.

6. When alignment satisfies most stringent tolerance of system components, tighten anchor bolts and grout between base and foundation. Allow minimum 48 hours for grout to harden. After grout hardens, remove jacking screws, fully tighten anchor bolts, and recheck alignment. Correct alignment as required.
7. After testing is complete, dowel motor or drivers and driven equipment. Comply with manufacturer's instructions.
8. Final alignment report including final misalignment values (both linear and angular) shall be submitted for review. The report shall be dated and signed by the journeyman millwright that completed the alignment.

G. Grouting Equipment Bases:

1. Comply with manufacturer's installation instructions and API Recommended Practice 686 Latest Edition, (Chapter 5, Section 3 in April 1996 version) for grouting spaces, and tolerances for level and alignments, both vertical and horizontal.
2. Grout base when piping connections are complete and in alignment with no strain transmitted to equipment.
3. Grout base when equipment is leveled and in alignment.
4. Epoxy Grout: As specified in Section 03 60 00.

H. Special Techniques: Use applicable special tools and equipment, including precision machinist levels, dial indicators, and gauges as required in equipment installations.

3.5 EBMUD FIELD CALIBRATION TAGS

A. Complete and install Field Calibration Tags on all instruments, pilot valves, relief valves, and other devices with ranges, setpoints, deadbands, and/or offsets. Record the verified settings on the EBMUD Field Calibration Tag with a black extra-fine point black permanent marker and affixed to the instrument with an 18 lb nylon cable tie. The Engineer shall witness the process. The blank tags are furnished by the District. Below is an example of the blank tag:



Field Calibration Tag

Equipment Tag ID: _____

Input: LR \sqrt{e}	UR \sqrt{e}	Units=
Output(scale): LR \sqrt{e}	UR \sqrt{e}	Units=
Setpoints: 1=	2=	Units=
Deadband=	Offset=	

Remarks: _____

Technician: _____ Inspector: _____ Date: _____

B. Definitions:

1. Deadband: The area of a signal range where no action occurs to prevent oscillation or repeated activation-deactivation cycles (“hunting”).
2. Offset: A value entered to compensate for mounting position or other effects. For pressure transmitters, this is typically compensation for the difference in the mounted elevation of the transmitter relative to the centerline elevation of the process pipe.
3. LRV = Lower Range Value.
4. Setpoints: The desired value specified on the P&ID for controlling a system. Dual switches will have two.
5. Units: The engineering units used, including: mA, gpm, psig, ft-H₂O, deg F, etc.
6. URV = Upper Range Value.

3.6 FIELD QUALITY CONTROL

- A. Test equipment as specified in Section 01 75 17 and the individual specification technical sections.

END OF SECTION

SECTION 33 12 16.32

ELECTRIC MOTOR VALVE ACTUATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Furnish and install Electric Motor Actuators for the valves listed in Table A.
- B. Related sections:
 - 1. Section 01 33 00 – Submittal Procedures.
 - 2. Section 01 45 27 – Shop Inspection.
 - 3. Section 01 75 17 – Field Testing and Startup.
 - 4. Section 33 12 01 – Basic Mechanical Materials and Methods.
 - 5. Section 40 05 59.34 – Fabricated Stainless Steel Slide Gates.

1.2 SUBMITTALS

- A. All electric motor valve actuators furnished of the same voltage class shall be by the same manufacturer, unless approved in writing by the Engineer prior to submittals or manufacture.
- B. Submittals in this section shall be submitted as a complete system with their respective valve submittals.
- C. It is the responsibility of the Contractor to coordinate the valve and actuator requirements with both valve and electric motor actuator vendors.
- D. Submit the following prior to assembly:
 - 1. See the submittal content requirements listed in “Electric Motor Valve Actuator Technical Submittal Checklist” attached at the end of this section.
 - 2. Each page of the submittal shall have a unique sequential page number (hand-written is acceptable, but must be completely legible).
 - 3. The first page of the submittal shall include the “Electric Motor Valve Actuator Technical Submittal Checklist” completed by the manufacturer’s representative. Each submittal requirement listed in the checklist shall include the corresponding submittal page number(s).
 - 4. If the “Electric Motor Valve Actuator Technical Submittal Checklist” is not included with the submittal or if all portions of the checklist are not completed

accurately by the manufacturer's representative, the submittal will be returned without review.

E. Submit the following prior to shipping:

1. Operations and Maintenance (O&M) Manual:

- a. Provide submittals for each type of actuator in accordance with Section 01 33 00.
- b. In addition to the requirements in Section 01 33 00, O&M manuals shall include:
 - 1) Copies of all final technical submittals.
 - 2) As-built actuator wiring diagrams.
 - 3) A section for field installation certification and field test results. The Contractor shall furnish the required number of copies for insertion into the final O&M Manuals.
 - 4) Certified copies of all tests made under AWWA Standard C542, Performance Tests shall be furnished by the Contractor whether or not the tests are witnessed by the Engineer.
- c. O&M manual materials shall be included with the manual for the corresponding valve and submitted as a single valve and actuator system O&M manual.

2. Field Functional Test Procedures: In accordance with Section 01 75 17 and as specified herein. Coordinate and submit valve and actuator test procedures in a single submittal. Submittals shall include applicable appendices 01 75 17 B Startup and Commissioning Test Forms.

F. Submit prior to field testing:

1. Manufacturer's Certificate of Proper Installation (copy to be inserted by the Contractor in the final O&M Manuals).

G. Submit after field testing:

1. Field Test Results (copy to be inserted by the Contractor in the final O&M Manuals).

1.3 REFERENCES

- A. ANSI/AWWA C542-09 – AWWA Standard for Electric Motor Actuators for Valves and Slide Gates.

- B. NEMA MG-1 – National Electric Manufacturers Association Standard for Motors and Generators.

1.4 OPERATING CONDITIONS

- A. Valve actuators shall be installed outdoors with unheated and unconditioned air conditions. Temperature will vary from 35 degrees Fahrenheit to 104 degrees Fahrenheit and actuators may be in direct sunlight. Because these are water facilities humidity levels can be high. Typical humidity ranges are 60 percent to 97 percent.
- B. Water temperature will be between 40 degrees Fahrenheit and 78 degrees Fahrenheit.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Electric motor actuators shall comply with AWWA Standard C542 except as modified in this specification. In cases where the requirements of this specification conflict with the AWWA requirements, the requirements of this specification shall govern.
- B. All electric motor actuators provided under this specification of the same power supply voltage shall be made by the same manufacturer.
- C. The Contractor shall provide the Engineer with an affidavit of compliance from the manufacturer or the manufacturer's authorized representative that the motor operators furnished comply with the applicable provisions of AWWA Standard C542 and this specification (see AWWA Standard C542, Affidavit of Compliance).
- D. Torque:
 - 1. The rated torque capability of each actuator assembly (motor and gear) shall at a minimum meet the Actuator Sizing Torque (AST). The actuator sizing torque (AST) shall be calculated by the manufacturer and based on the minimum required sizing torque (MRST) times the application factor (AF).

$$AST = AF \times MRST$$

- 2. The application factor (AF) is defined per AWWA C519 Table 2. The valve's required torque shall be as defined in AWWA C519: minimum required shaft torque (MRST). The minimum shaft torque (MRST) shall be provided by the manufacturer. The torque at both the seated position (seating and unseating) and the midstroke maximum (5 degrees to 90 degrees) total dynamic run (opening or closing) shall be evaluated using the valve under the differential pressure and pipeline velocity shown in Table A.
 - 3. Unless the referenced valve section (See Table A) requires that the valve be designed to isolate flow in both directions, the valve's required torque shall be for installation in the preferred direction.

- E. If adjustable mechanical stop-limiting devices are used, they shall be accurately set and locked by the valve manufacturer.
- F. Motor actuators shall be able to operate the valve from fully open to fully closed position, or the reverse, within the range of allowable stroke times shown in Table A.
- G. Use only copper wiring inside the actuator, the use of aluminum wiring is not acceptable.
- H. If a handheld remote control unit is required for actuator setup and calibration, one unit shall be furnished for each actuator.

2.2 ELECTRIC MOTOR ACTUATORS FOR SMALL QUARTER-TURN VALVES (120V POWER SUPPLY AS INDICATED IN TABLE A)

- A. Power Supply: 120V, 1 phase, 60 Hz.
- B. Motor:
 - 1. High starting torque motor, minimum 25 percent duty, with auto reset thermal sensor.
- C. Housing and Enclosure:
 - 1. Die cast aluminum, epoxy coated, rated NEMA 4X.
 - 2. Dual conduit openings.
- D. Gearing:
 - 1. All power train gears shall be metallic and shall be machine cut. Non-metallic gears are not acceptable.
- E. Position Switches:
 - 1. Two standard end-of-travel switches, SPDT, rated 10 amps at 120VAC.
- F. Rotation:
 - 1. Nominal 90 degrees, with +/- 5 degree adjustable mechanical travel stops. Stops shall be able to withstand maximum actuator torque.
- G. Controls:
 - 1. Provide LOCAL/OFF/REMOTE selector switch and OPEN/CLOSE pushbuttons to enable local operations or operation from remote isolated contacts.
- H. Other features:

1. Handwheel manual override, visual position indicator.
- I. Acceptable Manufacturers:
1. Bray series 70.
 2. Remote Control series RCEL.
 3. Or equal as approved by the Engineer.
- 2.3 ELECTRIC MOTOR ACTUATORS FOR LARGE VALVES (208V OR 480V POWER SUPPLY AS INDICATED IN TABLE A)
- A. Actuators shall include an intermediate reduction gear (worm gear, helical or spur gear type or combinations thereof) in a separate gear box located between the valve and the electric actuator.
1. Motor starters shall be solid state reversing type.
 2. Terminal connections for District use shall be located in a sealed terminal compartment that is separated from control components.
 3. The motor and controls enclosures shall have space heaters, 120 volt AC, or shall be double-sealed
- B. Motors:
1. The actuator motors shall meet the requirements of AWWA C542, Electric-Motor Actuators. General Design and shall be totally enclosed, ball-bearing, squirrel-cage, 3-phase, induction motors, Class "F" insulated or higher, for operation at the voltage specified in Table A. Motors shall be provided with solid state thermistors to prevent damage due to temperature overloads.
 2. Starts per Hour: Motors and controls shall be suitable for 1,200 starts per hour when actuators are shown as modulating in Table A. Other motors and controls shall be suitable for 60 starts per hour minimum unless otherwise noted. Duty cycle time must be a minimum of twice stroke time as listed in Table A.
- C. Position Sensing and Indication:
1. Position sensing circuits shall be solid state with no electro-mechanical contacts.
 2. Actuators shall have a local position indicator digital readout in percent open units.
 3. Remote position indication shall be provided via a 4-20 mA output signal.

D. Torque Sensing:

1. The actuator shall include adjustable torque sensing to limit actuator output torque in both the opening and closing directions.
2. The torque sensing feature shall be factory set to be 110 percent of the maximum torque required by the valve or as otherwise determined to be appropriate by the manufacturer and approved by the Engineer.

E. Contacts for District Use:

1. Four contacts for District use shall be wired to the terminal block that can be configured to perform any of the following functions:
 - a. Normally open contact to close when valve is 100 percent closed (valve closed status).
 - b. Normally open contact to close when valve is 100 percent open (valve open status).
 - c. Normally open contact to close at a field adjustable point when valve is from 2 percent to 100 percent open. This switch to be factory set to close when valve is 3 percent open (this switch shall actuate controls to turn off main pumps).
 - d. Normally open contact to close when the actuator's selector switch is in the "remote" position.

F. Electric Controls:

1. All control components shall be enclosed in a sealed compartment separated from the external connection terminal compartment.
2. Actuator calibration shall be "non-intrusive" such that no electrical compartments need to be opened to set position limits or torque limits.
3. Limit sensing, three-phase reversing starter, and other required controls shall be mounted in a NEMA 4X weatherproof enclosure which shall also contain a space heater powered from the actuator. Enclosure shall be supplied complete with 120 VAC control transformer unless the power supply is 120 VAC.
4. Reversing starter shall be electrically and mechanically interlocked, complete with overload relay and automatic reset. In addition each starter shall be provided with one normally open auxiliary run status contact wired to terminal strip for district use.
5. The reversing starters for modulating service valves shall be of a solid state design.

6. Unless stated otherwise, a 4-20 mA input signal shall be used for position control of modulating service valves , as noted in Table “A” of this Section.
7. Local controls shall include one selector switch marked "remote-stop-local", controls for OPEN and CLOSE operation and indicator lights for OPEN and CLOSE positions. Controls shall be heavy-duty oil-tight, and contacts shall meet NEMA A300 or A600 standards.
8. All devices and controls in the limit switch compartment shall be factory wired. All connections to external or field devices must be wired to the terminal block in the terminal compartment. Refer to Project Drawings for elementary diagram.
9. The actuator shall be equipped with an optional interrupt timer that allows the stroke time to be adjusted by pulsing/stepping the motor.
 - a. Actuator must also comply with stroke time in Table A without pulsing.
10. The actuator shall be equipped with a phase correction circuit that detects and corrects motor rotation faults.

G. Handwheels:

1. Surfaces shall be smooth with no rough edges to cut or abrade the person operating the valve.
2. The handwheel diameter shall be between 12-inch and 24-inch.
3. The maximum rim pull shall not exceed 40 pounds under any operating condition including breakaway.
4. The handwheel shall not turn when power is applied to the motor.

H. Factory Finish:

1. Manufacturer's standard factory finish shall be used.

I. Acceptable Manufacturers:

1. Limitorque MX.
2. AUMA SA range with AC Intelligent Controls.
3. Or equal as approved by the Engineer.

2.4 SINGLE PHASE ELECTRIC MOTOR ACTUATOR FOR 233-WSS-MOA-421-2 AND 233-WSS-MOA-422-2.

A. Supply in accordance with Section 2.3 except for as follows:

B. Motors:

1. The actuator motors shall meet the requirements of AWWA C542, Electric-Motor Actuators. General Design and shall be totally enclosed, ball-bearing, squirrel-cage, single-phase, induction motors, Class "F" insulated or higher, for operation at the voltage specified in Table A. Motors shall be provided with solid state thermistors to prevent damage due to temperature overloads.
 2. Motors and controls shall be suitable for 1200 starts per hour when actuators are shown as modulating in Table A. Other motors and controls shall be suitable for 60 starts per hour minimum unless otherwise noted.
 3. Motor Duty Cycle shall be a minimum of 15 minutes.
- C. Acceptable Manufacturers:
1. Limitorque MX.
 2. AUMA
 3. Or equal as approved by the Engineer.

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TABLE A
ELECTRIC MOTOR ACTUATORS FOR NEW VALVES AND GATES

Tag # and Location	Valve or Gate Spec Section	Valve Size (inch) or Gate Size (inch x inch)	Modulating Service (Yes/No)	Power Supply Voltage (VAC)	Required Starts per Hour, minimum	Handwheel Rotation to Open ¹	Acceptable Stroke Time Range ² (sec)	Maximum Differential Pressure Forward/Reverse (psi)	Maximum Flow Velocity ³ (ft/s)
8-RWS-MOA-024-2 8-RWS-MOA-025-2	40 05 59.34	72x84	Yes	208	1200	CCW	500	See Gate Section	See Gate Section
233-RWS-MOA-404	40 05 59.34	114x144	Yes	480	1200	CCW	720	See Gate Section	See Gate Section

Notes:

1. CW =Clockwise, CCW =Counterclockwise
2. Stroke time with continuous movement, without pulsing.
3. With the valve full open.

PART 3 - EXECUTION

3.1 SHIPPING AND HANDLING

- A. Electric motor actuators shall be stored per the manufacturer's instructions.
- B. Electric motor actuators shall be stored inside a heated building or structure and shall have dust tight plastic coverings.

3.2 INSTALLATION

- A. All powered actuators shall be sized and installed by an authorized representative of the actuator manufacturer.
- B. Install per manufacturer's instructions and as shown on drawings.
- C. All actuators shall be installed with good access to pushbutton controls and the declutch lever and the manual override handwheel. Installation shall include adequate clearances with walls or other obstacles to remove enclosure covers, and motor, and to maintain safe electrical device work clearances.
- D. All valve and actuator assemblies shall be shop or factory assembled. All mechanical end travel (stops), torque and limit settings shall be shop or factory

adjusted and tested. Assembled units shall be fully stroked (open-closed-open or closed-open-closed) in the shop or factory at least three times.

3.3 INSPECTIONS

- A. All electric motor operators will be inspected upon delivery for compliance with these specifications. Any actuator found not to comply will not be accepted until deficiencies are corrected.
- B. Each actuator shall be performance-tested at the factory per AWWA C542. Position switches, torque switches and mechanical stops shall be set for the test. During factory testing, the actuators shall operate without any intermittent or continuous tapping sounds. Operator exhibiting any noises other than a quiet and continuous motor noise during operation shall be repaired, or replaced, and then retested prior to shipping:
 - 1. At the discretion of the Engineer, the District will have a representative at the shop to witness the testing of the actuators. See Section 01 45 27 for inspection advance notification requirements and travel expenses. Failure by the Engineer to inspect or witness tests at the shop or factory shall not be construed as waiving inspection upon delivery.
- C. Contractor shall repair all coating defects in accordance with the coating manufacturer's instructions. Stainless steel, brass or bronze items shall not be coated.

3.4 FIELD TESTING

- A. Valve actuators shall be tested with the valve during the Field Functional Test and in accordance with Section 01 75 17.
- B. Valve and actuator and all appurtenances shall be tested together as a system.
- C. Demonstrate smooth and quiet operation of all actuators without any intermittent or continuous tapping sounds. Operator exhibiting any noises other than a quiet and continuous motor noise during operation shall be repaired, or replaced, and then retested at the sole expense of the Contractor.
- D. Electric Motor Actuators: Complete the field functional tests in accordance with the Field Functional Test Form at the end of this Section, and as directed by the Engineer.

3.5 SUPPLEMENTS

- A. The following supplements follow END OF SECTION and are a part of this section:
 - 1. Electric Motor Valve Actuator Technical Submittal Checklist.
 - 2. Field Functional Test Data Form.

END OF SECTION

**ELECTRIC MOTOR VALVE ACTUATOR
TECHNICAL SUBMITTAL CHECKLIST
(Manufacturer's Representative to complete one form per submittal)**

SPEC. SECTION TITLE & NO:		
TAG NO(s):		
SUBMITTAL CONTENT REQUIREMENTS	Page Number(s)	
1. Certified manufacturers' drawings shall include:		
a. Motor operator dimensions, construction details and materials.		
b. An outline drawing showing proposed orientation and mounting on the valve, with overall dimensions.		
c. A drawing showing the proposed valve/actuator orientation and relationship to nearby structures or obstacles. The drawing should also show floor/ platform location and any wall within 6 feet.		
d. Provide net weight of each actuator including required intermediate reduction gear.		
e. Coating materials to be used.		
2. For electric motor actuators, certified drawings shall also include:		
a. Electric wiring diagrams for position switches, power and control systems. These diagrams shall show the terminal designations for the control wiring.		
b. Number of handwheel turns to open the valve.		
c. Motor nameplate data.		
d. Weights of actuators and gearing assemblies.		
3. A data sheet summarizing all pertinent data for the actuator and the valve, including valve and actuator torques, motor and actuator nameplate data, starts per hour, motor duty time, total combined valve and actuator weights, valve pressure rating, speed range capability, factory set open and closing times, gear ratio for the electric actuator and the intermediate reduction gear, etc.		
4. Electric Motor Actuator Calculations for sizing the actuators meeting all the requirements at the maximum differential pressure and velocity conditions listed in Tables A. Include any referring calculations and/or literature in the reference pages.		
a. Required Actuator Torque (150% of Total Valve Torque) =	(e.g. 125 ft-lbs)	
b. Motor RPM =	(e.g. 43 RPM)	
c. Motor Torque =	(e.g. 25 ft-lbs)	
d. Gearbox Ratio=	(e.g. 350:1)	
e. Input Turns =	(e.g. 1050 turns)	

SPEC. SECTION TITLE & NO:		
TAG NO(s):		
SUBMITTAL CONTENT REQUIREMENTS		Page Number(s)
f. Operating Time =	(e.g. 124 sec)	
g. Duty Cycle Time =	(e.g. 15 minutes)	
h. Handwheel Diameter =	(e.g. 12")	
i. Rim Pull =	(e.g. 18 lbs)	
5. All electric actuator commissioning settings, including torque and limit switch settings.		
6. Drawing and calculation requirements shall meet the requirements of Section 33 12 01, Basic Mechanical Materials and Methods.		
7. All electric actuator commissioning settings, including torque and limit switch settings.		
8. Affidavit of Compliance.		
Append Electric Motor Valve Actuator Technical Submittal Checklist to the valve technical submittal checklist.		

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: Orinda WTP Disinfection and Chemical Systems Safety Improvements

Equipment Name: Electric Motor Valve Actuators

Tag No.: _____

Test Date(s): _____

Section No.: 33 12 16.32

P&ID No. _____

I. Pretest Documentation/Setup

Documents:

This test shall be conducted in conjunction with the valve functional test per 01 75 17 and Appendix B.11 Startup and Commissioning. Append these results to the valve test data sheet.

Field Test Setup (Identify any test instrument, special setups like tanks, hoses, etc): amp meter, volt meter

II. Field Functional Test

	<u>Yes</u>	<u>No</u>	<u>NA</u>	
1. Calibration/Loop/Electrical				Comments:
1.1 Instrument commissioning complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1.2 Loop Checks complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1.3 Electrical commissioning complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Installation Check				Comments:
2.1 Correct equipment tags have been installed (tags shall match P&IDs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.2 All fields on Asset List Spreadsheet completed for device (Contractor shall show inspector at the time of the test that the asset list is complete and accurate for this system)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.3 Verify O&M manual installation instructions have been completed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.4 Verify that the motor and actuator frame is electrically grounded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.5 Verify all position switches are properly adjusted and functional (see P&IDs for switch settings).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: Orinda WTP Disinfection and Chemical Systems Safety Improvements

Equipment Name: Electric Motor Valve Actuators

Tag No.: _____

Test Date(s): _____

Section No.: 33 12 16.32

P&ID No. _____

3. Operations Check	<u>Pass</u> <u>Fail</u> <u>NA</u>	Comments:
3.1 <u>Electrical Imbalance Test</u> : Measure and record input voltage motor amperes on each phase at the terminals of the motor. Verify that there is no significant phase imbalance, and that adequate voltage levels are applied to the motor.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
3.1 <u>Actuator Stroke Time</u> : Open and close each valve fully and measure and record stroke time in both directions. Stroke time shall be between __ – __ seconds.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
3.2 <u>Valve Closure Test</u> : Close the valve with the actuator and verify that the valve is leak tight (this test should be done with the valve "Leakage Test"). Adjust the actuator and repeat the test as necessary so that the valve closes fully meeting the leakage requirements.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
3.3 <u>Actuator Operation Test</u> : The actuator operates smoothly and quietly without any intermittent or continuous tapping sounds.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
4. Controls Check	<u>Pass</u> <u>Fail</u> <u>NA</u>	Comments:
4.1 <u>Local Check</u> : Place the actuator in "LOCAL" control mode, manually opening and closing the valve at the actuator, and verifying that the local valve position indicator and remote position indication 4-20 mA output signal (if applicable) read the proper values.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
4.2 <u>Open/Close Service Valves</u> : Simulate an open or close remote contact input signal and verify that the valve opens and closes.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
4.3 <u>Modulating Service Valves</u> : Simulate a 4-20 mA remote position input signal and use the following values: 0, 25, 50, 75, and 100 percent open. Verify that the valve opens or closes to the correct position without overshooting the target position. Also, verify that the local valve position indicator and remote position indication 4-20 mA output signal read the proper values at each position.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: Orinda WTP Disinfection and Chemical Systems Safety Improvements

Equipment Name: Electric Motor Valve Actuators

Tag No.: _____

Test Date(s): _____

Section No.: 33 12 16.32

P&ID No. _____

4.4 <u>Status Checks</u> : Verify motor run status operates properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Alarms Check	<u>Pass</u>	<u>Fail</u>	<u>NA</u>	Comments:
none	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6. Run Check	<u>Pass</u>	<u>Fail</u>	<u>NA</u>	Comments:
none	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. Other Tests and Checks	<u>Pass</u>	<u>Fail</u>	<u>NA</u>	Comments:
7.1 <u>Field Calibration Tag</u> : Attach to the valve actuator at the conclusion of the functional test. Tag shall include valve tag number, type of valve service (OPEN/CLOSE, or MODULATING), actuator stroke time (recorded above), and position switch settings (including switch tag numbers).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.2 Cover and seal the actuator to protect it from dust and water prior to operation (covers shall be removed prior to startup test).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

III. Participants/Witness	
Test conducted:	
By (signature): _____	Date: _____
Title: _____	Company Name: _____
By (signature): _____	Date: _____
Title: _____	Company Name: _____
EBMUD Witness:	
By (signature): _____	Date: _____

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **Orinda WTP Disinfection and Chemical Systems Safety Improvements**

Test Date(s): _____

Equipment Name: **Electric Motor Valve Actuators**

Section No.: **33 12 16.32**

Tag No.: _____

P&ID No. _____

Title: _____

SECTION 40 05 59.34

FABRICATED STAINLESS STEEL SLIDE GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Fabricated stainless steel slide gates.
- B. Gate manufacturer's responsibility shall extend to sizing, selection, and furnishing of associated electric actuators.
- C. Related sections:
 - 1. Section 01 33 00 – Submittals Procedures.
 - 2. Section 01 45 27 – Shop Inspection.
 - 3. Section 01 75 17 – Field Testing and Startup.
 - 4. Section 01 79 00 – Demonstration and Training.
 - 5. Section 05 05 24A – Mechanical Anchoring and Fastening to Concrete and Masonry.
 - 6. Section 05 50 00 – Metal Fabrications.
 - 7. Section 33 12 01 – Basic Mechanical Materials and Methods.
 - 8. Section 33 12 16.32 – Electric Motor Valve Actuators.

1.2 DEFINITIONS

- A. Gate Factor: Product of the gate width (in feet) times the sum of the design head (in feet) plus half the gate height (in feet).
- B. Slenderness ratio (l/r): The largest ratio obtained by dividing the unsupported length of the stem by the radius of gyration of the stem cross section.
- C. Design head: Depth from surface of water to centerline of gate. Use value specified in the gate schedule.
- D. Seating head: Pressure applied to gate slide from weight of water column above gate centerline that forces gate slide into seat.
- E. Unseating head: Pressure applied to gate slide from weight of water column above gate centerline that forces gate slide away from seat.
- F. Substantially similar:

1. Similar in size, design head, and service.
2. Utilizes the proposed design for critical components including guides and seals.

1.3 DESIGN REQUIREMENTS

- A. Except as modified or supplemented as specified in this Section, all gates and operators shall conform to the requirements of AWWA C561, latest edition.
- B. All gates shall utilize self-adjusting seals. Gates that utilize adjustable seal designs such as wedges, wedging devices, or pressure pads are not allowed.
- C. Gate components:
 1. Frames:
 - a. Design for the design head scheduled with a minimum safety factor of 5 with regard to ultimate tensile, compressive, and shear strength.
 - b. Self-contained gates: Where frames extend above the operating floor, design to be self-supporting so that no further reinforcing or support is required.
 - c. Design to resist seismic loads as follows:
 - 1) Seismic design parameters shall be as specified in Section 01 81 02.
 - 2) Hydrodynamic loads (impulsive and convective) from the water calculated in accordance with ACI 350.3-06.
 - 3) Inertial seismic forces due to the self-weight of the slide gate assembly, including any operators, actuators, and all appurtenances attached to the slide gate assembly shall be calculated in accordance with ACI 350.3-06 and ASCE 7-10.
 - 4) Load combinations shall include:
 - a) Gate fully closed: Dead load + fluid load + seismic load.
 - i) The fluid load and hydrodynamic loads due to seismic shall be calculated based on the Seismic Head indicated in the Gate Schedule.
 - b) Gate partially open: Dead load + fluid load + seismic load:
 - i) The fluid load and hydrodynamic loads due to seismic shall be calculated based on the Seismic Head indicated in the Gate Schedule.

- ii) The center of gravity of the gate assembly shall be assumed to be located in a position that maximizes the seismic load demands applied to the frame and the frame anchorage/support.
 - c) Gate fully open (upward opening gate): Dead load + seismic load:
 - i) The center of gravity of the gate assembly shall be calculated assuming that the gate slide is positioned at its highest level.
 - d) Gate fully open (downward opening gate): Dead load + fluid load + seismic load:
 - i) The fluid load and hydrodynamic loads due to seismic shall be calculated based on the Seismic Head indicated in the Gate Schedule.
 - e) The load combinations specified herein do not include load factors. Apply the appropriate load factors in accordance with ASCE 7-10 for the selected design methodology, whether that be strength design or allowable stress design.
2. Stem: Select stem diameter, stem guide quantity and stem guide spacing based on following criteria:
- a. Slenderness ratio (l/r): Shall not exceed 200.
 - b. Tensile strength: Suitable to withstand the force generated by the operator with the application of a 200 pound force applied to the crank or handwheel or a 250 foot-pound torque applied to the wrench nut.
 - c. Compressive strength:
 - 1) Suitable to withstand buckling due to the force generated by the operator with the application of an 80 pound force applied to the crank or handwheel or a 100 foot-pound torque applied to the wrench nut.
 - 2) Determine buckling load using Euler Column formula in accordance with AWWA C 561, where $C = 2$.
 - d. Design force for power actuators:
 - 1) Electric motor operators: 1.25 times the output thrust in the stalled-motor condition.
 - e. Gates having widths greater than 2 times the height: Provide with 2 lifting mechanisms connected by a tandem shaft.

- f. See the Drawings for additional constraints on where stem guides may be located.
 - g. For gates with electric actuators, the gate and actuator manufacturers shall coordinate the proposed gate stem configuration as described in Article 2.3 Paragraph E.5.
 - h. Minimum stem diameter: 1-1/2 inch.
3. Thrust nut: Suitable to withstand thrust developed by operator with the application of a 40 pound force on the crank or handwheel with safety factor of 5. Base design on ultimate strength of material used.
4. Yokes for self-contained gates:
- a. Design yoke using design loading criteria for stem with safety factor of 5 based on ultimate strength of the material used.
 - b. Maximum deflection at design load: Not to exceed 1/360th of the span or 1/4-inch, whichever is less.
5. Slide:
- a. Deflection shall be less than or equal to 1/1000 of the span of the gate or 1/16-inch, whichever is less, when under the design head.
 - b. Design for the maximum design head specified with a minimum safety factor of 5 with regard to ultimate strength of the material.
 - c. Design for the same seismic loads and load combinations specified herein for the frame.

1.4 PERFORMANCE REQUIREMENTS

- A. Leakage rate shall not exceed 0.05 gallons per minute per foot of wetted seat perimeter under seating and unseating heads at the maximum design head.
- B. Leakage testing shall be conducted in accordance with AWWA C561.

1.5 MANUFACTURER'S FIELD SERVICES

- A. **Manufacturer's Representative:** The Contractor shall furnish the services of a factory field representative designated by the equipment/system manufacturer, who shall be present at the project site to provide the services listed below. The manufacturer's representative shall have superior knowledge of all aspects of the equipment/system being furnished in this section. The manufacturer through their field representative shall advise the Contractor and the Engineer of the proper procedure for each of the services listed.

- B. Training Services: the manufacturer's representative shall be present at the site and classroom designated by the Engineer, for the minimum number of days listed below.

Minimum Total Time (Person-Days*)	Manufacturer's Service
1	Perform field assessment of the gate replacements at the existing Briones Diversion Works and North Raw Water Structure prior to preparation of shop drawings for those gates.
4	Installation supervision and certification.
2	Dry wall inspection and operational testing.
2	Wet wall functional and leakage testing.
1	Training of District personnel: See Section 01 79 00 for additional requirements.
* The person-days shown are total days for each service listed. One person-day is equivalent to 8 hours. The person-days shown are the minimum days required for each service, and travel time to and from the site and/or classroom is not included.	

1.6 SUBMITTALS

- A. Submit as specified in Section 01 33 00.
- B. Submit the following prior to fabrication:
1. Manufacturer's qualifications including installation history list demonstrating conformance with Source Quality Control requirements of this section. Include the following at a minimum:
 - a. Name and location of each installation.
 - b. Name and telephone number of person in direct responsible charge of the equipment.
 - c. Month and year the gate was placed in operation.
 - d. Size of gate and design head.
 - e. Number of units installed.
 - f. Service (open/close, throttling, modulating, etc.).

2. Product data: As specified in Section 33 12 01.
3. Shop drawings: As specified in Section 33 12 01 and meeting the following requirements:
 - a. Layout and installation drawings for each gate size and type.
 - b. Wall thimble designs.
 - c. Actuator pedestal designs, including thrust plates spanning the slab openings above each gate where applicable.
 - d. Electric motor or handwheel actuators as required for each gate shall be submitted as a single package.
4. Calculations: As specified in Section 33 12 01:
 - a. Gate and guide design calculations:
 - 1) Calculations and design data substantiating conformance with the Drawings and Specifications.
 - 2) Calculations that substantiate the slide design is in conformance with the minimum safety factors specified in the latest revision of AWWA C561. In particular, confirm this at the slide centerline and along the length of the slide, on each side, where it engages the guides.
 - 3) Slide design calculations showing stress and deflection at design seating and unseating heads for the gate and gate edge inserting into the guide frame.
 - 4) Calculations that substantiate guide frame is in conformance with the minimum safety factors specified in the latest revision of AWWA C561. In particular confirm that all components, including but not limited to, the guide frame and guide frame attachment bolts are designed within the specified safety factors.
 - b. Actuator design calculations:
 - 1) Calculations verifying the suitability of the selected motorized operator for the application.
 - 2) Torque required to open and close the gate, including maximum torque at any point along gate travel including expected breakaway torque from the seat. Indicate thrust value and stem factor. Apply a safety factor of 1.25 for sizing the motor operator.
 - 3) The torque supplied by the proposed electric actuator.

- 4) Open/close speed of the proposed electric actuator per Section 33 12 16.32.
 - 5) Gate opening and closing thrust forces that will be transmitted to the support structure at the actuator's extreme output (e.g., electric actuator stall).
- c. Seismic design calculations per Section 33 12 01.
 - d. All submitted calculations shall be prepared and stamped by a Professional Engineer licensed in the State of California.
- C. Submit the following prior to shipment:
1. Certified factory test reports for factory leakage tests for each gate on the project and accelerated wear tests. Submit Manufacturer's Certificate of Factory Acceptance Testing as defined in Section 01 75 17.
 2. Final vendor operation and maintenance manuals: As specified in Sections 01 33 00 and 33 12 01.
 3. Certified layout and installation drawings for each gate size and type.
 4. Reassembly drawings and picking plan for each gate size and type.
- D. Submit the following prior to field functional and performance testing:
1. Manufacturer's Certificate of Proper Installation as defined in Section 01 75 17.
 2. Field functional and performance test procedures, including:
 - a. Leakage test plan for each gate that includes the following at minimum:
 - 1) Source of water for filling upstream side of gate (for unseating head tests).
 - 2) Location where water will be discharged after the test.
 - 3) Method for calculating leakage rate on downstream side of gate.
- E. Submit the following upon completion of testing as defined in Section 01 75 17:
1. Completed Functional Test Data Form and Performance Test Reports including the Data Form included in this Section for each gate.

1.7 SOURCE QUALITY CONTROL

A. Factory Markings:

1. Mark gates according to the tag numbers in the Gate Schedules.

2. Additionally, mark or tag all gates to relate them to the specific installation drawing and instructions.
3. Where thimbles, frames and other components are not interchangeable, the components shall be match marked.

B. Manufacturer's Qualifications:

1. Minimum 20 years of experience in production of equipment substantially similar to the equipment specified.
2. Submit evidence of at least 20 separate completed projects that utilize substantially similar design for critical components: frame, guide, slide, and seals.
3. At least 4 different installations installed for at least 10 years utilizing gates at least 132" x 132" with design heads over 30 feet from invert of opening. Multiple gates at a single plant shall be considered as 1 installation toward meeting the experience requirements.

1.8 SHOP INSPECTION

- A. The Engineer will witness all phases of manufacturing, welding and passivation, and factory functional testing including leakage and accelerated wear tests.

1.9 WARRANTY

- A. Provide warranty as specified in Divisions 0 and 1.

1.10 REFERENCES

A. American Water Works Association (AWWA):

1. C561 - Fabricated Stainless Steel Slide Gates.
2. C542 – Electric Motor Actuators for Valves and Slide Gates

B. American Welding Society (AWS):

1. D1.6 - Structural Welding Code-Stainless Steel.

C. ASTM International (ASTM):

1. A276 – Standard Specification for Stainless Steel Bars and Shapes.
2. A240 – Standard Specification for Stainless Steel Plate.
3. B584 – Standard Specifications for Copper Alloy Sand Castings for General Application.

4. D1248 – Standard Specification for Polyurethane Plastics Extrusion Materials for Wire and Cable.
5. D2000 – Standard Classification for Rubber Products in Automotive Applications.
6. D4020 – Standard Specification for Ultra-High Molecular-Weight Polyethylene Molding and Extrusion Materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: One of the following or equal:
1. Whipps, Inc., Series 900.
 2. Fontaine-Aquanox, Series 20.
- B. Inclusion of a specific manufacturer’s name and model in the Specifications does not mean that the specific manufacturer’s standard product will be acceptable. Specified manufacturer’s or other manufacturer’s standard product shall be modified as required to meet the Specifications.
- C. Operators, anchor bolts, and wall thimbles: Provided by manufacturer of slide gates.

2.2 MATERIALS

- A. Refer to Table A:

TABLE A: COMPONENT MATERIAL	
Frame Assembly and Retainers	Stainless Steel, Type 316L, ASTM A240
Slide and Stiffeners	Stainless Steel, Type 316L, ASTM A240
Stem, Anchor Studs, Retainers	Stainless Steel, Type 316, ASTM A276
Fasteners and Nuts	Stainless Steel, Type 316, ASTM F593/F594
Invert Resilient Seal	Neoprene, ASTM D2000, Grade 2 BC 510
Gate Seat/Seals and Facing	Ultra-high molecular weight polyethylene: ASTM D1248 and D4020
Gate Thrust Nuts	Bronze ASTM B584, UNS Number C86500
Actuator Lift Nuts	Bronze ASTM B584, UNS Number C87300
Pedestal and Actuator Wall Brackets	Stainless Steel, Type 316L, ASTM A276

TABLE A: COMPONENT MATERIAL	
Stem Guide Brackets	Stainless Steel, Type 316L, ASTM A276
Stem Guide Bushings	Ultra-high molecular weight polyethylene: ASTM D1248 and D4020

- B. All wetted and unwetted parts including all fasteners and hardware, except as specified in this Section, shall be Type 316 or 316L stainless steel. When welded, material shall be Type 316L.

2.3 COMPONENTS

A. Slide:

1. All materials Type 316 or Type 316L stainless steel.
2. Rectangular or square.
3. Fabricated with a flat plate reinforced with formed plate stiffeners and/or structural members to form a rigid, one-piece slide. Reinforcing stiffeners shall be mounted horizontally and welded to the slide and to side vertical stiffeners.
4. Where required to resist design forces, vertical stiffeners shall be welded on the outside of the horizontal stiffeners for additional reinforcement and stress distribution.
5. Minimum thickness of all members, except seal retainers, shall be 1/4-inch.

B. Frame:

1. Construct gate frame of Type 316L stainless steel structural members. Provide one of the following designs:
 - a. Unitized Design:
 - 1) The vertical frame rails shall be formed from one plate creating a unitized frame design.
 - 2) Frame shall have wrap around gussets going around the frame groove on three sides extending back to weld onto the base wall plate at each anchor bolt location. Gussets shall stabilize frame.
 - b. Bolted Design:
 - 1) Frame members shall consist of one or more bolted structural members.

2. Mounting: Design shall allow for face mounting directly to a wall with stainless steel anchor bolts and grout, mounting to a wall thimble with stainless steel mounting studs and a mastic gasket, or embedded frame as indicated in the Gate Schedule.
3. Where applicable, the invert seal shall be mounted in the frame or on the slide with mechanical fasteners.
4. Allow replacement of the frame's top, bottom, and side seals without removing the frame from the concrete or wall thimble.
5. Mounting surface of the frame shall be machined flat as part of a leak-proof seal between the frame and mounting surface (for face and thimble mounted gates).
6. A rigid invert member shall be provided across the bottom of the opening. The invert member shall be flush-bottom type for upward opening gates. The invert member shall have a face continuous with the sides of the frame on downward-opening gates.
7. A rigid top seal member shall be provided across the top of the opening on gates designed to cover submerged openings.
8. Where frames extend above the operating floor, the frame design is to be self-supporting so that no further reinforcing or support is required.
9. Anchor bolts shall not pass through the sealing surface of the frame or guides.
10. Minimum thickness of all members shall be 1/4-inch.

C. Yoke: Self-contained gates only:

1. Type 316L stainless steel.
2. Extend guides and frame so that bottom of the yoke is at least 12 inches above top of slide at fully-opened position. Top of yoke shall be at least 3 feet above the operation floor.
3. Bolt or weld to frame.
4. Design to allow removal of the gate slide.
5. Provide mounting plate on top of yoke to mount actuator.

D. Guides and Seals:

1. Type 316L stainless steel guides with ultra-high molecular weight polyethylene insert in contact with slide.
2. Length: To completely support the slide fully in the open position.

3. Seals shall achieve the specified leakage requirements.
4. Sealing and sliding surfaces shall provide a low coefficient of friction with the surface of the slide. Seal system shall be durable and designed to accommodate high velocities and frequent cycling without loosening or suffering damage.
5. Seals shall be field replaceable without removing gate from concrete or wall thimble.
6. Anchor bolts shall not pass through the guides and seals. Seals must be removable without disassembly of the guide frame.
7. Self-adjusting ultra-high molecular weight polyethylene seals. Adjustable seal systems and those with elastomeric seals on sides and top of gate are not acceptable. This includes systems such as “J-seals,” “Bulb Seals,” and “Crown Seals.”
8. Minimum seating surface width: 1 inch in contact with slide.
9. Bottom seal (for downward-closing gates):
 - a. Resilient peroxide-cured EPDM, minimum durometer of 45.
 - b. Attached to the bottom of the slide or embedded in gate frame invert or grouted into the concrete channel invert.
10. Side and top seals (downward-closing gates) or bottom seals (downward-opening gates):
 - a. UHMWPE self-adjusting type seals, single extruded piece: Utilize a continuous peroxide-cured EPDM compression cord to ensure contact between the seals and the slide.
 - b. Side seals:
 - 1) Attach to frame using one of the following approaches:
 - a) Face mounted gates:
 - i) Side seal held in place between the front and back angles of the guide with Type 316 stainless steel bolts passing through the guide, seal, and frame along the length of the guide.
 - ii) Side seal held in place between front and back of a formed, 1-piece, rigid channel guide. Attach seals to frame using Type 316 stainless steel bolts.
 - b) Embedded Gates:

- i) Side seal held in place in the guide frame groove with 316 stainless steel bolt at the bottom of the guide.
 - ii) Design and installation shall provide access to and removal of the bolt to allow removal of the side seal without removing the gate from the concrete.
 - c) Side seal held in place between front and back of a formed, one piece, rigid channel guide frame. Attach seals to frame using Type 316 stainless steel bolts.
- c. Top Seal (downward-closing gates) or bottom seal (downward-opening gates): UHMWPE self-adjusting type seal with a single- or double-compression cord.
- d. The seal system shall be factory tested as specified in this Section.

E. Stem:

1. Type 316 stainless steel.
2. Stem shall be constructed of solid stainless steel bar for the entire length. Extension pipes are not acceptable.
3. Stem shall be threaded to allow full travel of the slide.
4. Drill and connect stem to slide structural sections with a minimum of two Type 316 stainless steel bolts for stems 1.75 inches and smaller. Larger stems shall connect with a minimum of three Type 316 stainless steel bolts or connect with a bolted stem coupling to a stub piece welded to at least two horizontal stiffeners. Fasteners shall include an anti-loosening feature such as thread locking compound. Fasteners shall be lubricated at assembly.
5. Coordinate the selection of the gate stem configuration with the gate operator and operating speed:
 - a. The selected gate stem configuration shall provide the most efficient combination of stem diameter/pitch/lead and keep the operating temperature at the stem nut to a minimum during operation.
 - b. For motorized applications, if the proposed gate stem configuration would result in any deviation from the operating rise rate specified in Section 33 12 16.32, base the bid price on the most efficient combination that meets the specified gate operating rise rate. However, submit proposed deviation along with cost deduct for evaluation and consideration by the Engineer.
6. Machine cut or rolled threads of the full depth Acme type, polished as necessary to a 16-microinch finish or better. Stub ACME threads or metric DIN 103 threads are not acceptable.

7. Stem couplings to join stems of more than one section:
 - a. Silicon bronze or stainless steel.
 - b. Threaded and keyed to stem or threaded and bolted to stem.
 - c. Fasteners shall include an anti-loosening feature such as thread locking compound.
 - d. Fasteners shall be Type 316 stainless steel and shall be lubricated at assembly.
 8. Stems on manually-operated gates shall be provided with adjustable manganese bronze stop collars to prevent over closing of the gate.
 9. Stem guides:
 - a. Type 316 stainless steel.
 - b. Split collar.
 - c. Adjustable in 2 directions.
 - d. Ultra-high molecular weight polyethylene bushing.
- F. Stem covers:
1. Fabricated from ultraviolet light resistant, clear butyrate or Lexan plastic pipe. Stem covers shall be capped on the upper end and either threaded into the top of the gate operators or held in place by stainless steel fasteners or bolt-down aluminum brackets.
 2. For weir gates:
 - a. Staff gauges shall be adhesive-backed mylar, suitable for outdoor service. Staff gauges shall be calibrated in hundredths of feet and shall read out directly the weir crest elevation relative to the National Geodetic Vertical Datum of 1929 (NGVD 1929). Staff gauges shall be supplemented with a stem-mounted pointer or indicator which shall permit direct observation of the weir gate crest elevation.
- G. Operating nut:
1. Locate at operator level.
 2. Material: Manganese bronze.
- H. Gate operators:
1. As indicated in the Slide Gate Schedule and as specified in Section 33 12 16.32 – Electric Motor Valve Actuators.

2. Equip manual operators and electric actuators with a 2-inch square nut to permit operation with a portable operator.
- I. Coordination with motorized operator supplier:
1. Gate manufacturer's responsibility shall extend to sizing and selecting motorized operators for each gate, meeting the requirements of 33 12 16.32 and based on:
 - a. Design seating and unseating head.
 - b. Open/close speed specified in Section 33 12 16.32 – Electric Motor Valve Actuators.
 - c. Torque safety factor of 1.4, minimum, applied to the maximum torque requirement, including breakaway from seat.
 2. Verify, in writing, that the motorized operators are adequately sized.
 3. In the event that a different size or model is required for any gate, gate manufacturer shall advise Contractor of the proper selection and Contractor shall provide, at no additional cost, the proper operator.
 4. The gate supplier shall machine the stem nuts, provide proper mounting adaptation, and adaptation hardware to ensure adequate interface between the motorized operators and the slide gates.
- J. Pedestals and wall brackets: Type 316L stainless steel. Where gates are installed at existing structures, provide extra anchor penetrations to be used in case of conflict with existing rebar.
- K. Bolts, nuts, and fittings: Type 316 stainless steel.
- L. Anchor bolts: Type 316 stainless steel with a minimum diameter of 1/2 inch.

2.4 WALL THIMBLES

- A. Provide wall thimbles for gates where scheduled and as indicated on the Drawings.
- B. F-section of a depth equal to the thickness of the structure wall upon which the gate is mounted:
 1. Modify F-sections where required for F-section and pipe connections in a wall. Refer to Drawings for additional requirements for piping connections on the outside of structures.
- C. Fabricated Type 316L stainless steel of sufficient section to resist permanent distortion; minimum 3/8 inch thick plate. Coordinate thickness of thimble with the plate thickness of the frame.

- D. Width of mounting flange of wall thimble: 1/2 inch wider than mounting flange of gate.
- E. Fully machine front flange of thimble to a plane. Drill and tap to match the drilling on the flange back gate seat.
- F. Clearly mark top center of each thimble for installation.
- G. Provide Type 316 stainless steel studs for attaching the gate frame.
- H. Seal joint between thimble and gate watertight, in accordance with AWWA C561.
- I. To permit entrapped air to escape as the thimble is being cast in concrete, drill holes in each entrapment zone formed by ribs, flanges, and water stops.
- J. Provide annular weep ring to control seepage and resist thrust, where needed to anchor the pipe thrust restraint system:
 - 1. Continuously weld weep ring to outside of the wall thimble.
 - 2. Weep ring shall be minimum 1/4 inch thick and minimum 2 inches deep.

2.5 MANUAL ACTUATORS

- A. Mounting: Floor stand or bench stand. Unless otherwise indicated on the Drawings position actuator 36 inches (nominal) above top of walkway surface.
- B. Bearings above and below finished threaded bronze operating nut: Ball or roller.
- C. Operator shall have a minimum wheel diameter of 24" or 15" crank handle.
- D. Indicator: Counterclockwise opening with arrow, and word OPEN cast on top of handwheel indicating direction for opening.
- E. Pull to operate: Maximum 40 pounds pull at most adverse design condition.
- F. Stem travel limiting device: Setscrew locked stop nuts above and below lift nut.
- G. Grease fittings: Suitable for lubrication of bearings.

2.6 FINISHES

- A. Stainless steel:
 - 1. Media blast gates and wall thimbles after fabrication in accordance with ASTM A380 to remove weld burn, slag, and splatter and to polish scratches.
 - 2. Clean the entire surface to produce an even color and sheen.

- B. All accessory equipment that is not stainless steel: Surface preparation, factory prime, field prime, and finish coats as specified in Section 09 96 57 and on the “Finish, Coating, and Color Schedule” on the Drawings.

2.7 FABRICATION

- A. All welds shall be performed by welders certified to AWS D1.6, or ASME Boiler and Pressure Vessel Code Section IX.
- B. Mill finish shall be provided on stainless steel plate and bar materials used in the gates. Welds shall be blasted with a non-ferrous media to remove weld burn and scale.
- C. Shop assembly:
 - 1. Gates shall be factory assembled, adjusted, and tested.
 - 2. Mount all accessories and appurtenances including, but not limited to, motor operators and limit switches so that the complete system may be tested at the factory.
 - 3. Electric actuators shall be shop tested by the original manufacturer prior to shipment.

2.8 FACTORY TESTING:

- A. All gates shall be factory assembled and tested before shipment.
 - 1. Each and every electric actuator shall also be tested on the specific gate it was designed for at the gate factory as a unit.
- B. Leakage testing:
 - 1. All gates shall be factory tested for leakage requirements in this section. Shop leakage testing shall be as specified in AWWA C561.
- C. Submit certified factory test reports and Manufacturer’s Certificate of Factory Acceptance Testing per Section 01 75 17 prior to shipment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All of the installation requirements in Part 3.1 apply to the Specification 2139 installation contractor.
 - 1. Install as indicated on the Drawings and in strict conformance with the manufacturer’s installation instructions, shop drawings, and recommendations.

2. Gates will be delivered by gate manufacturer. Provide equipment to unload the delivered gates.
3. Gates will be delivered palletized and disassembled. Reassemble gates per manufacturer installation instructions and recommendations.
4. Mount thimbles and gates plumb in both vertical planes and level in horizontal plane.
5. Coat seating surfaces between frame and wall thimble with a waterproof plastic compound or provide peroxide-cured EPDM gasket prior to tightening frame studs.
6. Adjust limit switches in electric operators in accordance with manufacturer's instructions.
7. Face mounted gates:
 - a. Mount gate to wall with anchor bolts and provide a minimum 1-inch grout pad in accordance with manufacturer's recommendations.
8. Electric Actuators:
 - a. Orient electric actuators on gates to provide appropriate operation and maintenance access for all components of the unit.

3.2 FIELD TESTING

- A. Manufacturer's representative shall be present for field functional and performance testing.
- B. Testing of all gates and associated actuators shall be witnessed by the District and the Engineer.
- C. Field Functional Testing:
 1. Complete the testing for each gate using the attached "Field Functional Test Data Form", in accordance with Section 01 75 17, and as directed by the Engineer.
 2. For gates with electric motor actuators, complete actuator functional testing per Section 33 12 16.32 in conjunction with testing for each gate. Attach the associated "Field Functional Test Data Form" and submit the test data as a single package.
 3. Leakage testing shall be completed per AWWA C561 requirements to demonstrate leakage rates required by this section under the design seating and unseating head conditions.

4. Consult the Engineer if it is not practical to replicate both design seating and unseating head conditions.
 5. In locations where multiple gates are installed in parallel and it is not practical to test leakage rates from individual gates, the leakage rates of a set of gates may be measured as one and the total leakage divided among the number of gates in the set to determine compliance with leakage requirements in this section.
- D. Control System Functional Testing:
1. Shall be per Section 01 75 17 after completion of gate functional testing and performance testing.

3.3 SUPPLEMENTS

- A. The following supplements follow END OF SECTION and are part of this section:
1. Field Functional Test Data Form.
 2. Field Performance Test Data Form.

3.4 SCHEDULE

- A. The Slide Gate Schedule is included on the following page(s). The Slide Gate Schedule is not a take-off list. Contractor shall provide additional gates per specifications and as indicated on the Drawings.

HEAVY-DUTY FABRICATED STAINLESS STEEL SLIDE GATE SCHEDULE												
Gate Tag Number	Location	Opening Size WxH ⁽⁷⁾ (inches)	Design Head, Seating and Unseating (feet) ⁽²⁾	Type of Frame ⁽⁴⁾	Type of Closure ⁽¹⁾	Gate Mount ⁽³⁾	Wall Thimble ⁽⁶⁾	Type of Operator ⁽⁵⁾	Seismic Head (feet) ⁽²⁾⁽⁸⁾	Max Deck Opening Width (inches) ⁽⁹⁾	Max Operator Thrust (lbs) ⁽¹²⁾	Gate Factor
8-RWS-SDG-024-2 ⁽¹⁵⁾ 8-RWS-SDG-025-2 ⁽¹⁵⁾	Briones Diversion Works	72x84	25	NSC ⁽¹³⁾	STD	FM	N/A	MOD/PS/R S	20	N/A	60,000	171
233-RWS-SDG-403 ⁽¹⁵⁾	Raw Water Bypass Vault	48x48	15	SC	STD	FM	N/A	CO/PS/RS	7	12	N/A	32
233-RWS-SDG-404 ⁽¹⁵⁾	North Raw Water Structure	114x114 ⁽¹⁴⁾	20	SC	STD	EC ⁽¹⁴⁾	N/A	MOD/PS/R S	20	27	N/A	235 ⁽¹⁴⁾

HEAVY-DUTY FABRICATED STAINLESS STEEL SLIDE GATE SCHEDULE												
Gate Tag Number	Location	Opening Size WxH ⁽⁷⁾ (inches)	Design Head, Seating and Unseating (feet) ⁽²⁾	Type of Frame ⁽⁴⁾	Type of Closure ⁽¹⁾	Gate Mount ⁽³⁾	Wall Thimble ⁽⁶⁾	Type of Operator ⁽⁵⁾	Seismic Head (feet) ⁽²⁾⁽⁸⁾	Max Deck Opening Width (inches) ⁽⁹⁾	Max Operator Thrust (lbs) ⁽¹²⁾	Gate Factor
<p>Notes:</p> <p>(1) Closure: DO = Downward Opening; FB = Flush Bottom; STD = Standard. See Typical Details P718 and P720 for additional installation details.</p> <p>(2) Measured from the maximum water level to the centerline of gate.</p> <p>(3) Mounting: FM = Face Mounted; EC = Inside Existing Channel; EMB = Embedded; SP = Spigot back.</p> <p>(4) Frame: SC = Self-Contained; NSC = Non-Self Contained; F = Flatback; FL = Flange back.</p> <p>(5) Operator: CO = Hand crank operator with 2-inch AWWA nut for portable operator; HW = Handwheel; HC = Hand crank; MO = Motor Operator; MOD = Modulating Motor Operator; HO = Hydraulic Operator; MHO = Manual Hydraulic Operator (Hand Pump); BS = Bench Stand; FS = Floor Stand; IFS = Interconnect Floor Stand; PS = Pedestal Support; RS = Rising Stem; NRS = Non-Rising Stem.</p> <p>(6) Wall Thimble: FWT = "F" Wall Thimble; F x FLG = F Thimble with transition to circular pipe flange.</p> <p>(7) Gate travel shall match the height of the gate unless otherwise noted.</p> <p>(8) Head condition to be used to calculate seismic forces.</p> <p>(9) Gates shall pass through the deck openings given. Opening location relative to the gate mounting surface is shown on the Drawings.</p> <p>(10) Removable precast concrete cover is taken off to extract the gates. No deck opening is provided.</p> <p>(11) Contractor and gate supplier shall verify existing conditions prior to preparation of shop drawings.</p> <p>(12) Maximum design thrust of the operator in the stalled condition. Notify the Engineer immediately if the operator sized for the design conditions will exert a larger force on the structure.</p> <p>(13) Refer to notes on drawings regarding mounting details and anchorage.</p> <p>(14) New self-contained gate in the North Raw Water Structure shall be anchored to the concrete channel side walls, with anchor bolts in shear, to resist the forces from the unseating head. Gate frame shall have a positive seal against the face with the pipe opening, and additional anchor bolts shall be placed into the concrete pipe opening wall to ensure proper seating of the gaskets for the vertical members, to hold the self-contained frame in place above the pipe opening zone, and to anchor the top seal. Minimum opening size is given in this schedule. Gate manufacturer may increase the gate opening width to suit the frame design that utilizes side wall anchorage, and may increase the opening height depending on the desired placement of the top seal. Gate design forces shall be based on the actual opening size, not the minimum given in this schedule. Invert seal frame member shall be bolted to the floor of the channel.</p> <p>(15) Indicated gates shall be furnished by the District and installed by the Specification 2139 Contractor.</p>												

END OF SECTION

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **ORINDA WTP DISINFECTION AND CHEMICAL SYSTEMS
SAFETY IMPROVEMENTS**

Test Date(s): _____

Equipment Name: _____

Section No.: **40 05 59.34**

Tag No.: _____

P&ID No. _____

I. Pretest Documentation/Setup

Documents:

Yes No NA

Comments:

a) Approved step by step functional test plan/procedure for listed equipment.

b) Coordinate with the District 2 weeks in advance to prepare for water received during testing.

c) Interconnection & Loop diagrams provided.

d) Technical Submittal complete (contractor show EADOC record).

e) Spare Parts provided.

f) Final O&Ms provided (contractor show final O&Ms).

g) All fields on Asset List Spreadsheet completed for device (Contractor shall show inspector at the time of the test that the asset list is complete and accurate for this system)

h) Confirm piping has been properly Chlorinated and flushed (if flowing through distribution system).

Field Test Setup (Identify any test instrument, special setups like tanks, hoses, etc):

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **ORINDA WTP DISINFECTION AND CHEMICAL SYSTEMS
SAFETY IMPROVEMENTS**

Equipment Name: _____

Tag No.: _____

Test Date(s): _____

Section No.: **40 05 59.34**

P&ID No. _____

II. Field Functional Test

1. Calibration/Loop/Electrical

Yes No NA

Comments:

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--|
| 1.1 Instrument commissioning complete. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 1.2 Loop Checks complete. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 1.3 Electrical commissioning complete. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

2. Installation Check (manufacturer's representative shall coordinate these checks and then certify the gates are ready for operation. Operation of gates shall not commence prior to completion.)

Pass Fail NA

Comments:

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--|
| 2.1 Correct equipment tags have been installed (tags shall match P&IDs) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2.2 Complete installation checks for gate and actuator listed in the manufacturer's O&M manual. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2.3 Verify equipment nameplate data matches the O&M manual. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2.4 Inspect anchorage, mechanical and accessible electrical bolted connections with a torque wrench. Values shall be in compliance with manufacturer's written recommendations. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2.5 Sign and date the Manufacturer's Certificate of Proper Installation. No running tests can proceed prior to receipt of this document. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **ORINDA WTP DISINFECTION AND CHEMICAL SYSTEMS
SAFETY IMPROVEMENTS**

Test Date(s): _____

Equipment Name: _____

Section No.: **40 05 59.34**

Tag No.: _____

P&ID No. _____

3. Operations Check

Pass Fail NA

3.1 Run each gate through at least two full cycles from the closed position to the open position and back to the closed position. Gates and operators shall function smoothly and without interruption.

3.2 For gates with manual operators, the effort to open and close the gates shall be measured, and shall not exceed the maximum operating effort specified. Complete this test in conjunction with leakage performance test to simulate high-head operating conditions where feasible. Max force on the handwheel to open or close (lbs): _____

3.3 Count and record the number of turns of the nut or hand wheel required to fully open and close the gate. Account for any discrepancies between actual number of turns and the number of turns identified by the manufacturer. Turns to open: _____

3.4 Verify gate opens and closes smoothly under operating pressure.

3.5 Leakage test: refer to the attached Field Leakage Test form.

4. Controls Check – Refer to Section 01 75 17 and Startup and Commissioning Plan Once Equipment Functional Testing is Complete.

Pass Fail NA

5. Alarms Check – Refer to Section 01 75 17 and Startup and Commissioning Plan Once Equipment Functional Testing is Complete.

Pass Fail NA

FIELD FUNCTIONAL TEST DATA FORM

EBMUD Project Title: **ORINDA WTP DISINFECTION AND CHEMICAL SYSTEMS
SAFETY IMPROVEMENTS**

Test Date(s): _____

Equipment Name: _____

Section No.: **40 05 59.34**

Tag No.: _____

P&ID No. _____

III. Participants/Witness

Test conducted:

By (signature): _____ Date: _____

Title: _____ Company Name: _____

By (signature): _____ Date: _____

Title: _____ Company Name: _____

EBMUD Witness:

By (signature): _____ Date: _____

Title: _____

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER: _____ EQPT SERIAL NO.: _____
EQPT TAG NO.: _____ EQPT/SYSTEM: _____
PROJECT NO.: _____ SPEC. & SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

- | Complete | Not Applicable | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Installed in accordance with Manufacturer's recommendations. |
| <input type="checkbox"/> | <input type="checkbox"/> | Inspected, checked, and adjusted. |
| <input type="checkbox"/> | <input type="checkbox"/> | Serviced with proper initial lubricants. |
| <input type="checkbox"/> | <input type="checkbox"/> | Electrical and mechanical connections meet quality and safety standards. |
| <input type="checkbox"/> | <input type="checkbox"/> | All system instruments are calibrated. |
| <input type="checkbox"/> | <input type="checkbox"/> | All applicable safety equipment has been properly installed. |

Comments: _____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate the equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and ready for startup and operations. I further certify that all information contained herein is true and accurate.

Date: _____

Manufacturer: _____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

O&M MANUAL REVIEW CHECKLIST
 (Manufacturer's Representative to complete one form per submittal)

SPEC. SECTION TITLE & NO:	
MFR Name, Address, Phone:	
Local Rep Name, Address, Phone:	

GENERAL FORMAT (See Section 01 33 00 for additional details)			
DESCRIPTION	PROVIDED?		COMMENTS
	YES	NO	
Specified copies provided			
Binder cover clearly labeled			
Spine Label			
System/Equipment type clearly identified			
District facility or facilities name(s) identified			
Specification number & title shown			
Title page provided			
Equipment tag numbers correctly shown			
Manufacturer's name, address, phone number provided			
Local Representative's name, address, phone number provided			
Table of contents provided			
Heavy section dividers w/ numbered or lettered plastic tabs provided			
Pages punched for 3-ring binder			
Info larger than 8-1/2 x 11 folded showing title block			
Original quality copies provided			

TECHNICAL CONTENT (See Section 01 33 00 for details)				
DESCRIPTION	LOCATION IN O&M			COMMENTS
	TAB#	PAGES	N/A	
Equipment Descriptions				
• Equipment names, model numbers & tag numbers				
• Equipment & major component functions				
• Drawings, diagrams & illustrations				
• Equipment Specification				
• Bill of materials				
• Legend, Abbreviation, and Acronym List				
Performance Information				
• Nameplate data				
• Performance test data/curves				

TECHNICAL CONTENT (See Section 01 33 00 for details)				
DESCRIPTION	LOCATION IN O&M			COMMENTS
	TAB#	PAGES	N/A	
Installation Instructions				
• Installation procedures & drawings				
• Equipment tolerances				
• Adjustment procedures				
Operating Instructions				
• Startup procedures				
• Normal & routine operations				
• Control functions				
• Alarms description and settings				
• Shutdown procedures				
• Emergency operations				
Electrical Information				
• Nameplate data				
• Relay, control, alarm contact settings				
• Motor test data				
Electrical Drawings				
• Single-line diagrams, three-line diagrams				
• Interconnection wiring diagram				
• Schematic and elementary diagrams				
• Panel layout drawings				
Instrumentation & Control				
• Control diagrams				
• Panel layout drawings				
• Instrument data sheets (specification forms)				
• Calibration Procedures				
• Final settings for adjustable control devices				
• Block diagrams and riser diagrams				
• Loop diagrams				
• Pneumatic/Hydraulic piping drawings				
• Hard copy printouts of control programs				
• Field calibration data sheets				
• Programming software (licensed to EBMUD) with user manuals				
Shipping and Storage Instructions				
Testing				
• Factory Test Report (procedures and results)				
• Field Test Procedures				
• Manufacturer's Certificate of Proper Installation (where specified)				
• Field Test Results				
Troubleshooting guide				

TECHNICAL CONTENT (See Section 01 33 00 for details)				
DESCRIPTION	LOCATION IN O&M			COMMENTS
	TAB#	PAGES	N/A	
Safety				
• Safety procedures/Lockout discussion				
• CAUTION, WARNING, DANGER text				
• Material Safety Data Sheets (MSDS)				
• Special safety equipment				
Preventive Maintenance				
Maintenance Summary Forms				
Lubrication Information				
• Location of lube points & frequency				
• Recommended type & grade, state specific MFR				
• Recommended viscosity & temperature range				
Overhaul Instructions				
• Detailed assembly drawings w/OEM part numbers				
• Tear down/rebuild instructions				
Spare Parts for Equipment & Components				
• Predicted life of parts subject to wear or aging				
• Recommended spare parts list w/ part numbers				
• Complete instructions for obtaining parts				
• Long-term storage requirements				
• Special tools				
Long-term Shutdown/Lay-up Instructions				
Warranty/Guarantee				

TYPICAL MAINTENANCE SUMMARY FORM
(Use as many pages as necessary. MS Word file available upon request)

1. Equipment Name: _____

2. Manufacturer: _____

3. Identification Numbers:

Tag: _____

Model: _____

Serial: _____

4. Nameplate Data (HP, voltage, speed, flow rate, head, etc.): _____

5. Manufacturer's Local Representative:

Name: _____

Telephone: _____

Address: _____

6. LUBRICANT LIST

<u>Reference Symbol</u> List symbols used in Item 8 below	<u>Lubricant Description</u> List equivalent lubricants: brand name(s), type, grade, viscosity, etc.

7. SPARE PARTS (Recommendation spare parts with part numbers; if any.)

8. Equipment Replacement Cost [\$] _____

♦

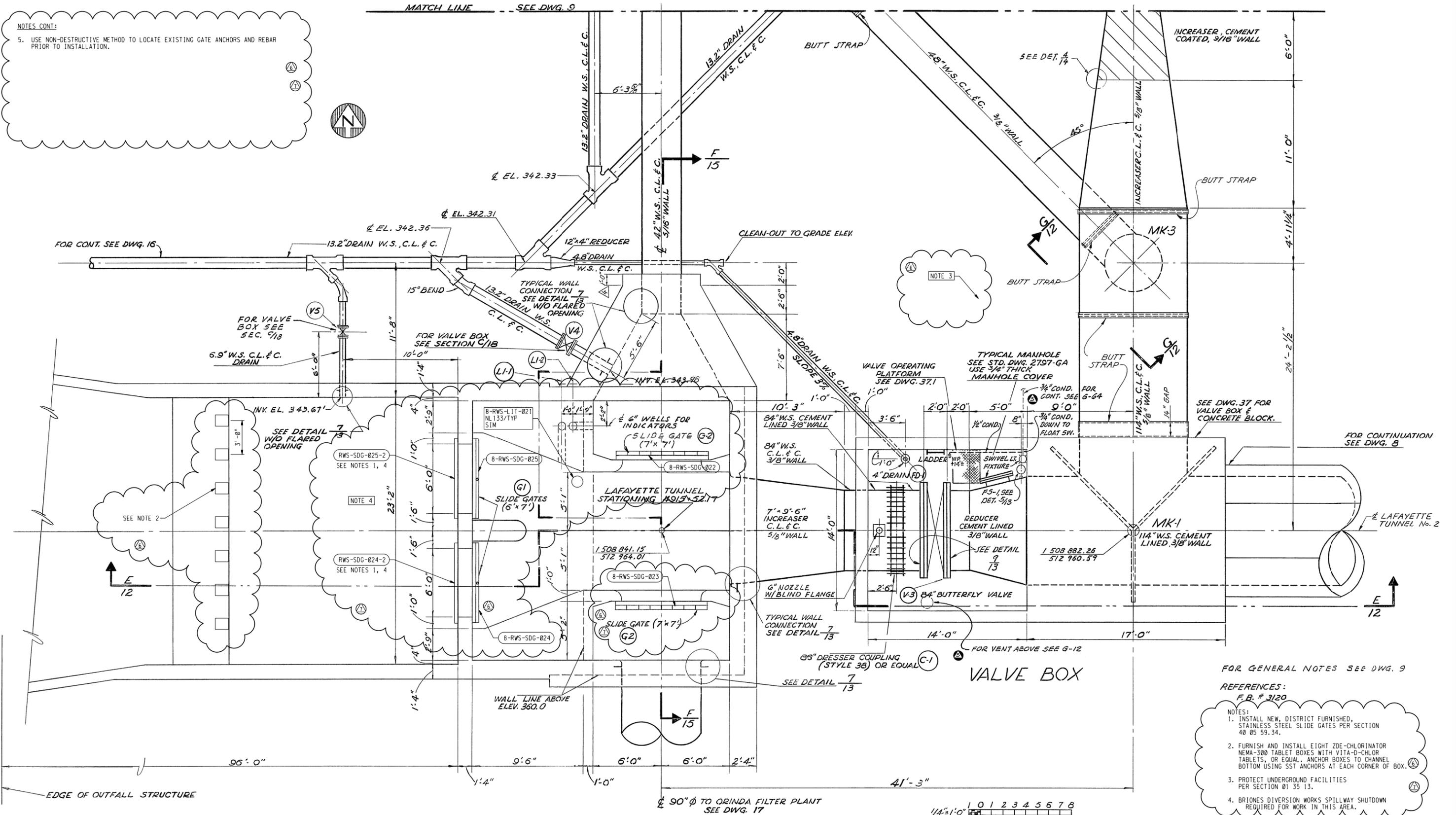
BRIONES DIVERSION WORKS

♦

NOTES CONT:
5. USE NON-DESTRUCTIVE METHOD TO LOCATE EXISTING GATE ANCHORS AND REBAR PRIOR TO INSTALLATION.



MATCH LINE SEE DWG. 9



REF 3:
REF 4:
REF 1:
REF 2:

USER: sycpw
DATE: 06-OCT-2021 12:56
FILE: E:\CSF\PDF\Work\King\24678940123\32*4099G10.R07

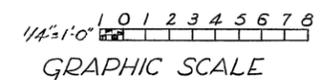
PLOT SCALE:
REGISTERED PROFESSIONAL ENGINEER
WATER SYSTEMS CONSULTANTS
No. 79446
STATE OF CALIFORNIA

OUTFALL CHANNEL OVERFLOW BASIN WEIR BASIN

FOR GENERAL NOTES SEE DWG. 9

REFERENCES:
F.R. # 3120

- NOTES:
1. INSTALL NEW, DISTRICT FURNISHED, STAINLESS STEEL SLIDE GATES PER SECTION 40 05 59.34.
2. FURNISH AND INSTALL EIGHT ZDE-CHLORINATOR NEMA-300 TABLET BOXES WITH VITA-D-CHLOR TABLETS, OR EQUAL. ANCHOR BOXES TO CHANNEL BOTTOM USING SST ANCHORS AT EACH CORNER OF BOX.
3. PROTECT UNDERGROUND FACILITIES PER SECTION 01 35 13.
4. BRIONES DIVERSION WORKS SPILLWAY SHUTDOWN REQUIRED FOR WORK IN THIS AREA.



3" ON ORIGINAL DOCUMENT

NO.	DATE	REVISION	BY	REC.	APP.
01	01OCT2021	REVISED PER SPEC 2139 ADDENDUM 3	PVB	PVB	CTC
02		REVISED PER SPEC 2139			

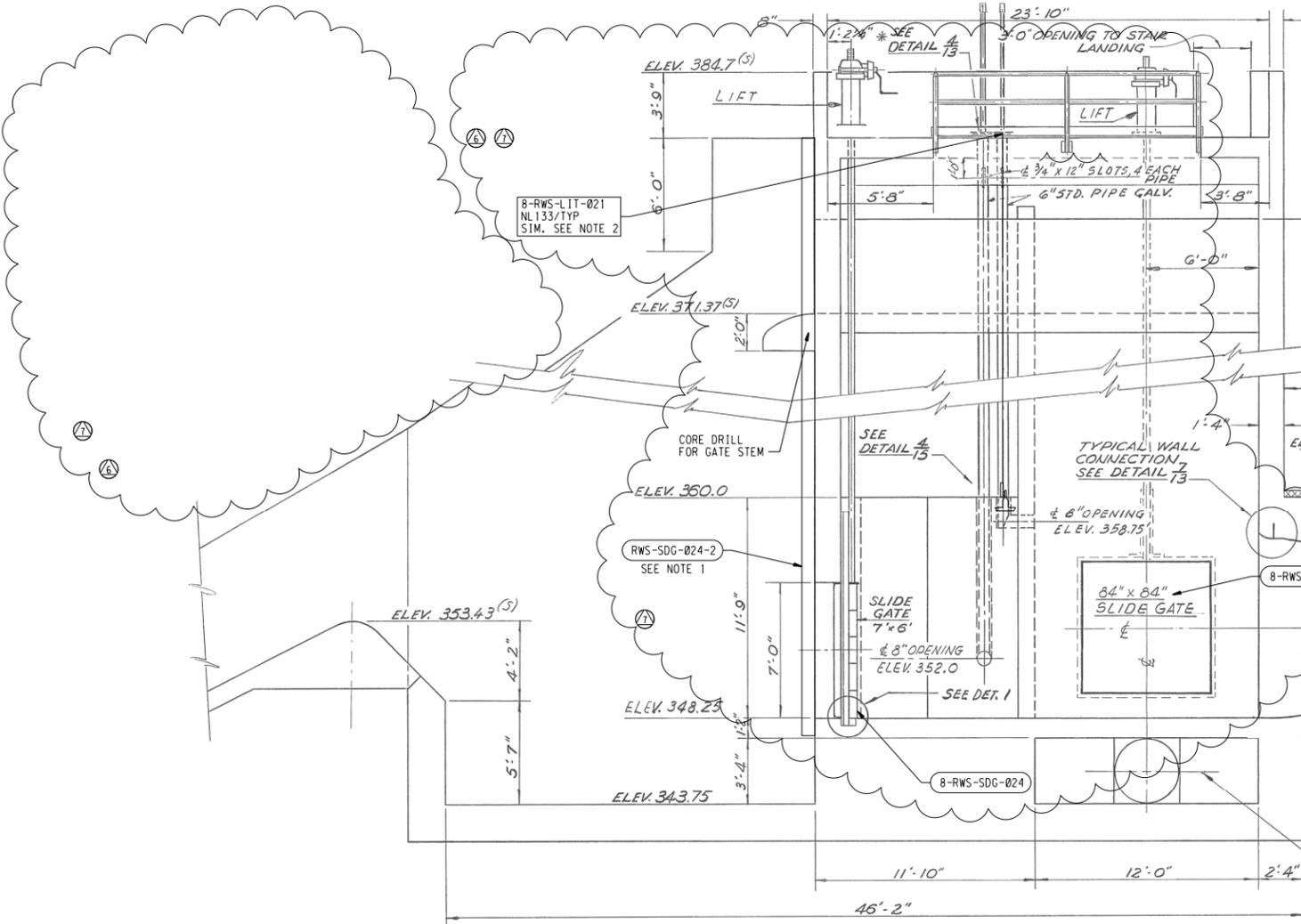
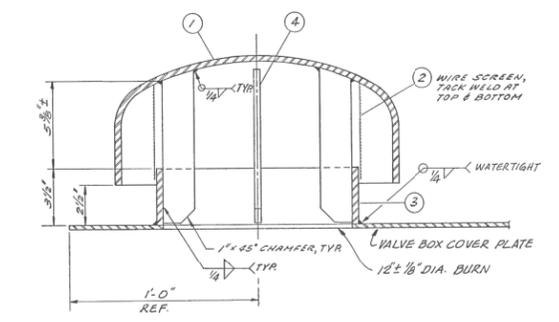


DESIGNED BY	PBVB
DESIGN CHECKED BY	CE
DRAWN BY	JLG
SR. PROJ. ENGR.	PBVB
R.P.E. NO. C 79446	
APPROVED	CTC
PRINCIPAL IN CHARGE, R.P.E. NO. C 72713	

PROJECT MANAGER	R.P.E. NO. C82926
RECOMMENDED BY	SR. CIVIL ENGR. R.P.E. NO. C74901
APPROVED BY	MGR. OF DESIGN R.P.E. NO. C48598

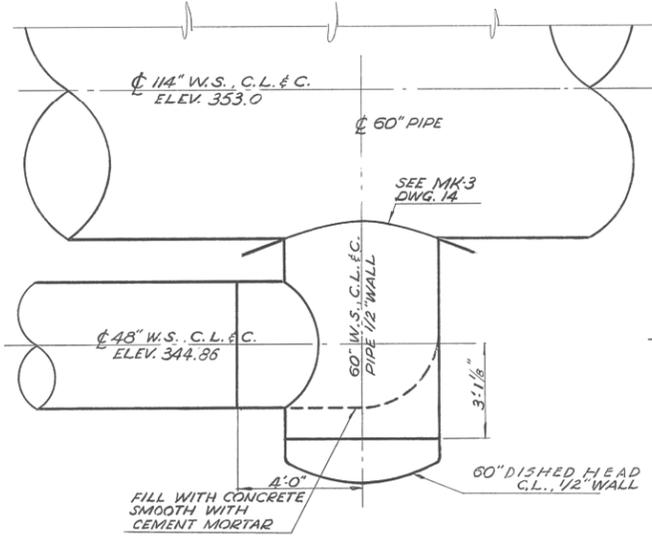
EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA
ORINDA WATER TREATMENT PLANT
GENERAL
LAFAYETTE TUNNEL NO. 2 BRIONES DIVERSION WORKS & BRIONES PUMPING PLANT PLAN
PROJ. NO. SPEC 2139
SCALE
DATE 22SEP2021
4099-G-10
7

ITEM	REQ'D.	DESCRIPTION	REMARKS
1	1	18" BUTT WELDING CAP. STEEL, STANDARD WEIGHT	
2	1	1" MESH GALVANIZED HARDWARE CLOTH W/APPROX. 1/8" WIRE, 6" WIDE X 3'-6 1/2"	
3	1	12" SCHEDULE 40 STEEL PIPE, 3 1/2" LONG	
4	4	3/8" x 2" H.R.S. FLAT, 9 1/2" LONG	

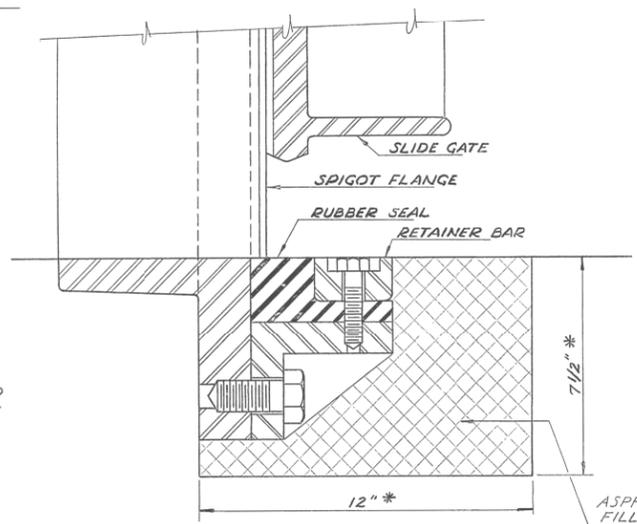


TOP OF CONCRETE VARIES
WEIR PLATES NOT SHOWN, SEE DET A/39

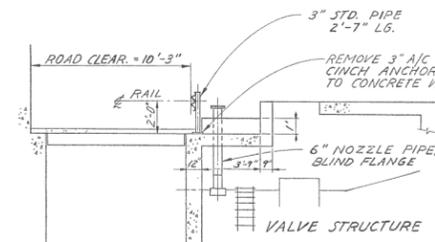
SECTION E
SCALE: 1/4" = 1'-0"



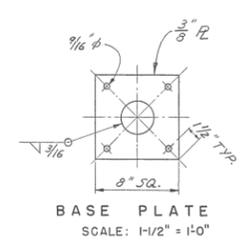
SECTION G
SCALE: 3/8" = 1'-0"



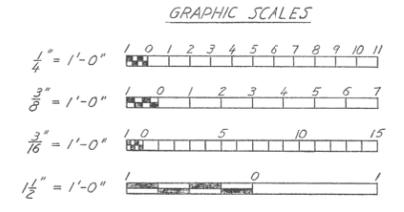
DETAIL 1
NO SCALE



DETAIL 2
SCALE: 3/16" = 1'-0"



BASE PLATE
SCALE: 1-1/2" = 1'-0"



NOTE:
* DIMENSION TO BE VERIFIED WITH MANUFACTURERS DWGS FOR GENERAL NOTES, SEE DWG 9

NOTES
1: INSTALL NEW, DISTRICT FURNISHED, STAINLESS STEEL SLIDE GATES PER SECTION 40 05 59.34.
2. SENSOR ELEVATION 360.0

USER: svcpw
DATE: 27-OCT-2021 10:10
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NO.	DATE	BY	REC.	APP.
1	01OCT2021			
2				
3				
4				
5				
6				



DESIGNED BY	PBVB
DESIGN CHECKED BY	CE
DRAWN BY	JLG
SR. PROJ ENGR.	PBVB
APPROVED	CTC

PROJECT MANAGER	R.P.E. NO. C82926
RECOMMENDED	SR. CIVIL ENGR. R.P.E. NO. C74901
APPROVED	MGR OF DESIGN R.P.E. NO. C48598

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

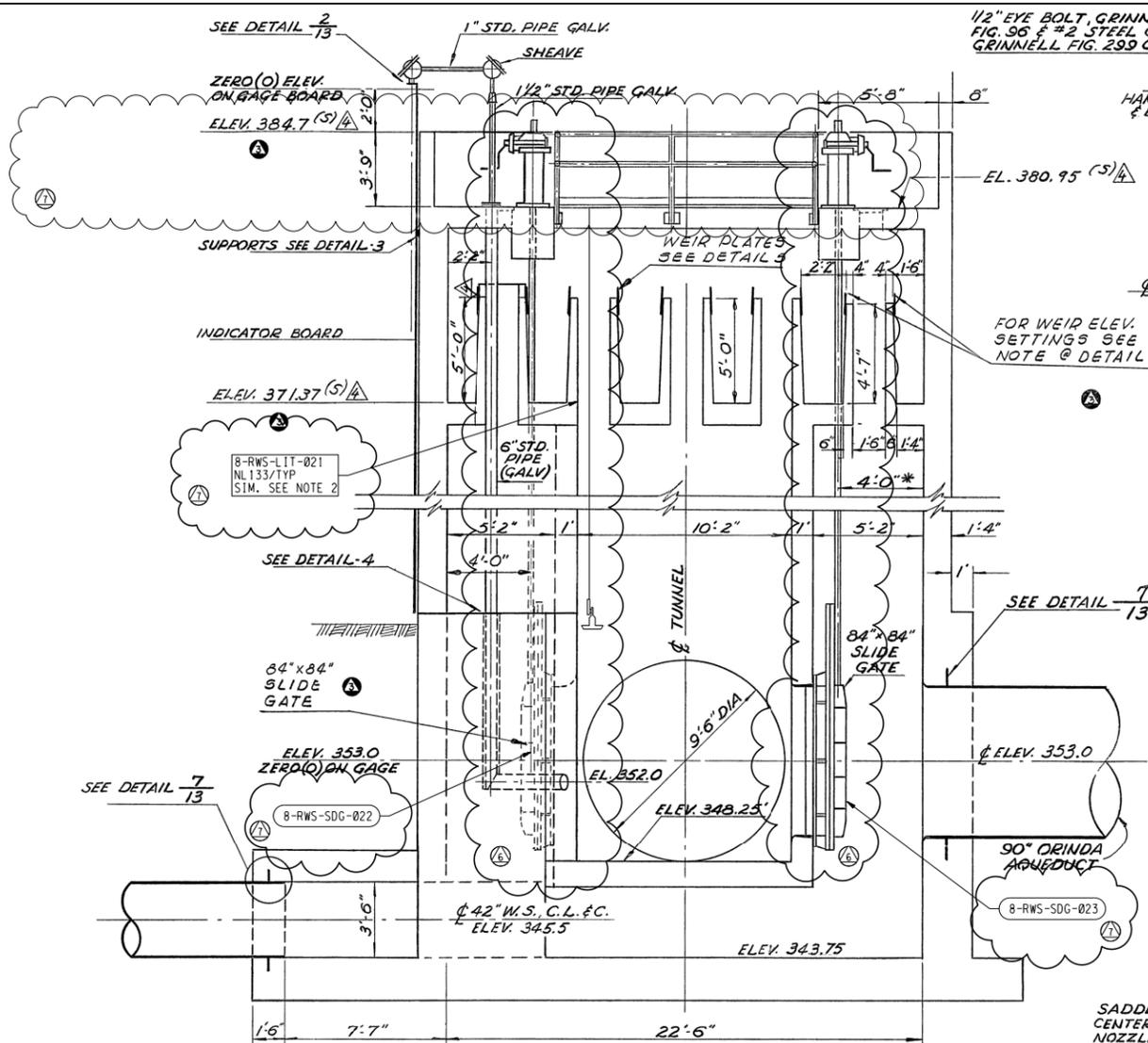
ORINDA WATER TREATMENT PLANT
BRIONES DIVERSION WORKS

GENERAL
LAFAYETTE TUNNEL NO. 2 AND BRIONES
PUMPING PLANT SECTIONS

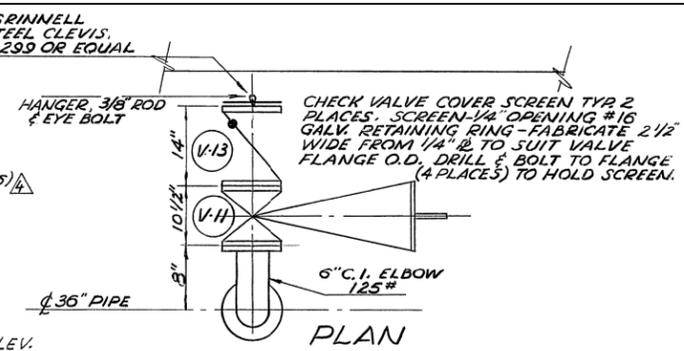
PROJ NO. SPEC 2139
SCALE
DATE 22SEP2021

4099-G-12

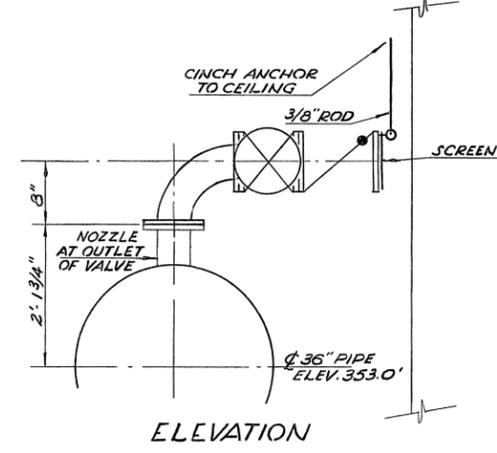
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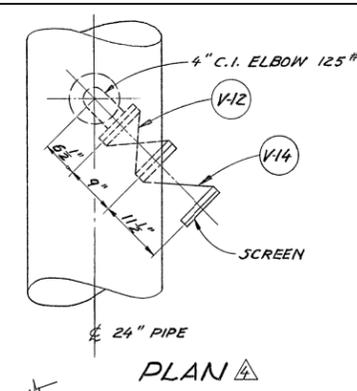
SECTION F/10
SCALE: 1/4" = 1'-0"



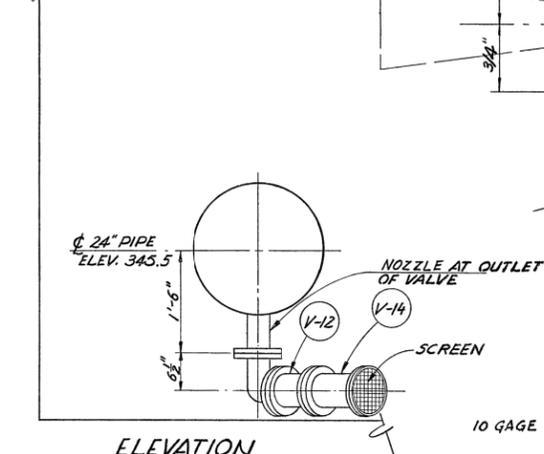
PLAN



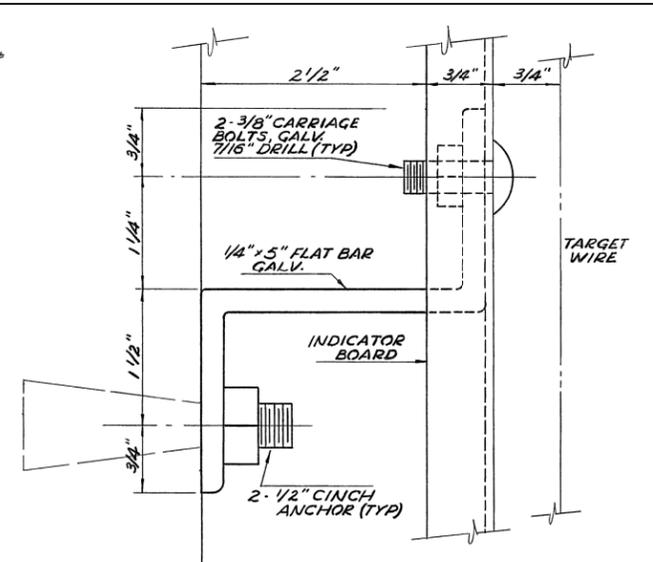
ELEVATION
DETAIL 1/9
SCALE: 3/4" = 1'-0"



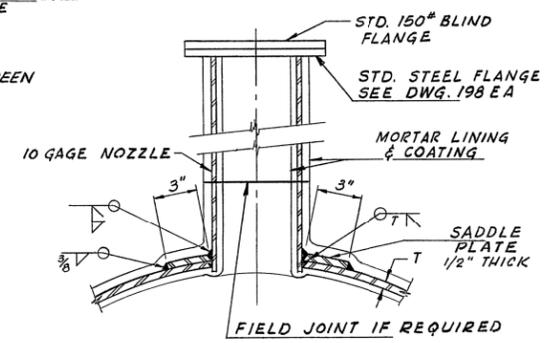
PLAN



ELEVATION
DETAIL 2/9
SCALE: 3/4" = 1'-0"

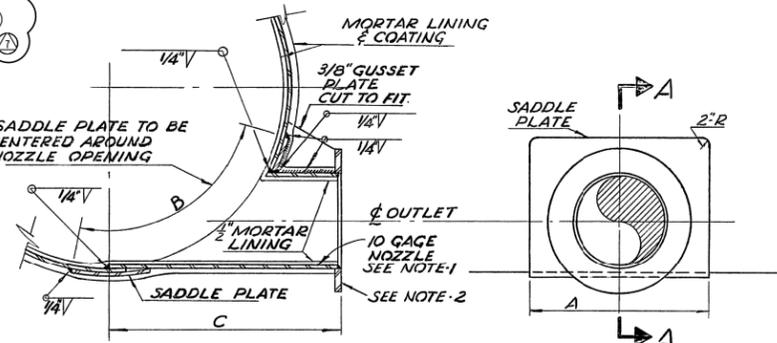


DETAIL 3
MAX. SPACING 6'
FULL SCALE



DETAIL 7/12
NO SCALE

NOTE: ENTIRE NOZZLE ASSEMBLY INCLUDING SADDLE PLATE MAY BE INSTALLED IN THE FIELD AT THE CONTRACTOR'S OPTION.



SECTION-A **ELEVATION**

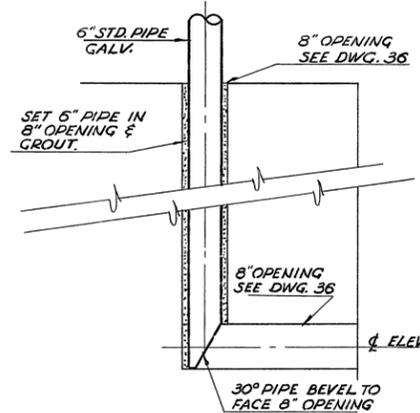
PIPE SIZE	OUTLET NOM. SIZE	NOZZLE O. D.	SADDLE PLATE THICKNESS	A	B	C
48"	12"	13.2"	1/2"	24"	36"	31"
54"	12"	13.2"	3/4"	18"	37"	36"

DETAIL 6/9
NO SCALE

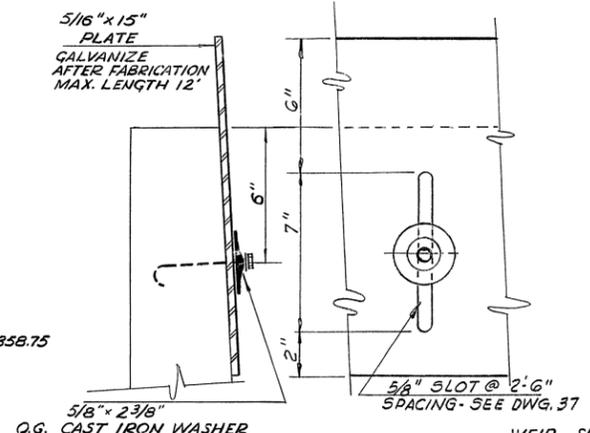
NOTES:

1. APPLY MORTAR COATING AFTER INSTALLATION
2. FOR STANDARD FLANGE DETAILS SEE STD. DWG 198 EA

NOTES:
1. INSTALL NEW, DISTRICT FURNISHED, STAINLESS STEEL SLIDE GATES PER SECTION 40 05 59.34.
2. SENSOR ELEVATION 360.00.

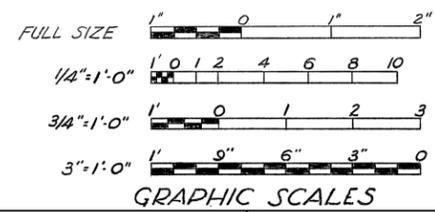


DETAIL 4
SCALE: 3/4" = 1'-0"



DETAIL 5
SCALE: 3" = 1'-0"

WEIR SETTING:
SET WEIR PLATES AT ELEV. 376.73 EXCEPT AS FOLLOWS: SET 4 LENGTHS OF 12' WEIR ON 2 SIDE TROUGHS FACING 12' x 5.2' SHAFT AT ELEV. 376.26.



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DATE: 27-OCT-2021 10:10
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NO.	DATE	BY	REC.	APP.
1	01OCT2021			
2				



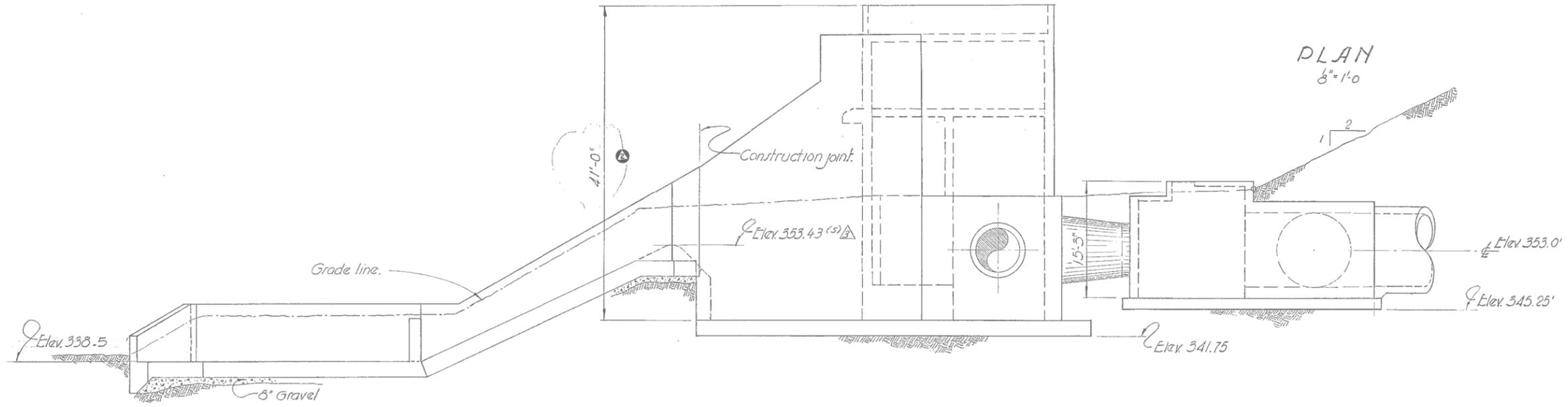
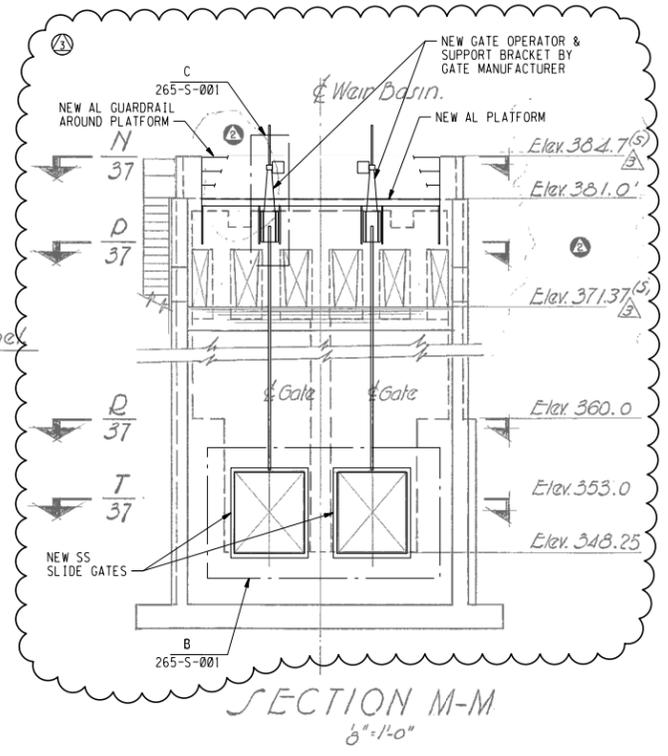
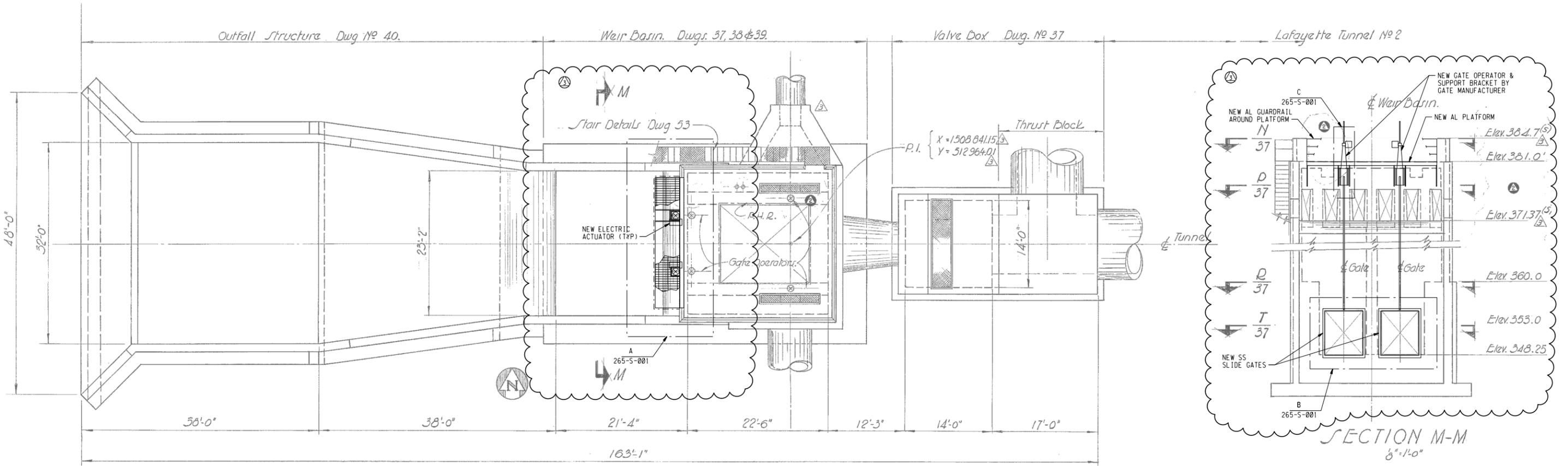
DESIGNED BY: PVBV
DESIGN CHECKED BY: CE
DRAWN BY: JLG
SR. PROJ. ENGR.: PVBV
APPROVED: CTC
PRENDSARAEN ENABHARAP, P.E. NO. C-10813

PROJECT MANAGER: R.P.E. NO. C82926
RECOMMENDED: SENIOR CIVIL ENGR. R.P.E. NO. C74901
APPROVED: MGR OF DESIGN R.P.E. NO. C48598

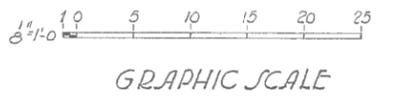
EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

ORINDA WATER TREATMENT PLANT
BRIONES DIVERSION WORKS
GENERAL
LAFAYETTE TUNNEL NO. 2 BRIONES
DIVERSION WORKS & BRIONES PUMPING PLANT DETAILS

PROJ NO. SPEC 2139
SCALE: 4099-G-15
DATE: 22SEP2021
STRUCT. DISC. NUMBER REV.



- NOTES**
1. For General Notes see Dwg No. 31.
 2. Vertical construction joints shall not be used in Weir Basin.



3" ON ORIGINAL DOCUMENT

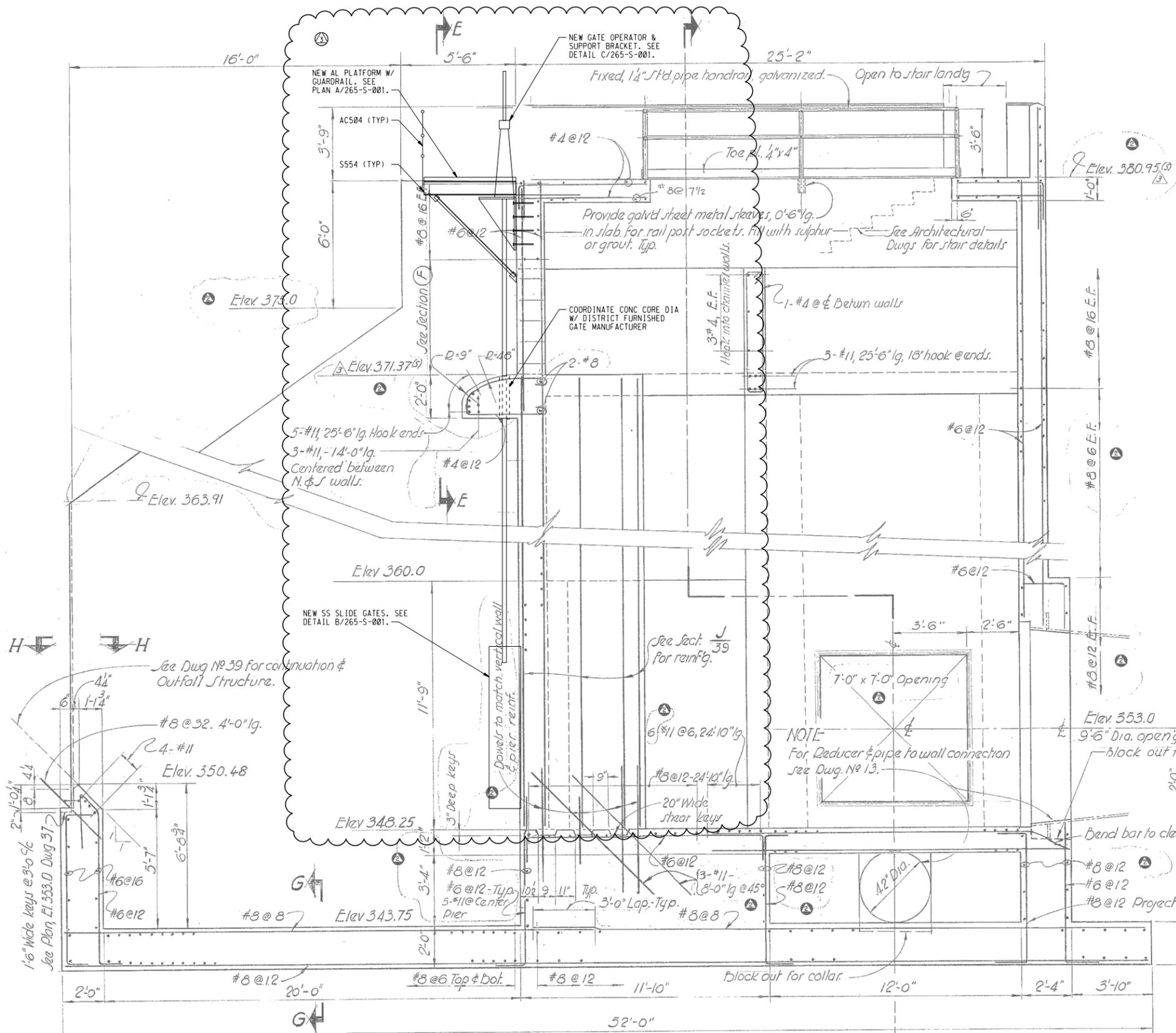
NO.	DATE	BY	REC.	APP.
01	NOV 2021			



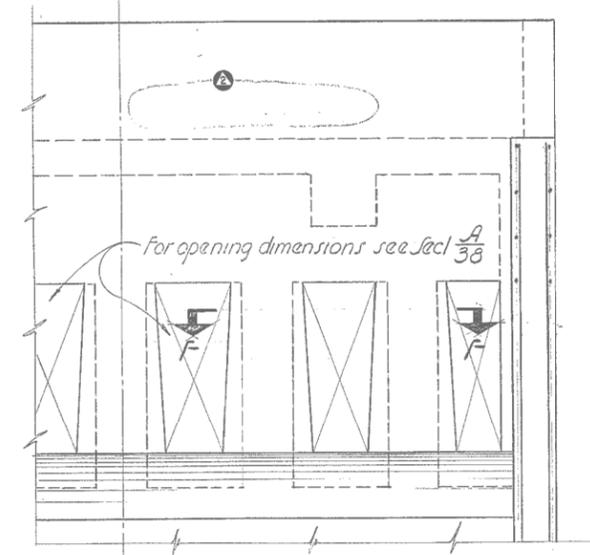
DESIGNED BY	EQ
DESIGN CHECKED BY	CE
DRAWN BY	RW
SR. PROJ ENGR.	PBVB
APPROVED	CTC
PRINCIPAL IN CHARGE, R.P.E. NO.	

PROJECT MANAGER	JEFFREY C. BANDY
RECOMMENDED BY	MICHAEL J. HARTLAUB
APPROVED BY	S. TEREZENTSEFF

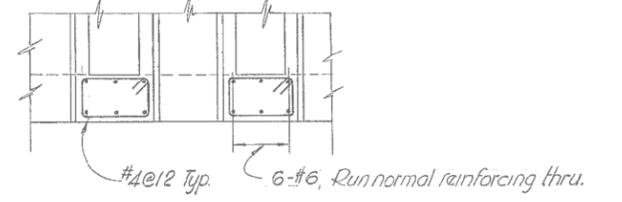
EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
ORINDA WATER TREATMENT PLANT BRIONES DIVERSION WORKS STRUCTURAL			
LAFAYETTE TUNNEL NO. 2 GENERAL ARRANGEMENT			
PROJ NO.	SPEC 2139	4099-G-36	3
SCALE			
DATE	22SEP2021	STRUCT.	DISC. NUMBER REV.



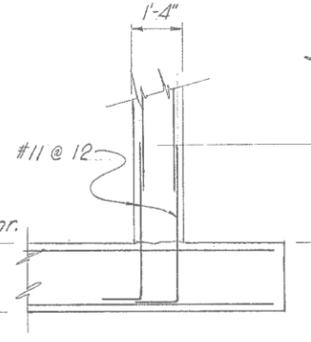
Symmetrical about ϕ except as noted.



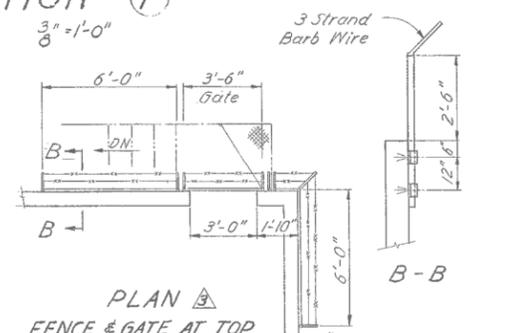
ELEVATION @ E
3/8" = 1'-0"



SECTION F
3/8" = 1'-0"



SECTION G
3/8" = 1'-0"



PLAN A
FENCE & GATE AT TOP OF WEIR STRUCTURE
NO SCALE



KAISER ENGINEERS
DIVISION OF HENRY J. KAISER COMPANY
OAKLAND CALIFORNIA

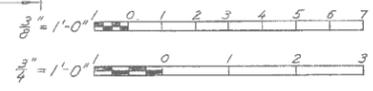
APPROVED: *[Signature]*
CHIEF ENGINEER R.P.E. No. 969

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

ORINDA WATER TREATMENT PLANT
BRIONES DIVERSION WORKS
STRUCTURAL
LAFAYETTE TUNNEL NO. 2
SECTIONS & DETAILS

PROJ NO. SPEC 2139	4099-G-38	3
SCALE	STRUCT. DISC.	NUMBER REV.
DATE 22SEP2021		

GRAPHIC SCALES



SECTION B
3/8" = 1'-0"

SECTION H
3/4" = 1'-0"



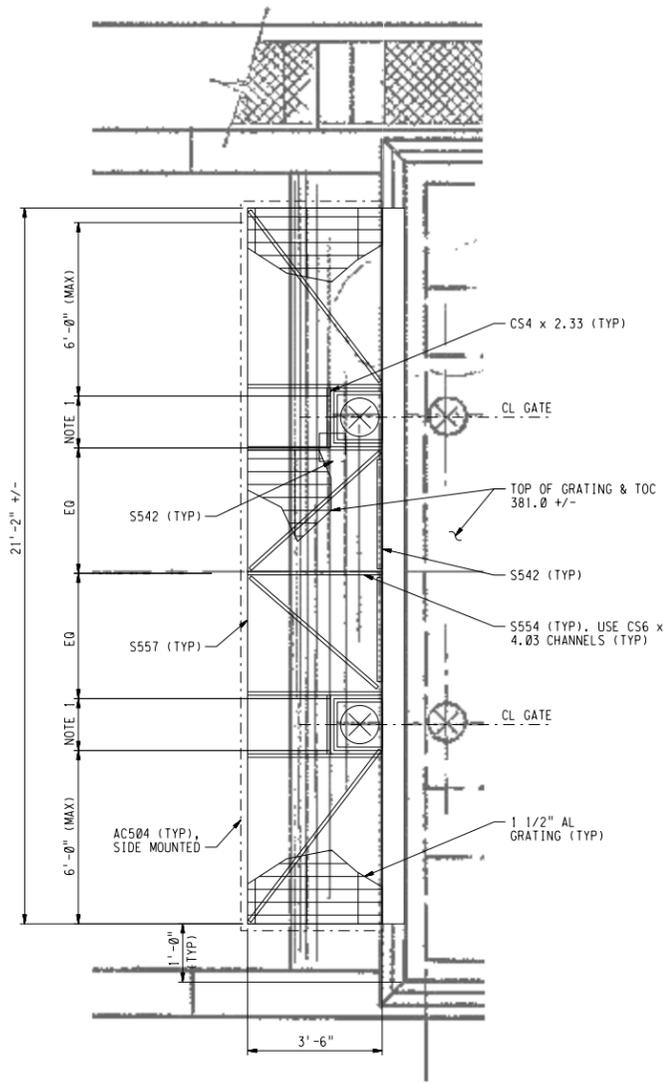
NO.	DATE	BY	REC.	APP.
01	NOV2021			



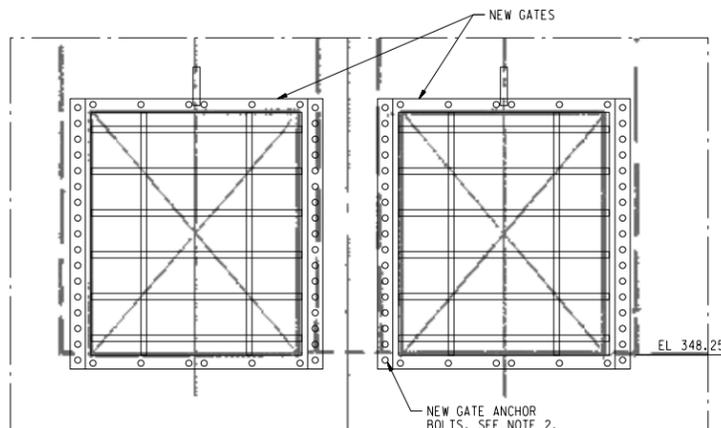
DESIGNED BY	EQ
DESIGN CHECKED BY	CE
DRAWN BY	RW
SR. PROJ ENGR.	PBVB
R.P.E. NO. C 79446	
APPROVED	CTC
PRINCIPAL IN CHARGE, R.P.E. NO.	

PROJECT MANAGER	R.P.E. NO. C82926
RECOMMENDED BY	SR. CIVIL ENGR. R.P.E. NO. C74901
APPROVED BY	MGR OF DESIGN R.P.E. NO. C48598

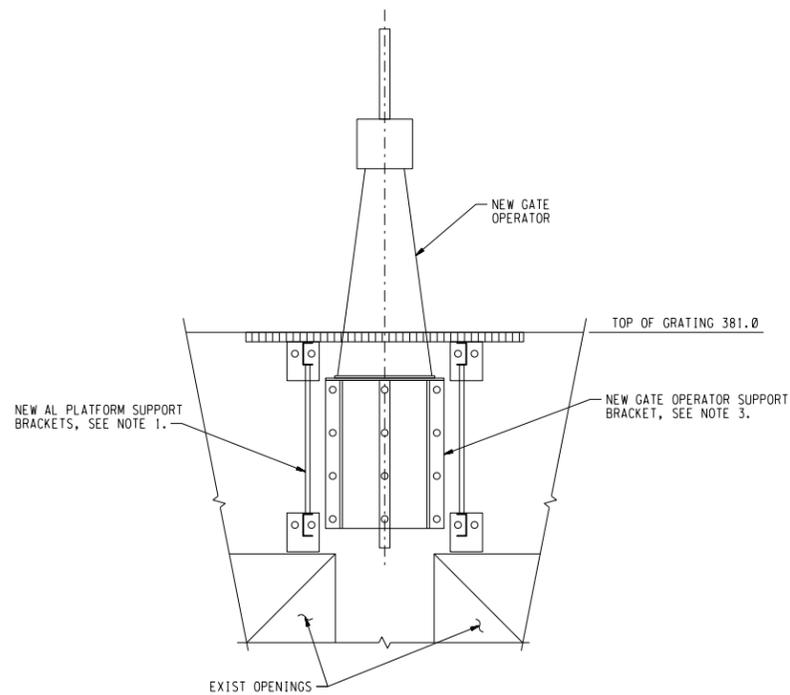
PROJECT MANAGER	<i>[Signature]</i> JEFFREY C. BANDY
RECOMMENDED BY	<i>[Signature]</i> MICHAEL J. HARTLAUB
APPROVED BY	<i>[Signature]</i> SERGE V. TEREZENTJEFF



ALUMINUM PLATFORM PLAN A
NO SCALE 4099-G-36



NEW GATE DETAIL B
NO SCALE 4099-G-36



NEW GATE SUPPORT BRACKET C
NO SCALE 4099-G-36

- NOTES:
1. PLATFORM BRACKET LOCATION TO BE COORDINATED WITH DISTRICT FURNISHED GATE OPERATOR SUPPORT BRACKET DIMENSIONS AND LOCATION. REFER TO DETAIL "C" ON THIS DRAWING. PLATFORM BRACKETS TO BE LOCATED CLOSE TO GATE OPERATOR SUPPORT BRACKET TO PROVIDE AL GRATING SUPPORT AND A GAP OF 2 INCHES BETWEEN OPERATOR AND GRATING.
 2. CONTRACTOR TO COORDINATE ANCHOR BOLT INSTALLATION WITH MANUFACTURER OF DISTRICT FURNISHED SS SLIDE GATES. CONTRACTOR TO USE NON DESTRUCTIVE SCANNING METHODS TO IDENTIFY LOCATION OF EXISTING REINFORCING BARS AND EXISTING GATE ANCHOR BOLTS. EXISTING REINFORCING STEEL SHALL NOT BE CUT UNLESS APPROVED BY DISTRICT'S REPRESENTATIVE. CONSULT MANUFACTURER TO DETERMINE WHETHER ALTERNATIVE ANCHOR BOLT LOCATIONS MAY BE USED WHERE ANCHOR HOLES COINCIDE WITH EXISTING REINFORCING STEEL.
 3. CONTRACTOR TO COORDINATE ANCHOR BOLT INSTALLATION WITH MANUFACTURER OF DISTRICT FURNISHED SS SLIDE GATE OPERATOR SUPPORT BRACKET. CONTRACTOR TO USE NON DESTRUCTIVE SCANNING METHODS TO IDENTIFY LOCATION OF EXISTING REINFORCING BARS. EXISTING REINFORCING STEEL SHALL NOT BE CUT UNLESS APPROVED BY DISTRICT'S REPRESENTATIVE.
 4. PLATFORM DESIGN LIVE LOAD: 100 PSF.

3" ON ORIGINAL DOCUMENT

NO.	DATE	BY	REC.	APP.
01	NOV2021			
REVISED PER SPEC 2139 ADDENDUM 3				E.O.



DESIGNED BY	EQ
DESIGN CHECKED BY	CE
DRAWN BY	RW
SR. PROJ ENGR,	PBVB
R.P.E. NO. C 79446	
APPROVED	CTC
PRINCIPAL IN CHARGE, R.P.E. NO.	

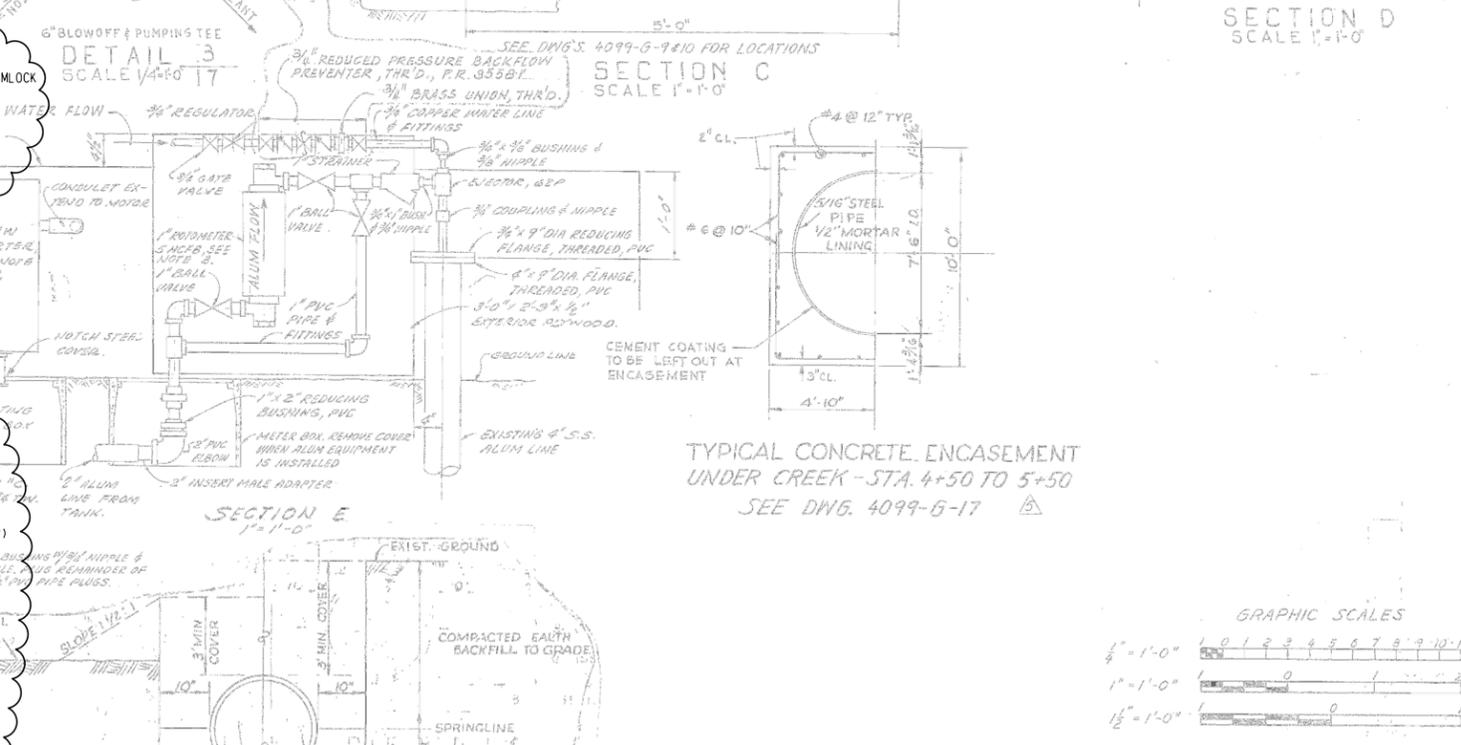
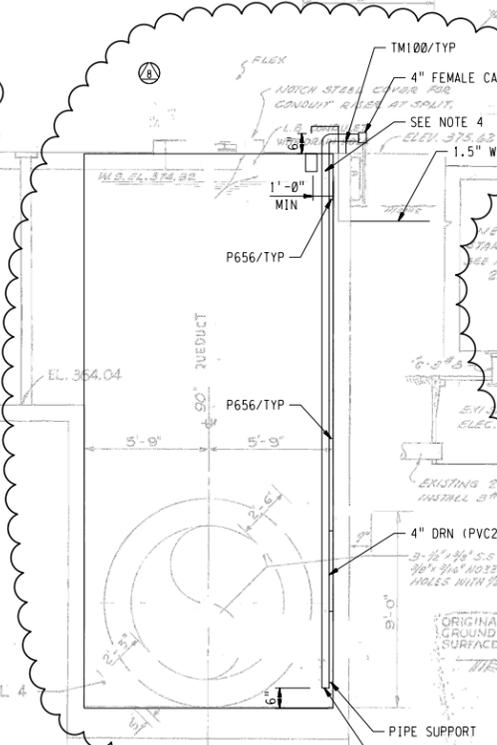
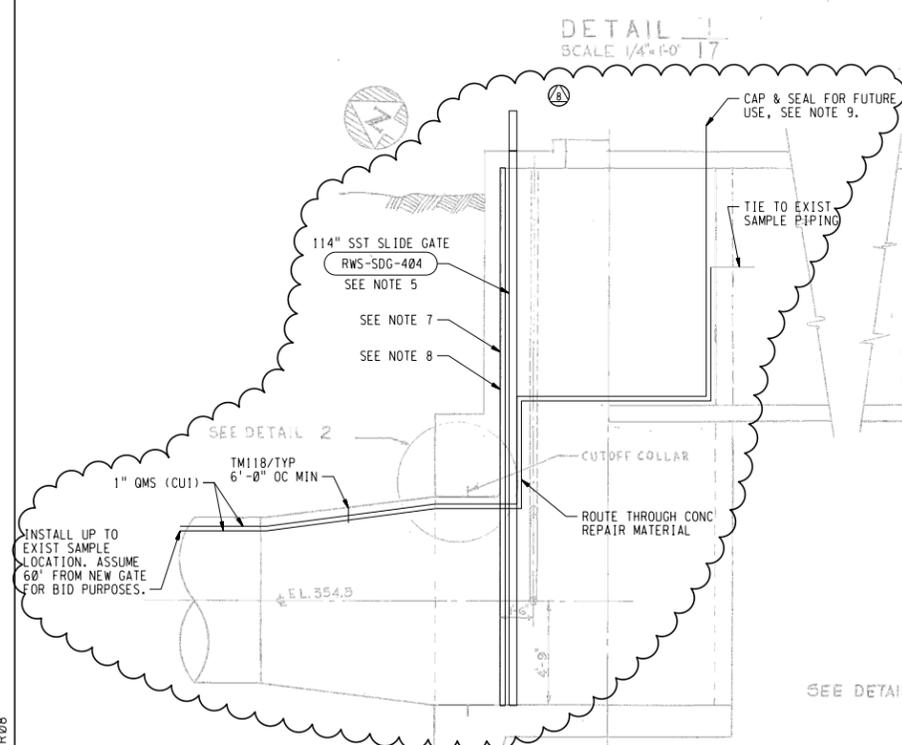
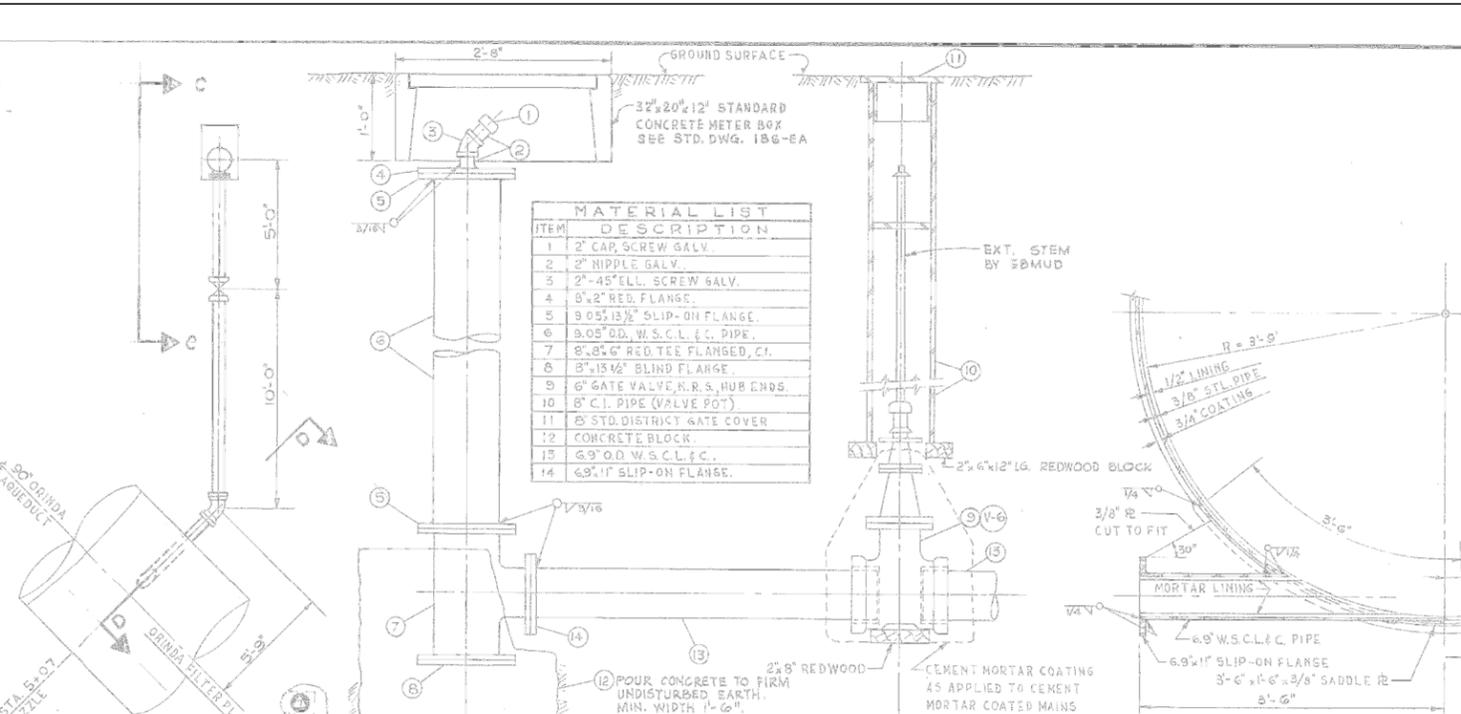
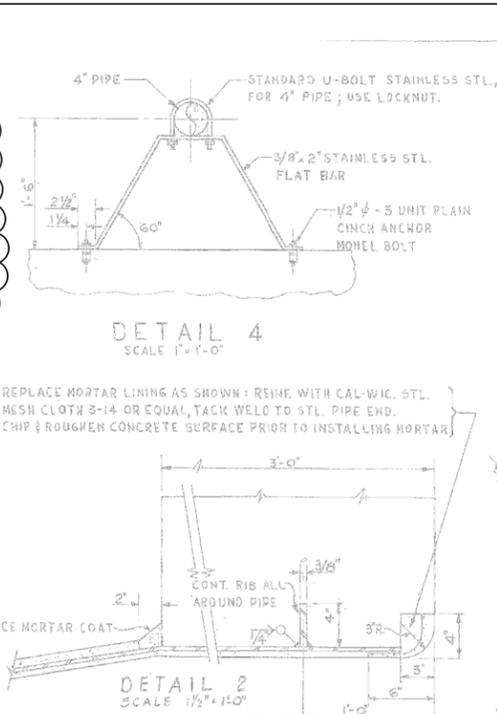
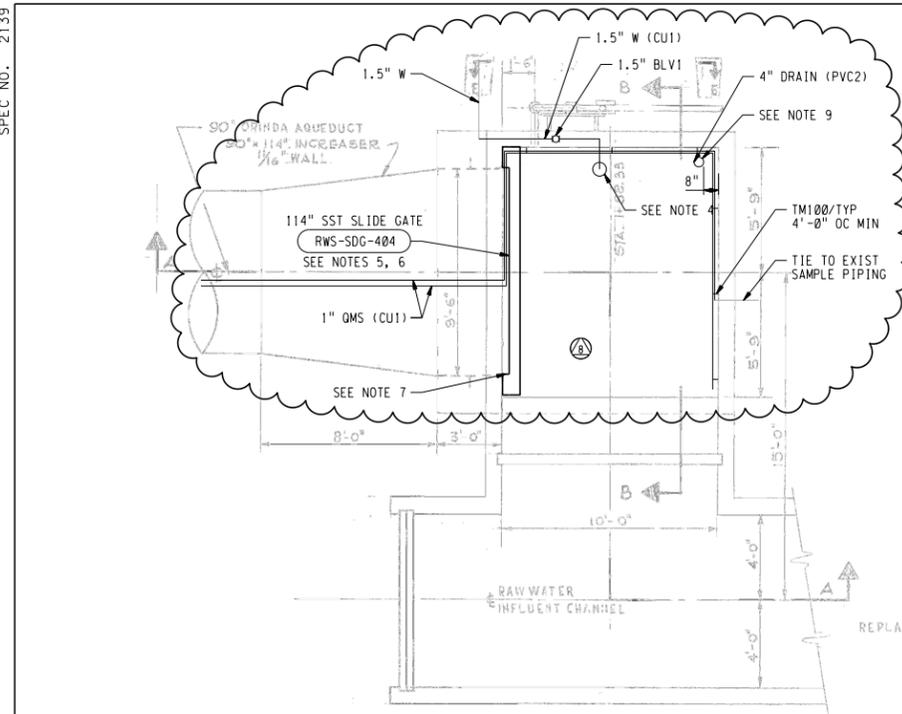
PROJECT MANAGER	R.P.E. NO. C82926	<i>Jeffrey C. Bandy</i>
RECOMMENDED BY	SR. CIVIL ENGR,	R.P.E. NO. C74901
APPROVED BY	MGR OF DESIGN	R.P.E. NO. C48598
		<i>S. Terenteff</i>

EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
ORINDA WATER TREATMENT PLANT BRIONES DIVERSION WORKS STRUCTURAL DIVERSION WORKS SPILLWAY GATES PLAN, SECTIONS, AND DETAILS			
PROJ NO. SPEC 2139	265-S-001		0
SCALE			
DATE 22SEP2021	STRUCT.	DISC.	NUMBER
			REV.

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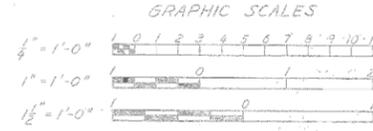
NORTH RAW WATER CHANNEL ISOLATION GATE

♦



NOTE:

- FOR TYR WELDED STEEL PIPE JOINTS SEE DWG. 14
- COMBINATION LINE STARTER WITH CIRCUIT BREAKER AND THIRD OVERLOAD IN MEMO 4 STAINLESS STEEL ENCLOSURE GUTLER-HAMMER #3591-H36617 EXCEPT WITH OIL TIGHT START-STOP PUSHBUTTON MOUNTED IN COVER. PROVIDE PADLOCK FEATURE ON STOP BUTTON.
- REMOVE ROTOMETER & PIPING AS A UNIT AND STORE IN FILTER PLANT WHEN NOT IN USE.
- 8-INCH CORE DRILL. USE NON-DESTRUCTIVE METHODS TO AVOID REBAR. ROUTE 1.5-INCH W PIPE TO CENTER OF OPENING
- INSTALL DISTRICT FURNISHED SLIDE GATE PER 40 05 59.34. CONTRACTOR TO COORDINATE ANCHOR BOLT INSTALLATION WITH MANUFACTURER OF DISTRICT FURNISHED SS SLIDE GATES. CONTRACTOR TO USE NON DESTRUCTIVE SCANNING METHODS TO IDENTIFY LOCATION OF EXISTING REINFORCING BARS AND EXISTING GATE ANCHOR BOLTS. EXISTING REINFORCING STEEL SHALL NOT BE CUT UNLESS APPROVED BY DISTRICT'S REPRESENTATIVE. CONSULT MANUFACTURER TO DETERMINE WHETHER ALTERNATIVE ANCHOR BOLT LOCATIONS MAY BE USED WHERE ANCHOR HOLES COINCIDE WITH EXISTING REINFORCING STEEL.
- CONTRACTOR SHALL FURNISH AND INSTALL A 304 SST SEAL PLATE OVER THE DECK OPENING FOR THE SELF-CONTAINED GATE FRAME. SEAL PLATE GEOMETRY SHALL BE COORDINATED WITH GATE DESIGN TO CREATE A TIGHT SEAL PER TYPICAL DETAIL 5562.
- GROUT PAD FOR GATE FRAME. SEE STRUCTURAL DRAWINGS FOR DETAILS.
- ROUTE NEW ELECTRICAL CONDUITS AND NEW SAMPLE LINES THROUGH GROUT PAD.
- CORE DRILL AND INSTALL LINK SEAL AROUND NEW PIPE. USE NON-DESTRUCTIVE METHODS TO AVOID REBAR.



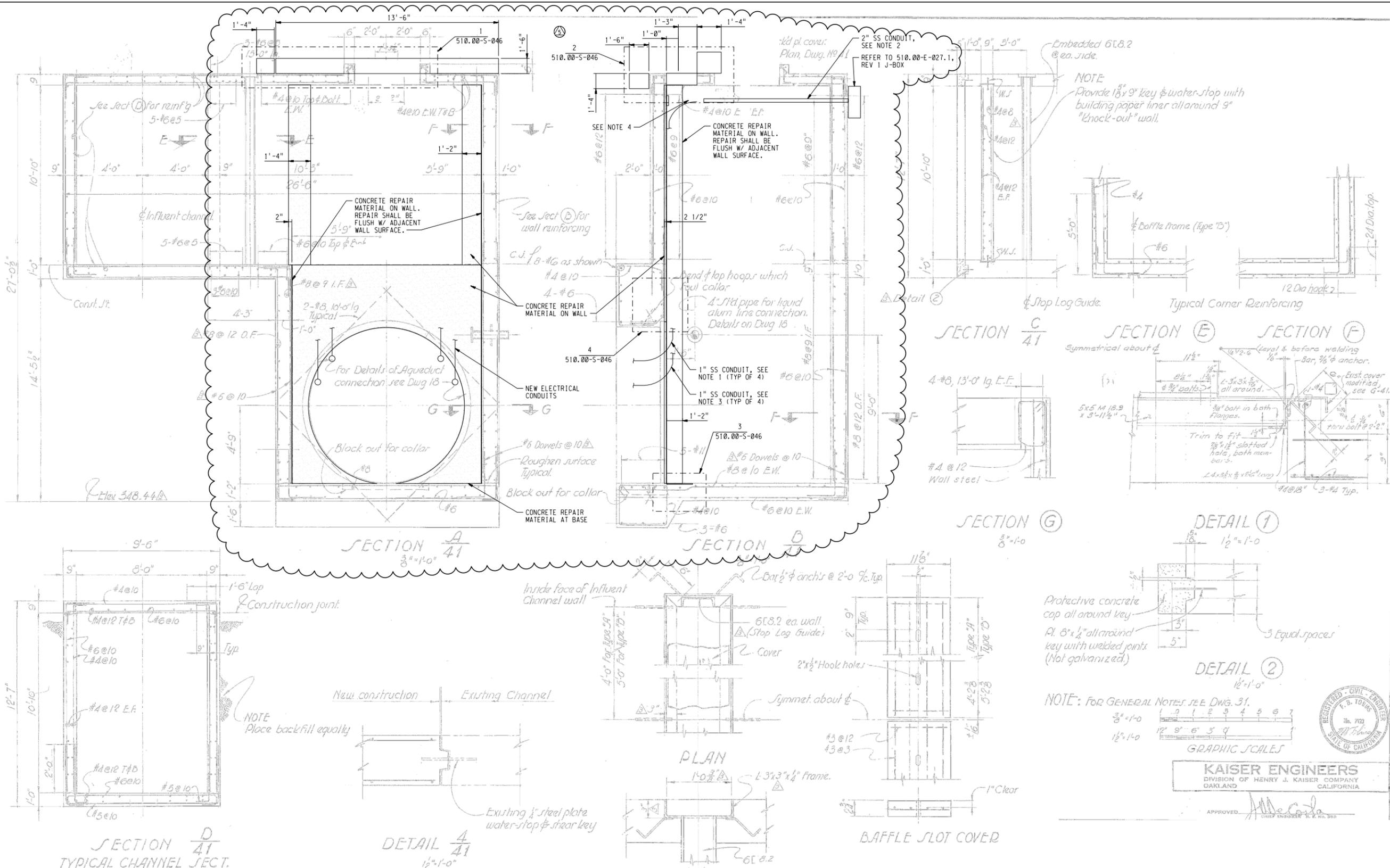
NO.	DATE	BY	REC.	APP.
010CT2021	REVISED PER SPEC 2139 ADDENDUM 3	PVB	PVB	CTC



DESIGNED BY	PBVB
DESIGN CHECKED BY	CE
DRAWN BY	JLG
SR. PROJ ENGR.	PBVB
APPROVED	CTC
PRINCIPAL IN CHARGE, R.P.E. NO. C 72713	

PROJECT MANAGER	R.P.E. NO. C82926
RECOMMENDED BY	SENIOR CIVIL ENGR. R.P.E. NO. C74901
APPROVED BY	MR. OF DESIGN R.P.E. NO. C48598

EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
ORINDA WATER TREATMENT PLANT			
GENERAL			
PROJ NO.	SPEC 2139	STRUCT.	DISC.
SCALE		NUMBER	REV.
DATE	22SEP2021		



- NOTES:**
1. PROVIDE FOUR 1" STAINLESS STEEL ELBOWS, EACH WITH 4 TRANSDUCER CABLES, ROUTED THROUGH CONCRETE REPAIR MATERIAL AREA BETWEEN GATE FRAME AND CHANNEL WALL. CONTINUE FOUR 1" STAINLESS STEEL CONDUITS UP AND OUT OF CONCRETE REPAIR MATERIAL AT NE CORNER OF INLET CHANNEL.
 2. PROVIDE 2" STAINLESS STEEL CONDUIT, WITH 16 TRANSDUCER CABLES, FROM TOP NE CORNER OF INLET CHANNEL, TO SE CORNER, CORE DRILL WALL, AND ROUTE CONDUIT THROUGH WALL 0 ABOVE GRADE J-BOX. REFER TO DWG 510.00-E-027.1 REV 1 FOR J-BOX.
 3. EXTEND FOUR 1" STAINLESS STEEL CONDUITS 10' INTO AQUEDUCT AND PROVIDE CABLE SEAL FITTING (ROXTEC #102618 OR EQUAL) AT END OF CONDUITS, PRIOR TO TRANSITIONING TO FLOWMETER CABLE AND CONDUIT INSTALLATION MEANS.
 4. TRANSITION TRANSDUCER CABLES FROM FOUR 1" CONDUIT TO SINGLE 2" CONDUIT. TRANSITION POINT TO BE ACCESSIBLE FROM VAULT ABOVE.
 5. PROVIDE TWO 1" COPPER SAMPLE LINES ROUTED THROUGH CONCRETE REPAIR MATERIAL PER MECHANICAL DRAWINGS.

NO.	DATE	BY	REC.	APP.
010CT2021	REVISED PER SPEC 2139 ADDENDUM 3	EO	PVB	CTC



DESIGNED BY	EQ
DESIGN CHECKED BY	CE
DRAWN BY	RW
SR. PROJ ENGR.	PBVB
R.P.E. NO. C 7946	
APPROVED	CTC
PRINCIPAL IN CHARGE, R.P.E. NO.	

PROJECT MANAGER	R.P.E. NO. C82926
RECOMMENDED	
SR. PROJ ENGR.	PBVB
R.P.E. NO. C 74901	
APPROVED	
MGR OF DESIGN	
R.P.E. NO. C48598	

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

ORINDA WATER TREATMENT PLANT
BRIONES DIVERSION WORKS
STRUCTURAL

LAFAYETTE TUNNEL NO. 2 ORINDA RAW
WATER LINE INFLUENT CHANNEL SECTIONS & DETAILS

PROJ NO. SPEC 2139
SCALE
DATE 22SEP2021

4099-G-42
STRUCT. DISC. NUMBER

5
REV.



KAISER ENGINEERS
DIVISION OF HENRY J. KAISER COMPANY
OAKLAND CALIFORNIA

NOTE: FOR GENERAL NOTES SEE DWG. 31.

3'-10" 1'-0" 1'-0" 1'-0" 1'-0" 1'-0" 1'-0" 1'-0" 1'-0" 1'-0"

GRAPHIC SCALES

Protective concrete cap all around key
At 6" x 1/2" all around key with welded joints (Not galvanized)

NOTE
Provide 1 1/2" x 9" key & water-stop with building paper liner all around 9" "knock-out" wall.

CONCRETE REPAIR MATERIAL ON WALL. REPAIR SHALL BE FLUSH W/ ADJACENT WALL SURFACE.

CONCRETE REPAIR MATERIAL ON WALL. REPAIR SHALL BE FLUSH W/ ADJACENT WALL SURFACE.

CONCRETE REPAIR MATERIAL ON WALL. REPAIR SHALL BE FLUSH W/ ADJACENT WALL SURFACE.

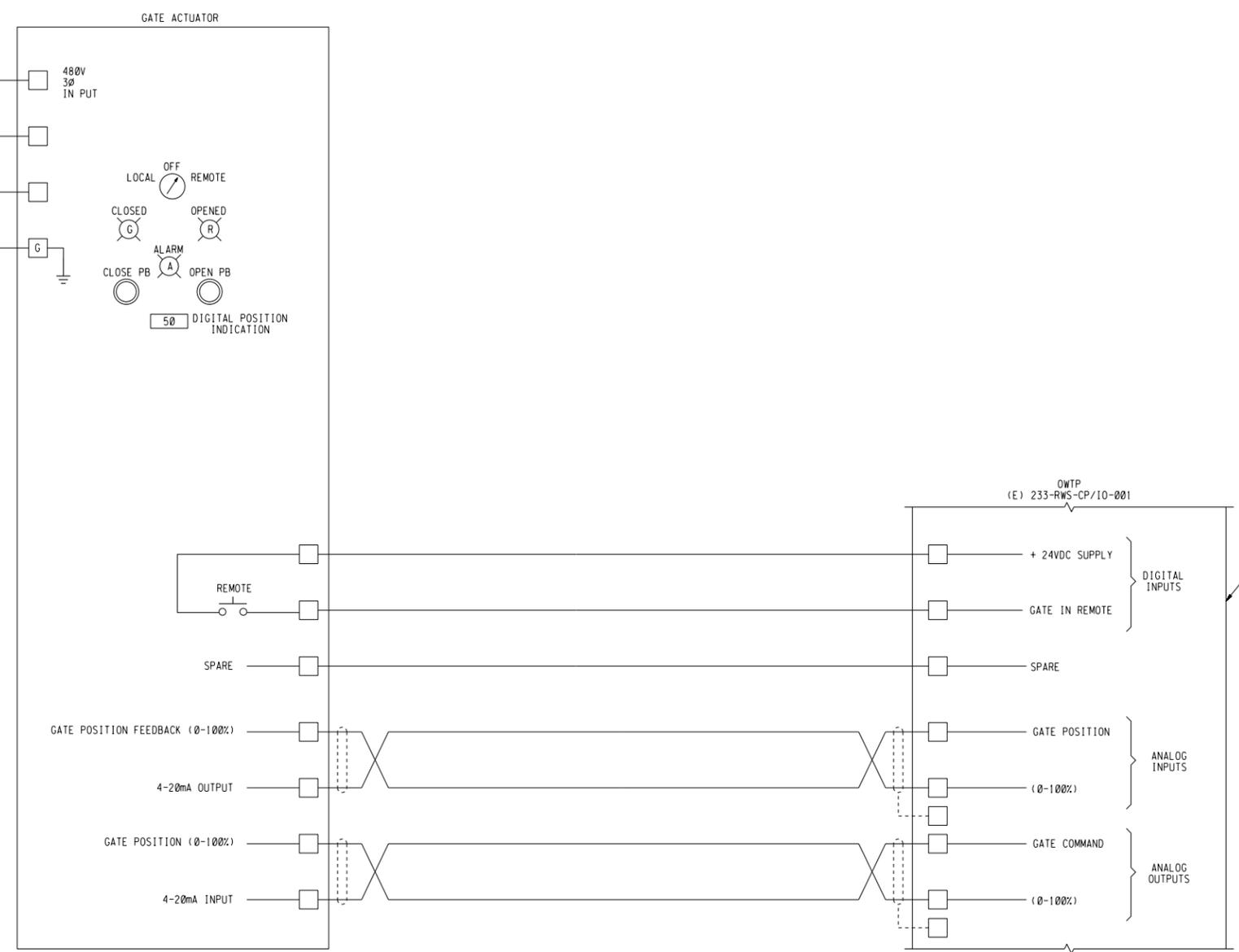
CONCRETE REPAIR MATERIAL AT BASE

CONCRETE REPAIR MATERIAL ON WALL. REPAIR SHALL BE FLUSH W/ ADJACENT WALL SURFACE.

CONCRETE REPAIR MATERIAL ON WALL. REPAIR SHALL BE FLUSH W/ ADJACENT WALL SURFACE.



480VAC
3Ø, 3W FROM
233-EPS-MCC-002



GENERAL NOTES

1. NOT ALL ACUTATOR TERMINAL BLOCKS ARE REPRESENTED IN DIAGRAM.
2. SUBMIT SCHEMATICS THAT INCLUDE WIRE LABELS, INSULATION COLOR, WIRE SIZE, JUMPERS, AND TERMINAL BLOCK LABELS.

LOCATED IN NORTH RAPID MIX

ORINDA WATER TREATMENT PLANT - 480 VAC VALVE ACTUATORS		
VALVE ACTUATOR TAG NO.	FED FROM MCC	VALVE SHOWN ON DRAWING
233-RWS-MQA-404	233-EPS-MCC-002	510.00-E-027.1

NEW DRAWING ISSUED PER ADDENDUM NO. 3

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

ORINDA WATER TREATMENT PLANT

ELECTRICAL
SCHEMATIC DIAGRAM
480V MODULATING ACTUATORS

PROJ NO. SPEC 2139	510.00-E-227	0
SCALE NONE	STRUCT. DISC. NUMBER	REV.
DATE 22SEP2021		

3" ON ORIGINAL DOCUMENT

J Calton Engineering

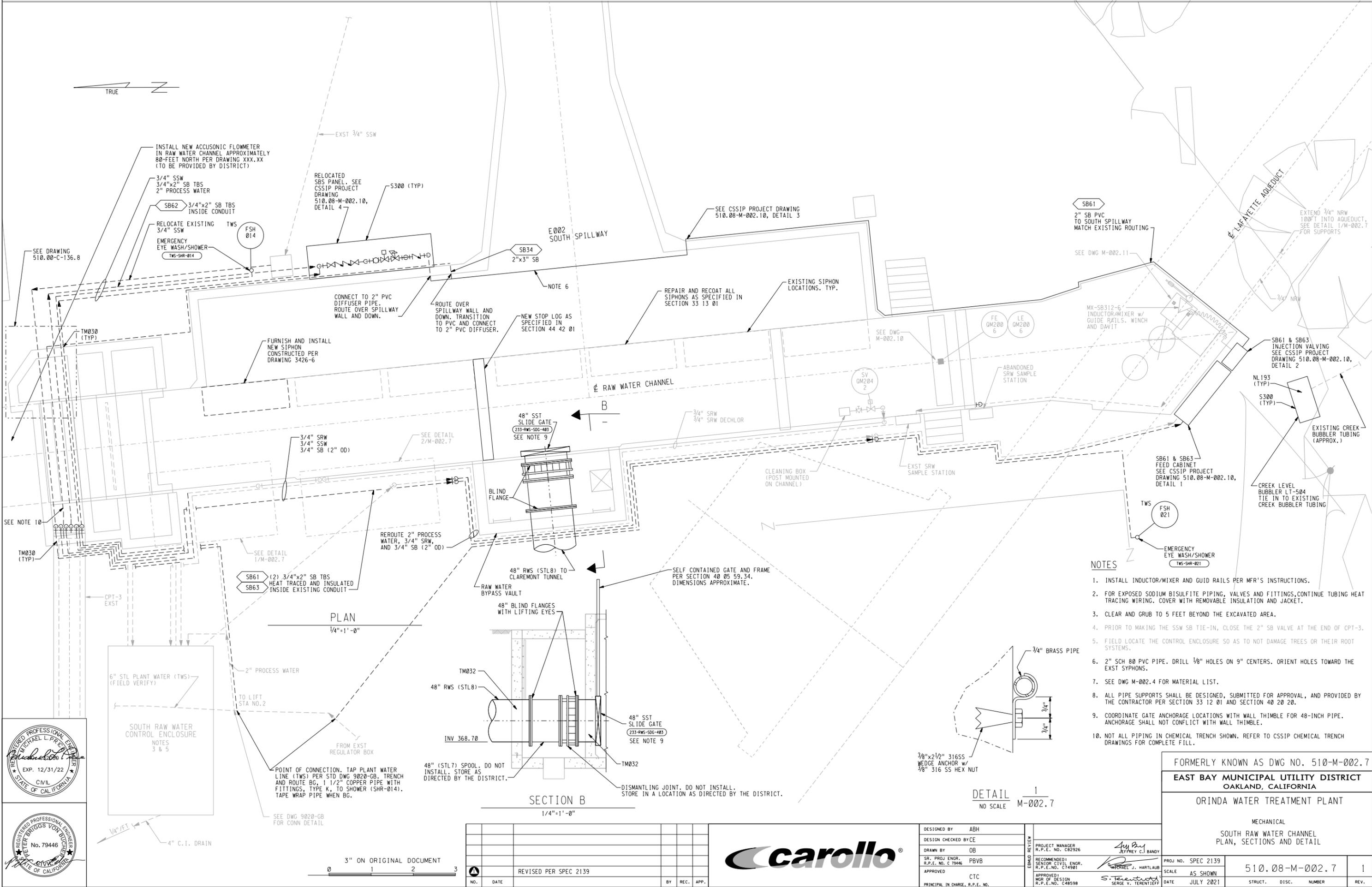
NO.	DATE	BY	REC.	APP.

DESIGNED BY JCC	PROJECT MANAGER R.P.E. NO. C82926
DESIGN CHECKED BY JCC	RECOMMENDED: SENIOR CIVIL ENGR. R.P.E. NO. C74901
DRAWN BY CE	APPROVED: MGR OF DESIGN R.P.E. NO. C48598
SR. PROJ ENGR, R.P.E. NO. C 79446	PRINCIPAL IN CHARGE, R.P.E. NO.
PBVB	
CTC	

♦

SOUTH RAW WATER CHANNEL

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- NOTES**
1. INSTALL INDUCTOR/MIXER AND GUID RAILS PER MFR'S INSTRUCTIONS.
 2. FOR EXPOSED SODIUM BISULFITE PIPING, VALVES AND FITTINGS, CONTINUE TUBING HEAT TRACING WIRING. COVER WITH REMOVABLE INSULATION AND JACKET.
 3. CLEAR AND GRUB TO 5 FEET BEYOND THE EXCAVATED AREA.
 4. PRIOR TO MAKING THE SSW SB TIE-IN, CLOSE THE 2" SB VALVE AT THE END OF CPT-3.
 5. FIELD LOCATE THE CONTROL ENCLOSURE SO AS TO NOT DAMAGE TREES OR THEIR ROOT SYSTEMS.
 6. 2" SCH 80 PVC PIPE. DRILL 1/8" HOLES ON 9" CENTERS. ORIENT HOLES TOWARD THE EXST SYPHONS.
 7. SEE DWG M-002.4 FOR MATERIAL LIST.
 8. ALL PIPE SUPPORTS SHALL BE DESIGNED, SUBMITTED FOR APPROVAL, AND PROVIDED BY THE CONTRACTOR PER SECTION 33 12 01 AND SECTION 40 20 20.
 9. COORDINATE GATE ANCHORAGE LOCATIONS WITH WALL THIMBLE FOR 48-INCH PIPE. ANCHORAGE SHALL NOT CONFLICT WITH WALL THIMBLE.
 10. NOT ALL PIPING IN CHEMICAL TRENCH SHOWN. REFER TO CSSIP CHEMICAL TRENCH DRAWINGS FOR COMPLETE FILL.



FORMERLY KNOWN AS DWG NO. 510-M-002.7

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

ORINDA WATER TREATMENT PLANT

MECHANICAL
SOUTH RAW WATER CHANNEL
PLAN, SECTIONS AND DETAIL

PROJ NO. SPEC 2139	510.08-M-002.7	1
SCALE AS SHOWN	STRUCT. DISC. NUMBER	REV.
DATE JULY 2021		



NO.	DATE	BY	REC.	APP.

REVISED PER SPEC 2139

DESIGNED BY	ABH	PROJECT MANAGER	R.P.E. NO. C82926
DESIGN CHECKED BY	CE	RECOMMENDED BY	SENIOR CIVIL ENGR. R.P.E. NO. C74901
DRAWN BY	OB	APPROVED BY	MGR OF DESIGN R.P.E. NO. C48598
SR. PROJ ENGR.	PBVB	PRINCIPAL IN CHARGE, R.P.E. NO.	
APPROVED	CTC		

