EAST BAY MUNICIPAL UTILITY DISTRICT

REQUEST FOR QUOTATION (RFQ) No. 1531A
for
60-HP VERTICAL TURBINE DECANT PUMPS

For complete information regarding this project, see RFQ posted at http://www.ebmud.com/business-opportunities or contact the EBMUD representative listed below. Thank you for your interest!

Contact Person: John W. Grimes
Phone Number: (510) 287-0316
E-mail Address: jgrimes@ebmud.com

Please note that prospective bidders are responsible for reviewing http://ebmud.com/business, during the RFQ process, for any published addenda regarding this RFQ.

RESPONSE DUE
by
1:30 p.m.
on
November 18, 2015
at
EBMUD, Purchasing Division
375 Eleventh St., First Floor
Oakland, CA 94607

EAST BAY MUNICIPAL UTILITY DISTRICT

RFQ No. 1531A
for
60-HP VERTICAL TURBINE DECANT PUMPS

TABLE OF CONTENTS

I. STATEMENT OF WORK

A. SCOPE

It is the intent of these specifications, terms, and conditions to describe the requirement to furnish and deliver two (2) 60-HP vertical turbine decant pumps F.O.B. to the District's Walnut Creek Water Treatment Plant, Attn: Stephen Lackenbauer, 2201 Larkey Lane, Walnut Creek, California 94597.

East Bay Municipal Utility District (District) intends to award a contract to the lowest cost bidder whose response conforms to the RFQ and 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 turbine pumps for at least three (3) years.

    b. Bidder shall possess all permits, licenses, and professional credentials necessary to supply product and perform services as specified under this RFQ.

C. DELIVERY REQUIREMENTS

It is required that 60-HP Vertical Turbine Decant Pumps be furnished and delivered f.o.b. to the District's Walnut Creek Water Treatment Plant, Attn: Stephen Lackenbauer, 2201 Larkey Lane, Walnut Creek, California 94597.All products shall be in new and unused condition and shall be of the most current and up to date model.

D. SPECIFICATIONS

See Exhibit E specifications sections for product requirements:

1. 01 45 27 - Shop Inspections
2. 33 12 23.10 - Vertical Turbine Pumps

E. 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.

F. INSPECTION

The District will inspect material after its arrival at the delivery point. If the rejection rate of a sample of components is 10% or higher, all components will be rejected. Contractor is solely responsible for ensuring the material arrives at the District's ship-to location free of defects and manufactured in strict conformance with the specifications.

The District reserves the right-of-access to the Contractor's facility to verify conformance to this specification at the District's expense. Contractor shall pay for District Staff to witness test as required in specifications sections 01 45 27 and 33 12 23.10.

II. CALENDAR OF EVENTS

EVENT	DATE/LOCATION
RFQ Issued	October 9, 2015
Response Due	November 18, 2015 by 1:30 p.m.
Anticipated Contract Start Date	December 16, 2015
Required Delivery Date	May 31, 2016 or earlier

Note: All dates are subject to change.

Bidders are responsible for reviewing http://ebmud.com/business 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.

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 PO or contract that may be awarded as a result of this RFQ.

5. Award of contract. The right is reserved 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 technical defects, 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.

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. PROTESTS

Protests must be in writing and must be received no later than seven (7) business days after either of the following: posting of the RFQ results on the District's website (www.ebmud.com), or notification of selection/non-selection, whichever is sooner. 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 protestor. If a firm is representing the protestor, they shall include their contact information in addition to that of the protesting firm.

Protests must be mailed or hand delivered to the Manager of Purchasing, 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 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 working days from the date of receipt of the requesting organization's determination on the protest.

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 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. Written POs may be issued upon approval of written itemized quotations received from the Contractor.

2. POs and payments for products and/or services will be issued only in the name of Contractor.

3. 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 based upon time needed to complete delivery and acceptance.

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. Bidder expressly warrants that all goods and services to be furnished pursuant to any contract awarded it arising from the Bid will conform to the descriptions and specifications contained herein and in supplier catalogs, product brochures and other representations, depictions or models, and will be free from defects, of merchantable quality, good material, and workmanship. Bidder expressly warrants that all goods and services to be furnished pursuant to such award will be fit and sufficient for the purpose(s) intended. This warranty shall survive any inspections, delivery, acceptance, payment, or contract termination for any reason, by the 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 33 12 23.10;

b. Seventy Five (75) percent upon successful factory observed testing of the equipment as outlined in Specification Section 01 45 27 and 33 12 23.10;

c. Ten (10) percent upon delivery of equipment and acceptance by the District;

d. Five (5) percent upon receipt and District acceptance of all delivery O&M as outlined in as outlined in Specification Section 33 12 23.10;

2. The District shall notify Contractor of any invoice adjustments required.

3. Invoices shall contain, at a minimum, District PO 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.

5. Any changes to any of the foregoing invoicing terms are allowed by consensual agreement between Contractor and the District.

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 only to be contacted for the purposes specified below.

TECHNICAL SPECIFICATIONS:
Attn: Nathan Gronlund, Associate Mechanical Engineer
EBMUD - Design Div. / Engineering Dept.
E-Mail: ngronlun@ebmud.com
PHONE: (510) 287-1277

CONTRACT EQUITY PROGRAM:
Attn: Contract Equity Office
PHONE: (510) 287-0114

AFTER AWARD:
Attn: Elena M. Owre, Assistant Engineer
EBMUD - Pipeline Infrastructure Div. / Engineering Dept.
E-Mail: eowre@ebmud.com
PHONE: (510) 287-0259

B. SUBMITTAL OF RFQ RESPONSE

1. Late and/or unsealed responses will not be accepted.

2. RFQ responses submitted via electronic transmissions will not be accepted. Electronic transmissions include faxed RFQ responses or those sent by electronic mail ("e-mail").

3. RFQ responses will be received only at the address shown below, must be SEALED, and must be received at the District Purchasing Division by 1:30 p.m. on the due date specified in the Calendar of Events. Any RFQ response received after that time or date, or at a place other than the stated address cannot be considered and will be returned to the bidder unopened.

   All RFQ responses must be received and time stamped at the stated address by the time designated. The Purchasing Division's timestamp shall be considered the official timepiece for the purpose of establishing the actual receipt of RFQ responses.

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

   Mailed:
   Andrew Akelman, Manager of Purchasing
   East Bay Municipal Utility District
   60-HP Vertical Turbine Decant Pumps
   RFQ No. 1531A
   EBMUD–Purchasing Division
   P.O. Box 24055
   Oakland, CA 94623

   Hand Delivered or delivered by courier or package delivery service:
   Andrew Akelman, Manager of Purchasing
   East Bay Municipal Utility District
   60-HP Vertical Turbine Decant Pumps
   RFQ No. 1531A
   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.

5. Bidders are to submit one (1) original hardcopy RFQ response (Exhibit A – RFQ Response Packet, including Contract Equity Program forms and all additional documentation stated in the "Required Documentation and Submittals" section of Exhibit A), all with original ink signatures.

6. All costs required for the preparation and submission of an RFQ response shall be borne by the bidder.

7. 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.

8. 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.

9. 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.

10. It is understood that the District reserves the right to reject any or all RFQ responses.

C. RESPONSE FORMAT

1. **Bidders shall not modify any part of Exhibits A, B, C, or D, or qualify their RFQ responses. Bidders shall not submit to the District a re-typed or otherwise re-created version of these documents or any other District-provided document.**

2. 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. 1531A – 60-HP VERTICAL TURBINE DECANT PUMPS

To: The EAST BAY MUNICIPAL UTILITY District ("District")

From: _____
(Official Name of Bidder)

RFQ RESPONSE PACKET GUIDELINES

- **AS DESCRIBED IN SECTION IV- RFQ RESPONSE SUBMITTAL INSTRUCTIONS AND INFORMATION, BIDDERS ARE TO SUBMIT ONE (1) ORIGINAL HARDCOPY RFQ RESPONSE WITH ORIGINAL INK SIGNATURES, AND ONE COPY CONTAINING THE FOLLOWING, IN THEIR ENTIRETY:**
  - **EXHIBIT A – RFQ RESPONSE PACKET, INCLUDING CONTRACT EQUITY PROGRAM FORMS AND ALL ADDITIONAL 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 <u>ANY</u> CLARIFICATIONS AND/OR AMENDMENTS, OR TAKING EXCEPTION TO ANY PART OF THIS RFQ, THESE <u>MUST</u> 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.**

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 of RFQ No. 1531A.

3. The undersigned acknowledges acceptance of all addenda related to this RFQ. List Addenda for this RFQ on the lines below:

Addendum #	Date

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 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.

10. 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 5% bid preference, and has completed the Contract Equity Program and Equal Employment Opportunity forms at the hyperlink contained in the Contract Equity Program and Equal Opportunity section of this Exhibit A.

*If no box is checked, it will be assumed that the bidder is ineligible for bid preference and none will be given. 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):

☐ Corporation ☐ Joint Venture

☐ Limited Liability Partnership ☐ Partnership

☐ Limited Liability Corporation ☐ Non-Profit / Church

☐ Other: _____

Jurisdiction of Organization Structure: _____

Date of Organization Structure: _____

Federal Tax Identification 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_____

BIDDING SHEET

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.

Item	Quantity	Unit of Measure	Description	Item Unit Cost	Extended Cost
1	2	each	60-HP Vertical Turbine Decant Pumps, as herein specified.	$_____	$_____
2	1	Lump sum	Travel Costs, Factory Inspection, and Testing of Pumps		$_____
			TOTAL AMOUNT BID		$_____

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. **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.

2. **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.**

3. **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"; and Form P-46, "Designation of Subcontractors."** 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. 1531A – 60-HP Vertical Turbine Decant Pumps

Bidder Name: ________________________________

Bidder must provide a minimum of 3 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. 1531A – 60-HP Vertical Turbine Decant Pumps

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.**	***Bidder takes exception to…***

*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 Program 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

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 award.

The following are the minimum insurance limits, required by the District, to be held by the Contractor performing on this RFQ:

INDEMNIFICATION AND INSURANCE

A. Indemnification

CONTRACTOR expressly agrees to defend, indemnify, and hold harmless the District and its Directors, officers, agents, and employees from and against any and all loss, liability, expense, claims, suits, and damages, including attorneys' fees, arising out of or resulting from CONTRACTOR's, its associates', employees', subcontractors', or other agents' negligent acts, errors or omissions, or willful misconduct, in the operation and/or performance under this Agreement.

B. Insurance Requirements

CONTRACTOR shall take out and maintain during the life of the Agreement all the insurance required in this section, and if requested shall submit certificates for review and approval by the District. The Notice to Proceed shall not be issued, and CONTRACTOR shall not commence work until such insurance has been approved by the District. The certificates shall be on forms approved by the District. Acceptance of the certificates shall not relieve CONTRACTOR of any of the insurance requirements, nor decrease the liability of CONTRACTOR. The District reserves the right to require CONTRACTOR to provide insurance policies for review by the District.

C. Workers Compensation Insurance

CONTRACTOR shall take out and maintain during the life of the Agreement Workers Compensation Insurance for all of its employees on the project. In lieu of evidence of Workers Compensation Insurance, the District will accept a Self-Insured Certificate from the State of California. CONTRACTOR shall require any subcontractor to provide it with evidence of Workers Compensation Insurance.

D. Commercial General Liability Insurance

CONTRACTOR shall take out and maintain during the life of the Agreement Automobile and General Liability Insurance that provides protection from claims which may arise from

operations or performance under this Agreement. If CONTRACTOR elects to self-insure (self-fund) any liability exposure during the contract period above $50,000, CONTRACTOR is required to notify the District immediately. Any request to self-insure must first be approved by the District before the changed terms are accepted. CONTRACTOR shall require any subcontractor to provide evidence of liability insurance coverages.

The amounts of insurance shall be not less than the following:

$2,000,000/Occurrence, Bodily Injury, Property Damage -- Automobile.
$2,000,000/Occurrence, Bodily Injury, Property Damage -- General Liability.

The following coverages or endorsements must be included in the policy(ies)*:*

1. The District, its Directors, officers, and employees are Additional Insureds in the policy(ies) as to the work being performed under the contract.

2. The coverage is *Primary and non-contributory* to any other applicable insurance carried by the District.

3. The policy(ies) covers *contractual liability*.

4. The policy(ies) is written on an *occurrence* basis.

5. The policy(ies) covers the District's Property in Consultant's care, custody, and control.

6. The policy(ies) covers *personal injury* (libel, slander, and wrongful entry and eviction) liability.

7. The policy(ies) covers explosion, collapse, and underground hazards.

8. The policy(ies) covers *products and completed operations.*

9. The policy(ies) covers the use of *owned, non-owned* and hired automobiles.

10. The policy(ies) will not be canceled nor the above coverages/endorsements reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

GENERAL REQUIREMENTS

CONTENTS

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) 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 OF TITLE

Contractor shall warrant to the District, its successors and assigns, that the title to the materials, supplies or equipment covered by the Contract, when delivered to the District or to its successors or assigns, is free from all liens and encumbrances.

8. WARRANTY OF FITNESS

Contractor hereby warrants that all materials furnished shall meet the requirements and conditions of the Contract Documents; shall be fit for the purposes intended and fulfill its design functions; be free of all patent and latent defects in design, materials and workmanship; and perform satisfactorily. It is understood and agreed that by acceptance of this warranty and the acceptance of the materials or supplies to be manufactured or assembled pursuant to these specifications, the District does not waive any warranty either expressed or implied in Sections 2312 to 2317, inclusive, of the Commercial Code of the State of California or any products liability of the Contractor as determined by any applicable decision of a court of the State of California or of the United States.

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 performing 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 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 Engineer. 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 with in 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. <u>Termination by the District for Cause</u>:

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.

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. TRANSFER OF INTEREST

Contractor shall not assign, transfer or otherwise substitute its interest in the Contract or any of the contract obligations without prior written consent from the District.

25. 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.

26. 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.

27. 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.

28. WAIVER OF RIGHTS

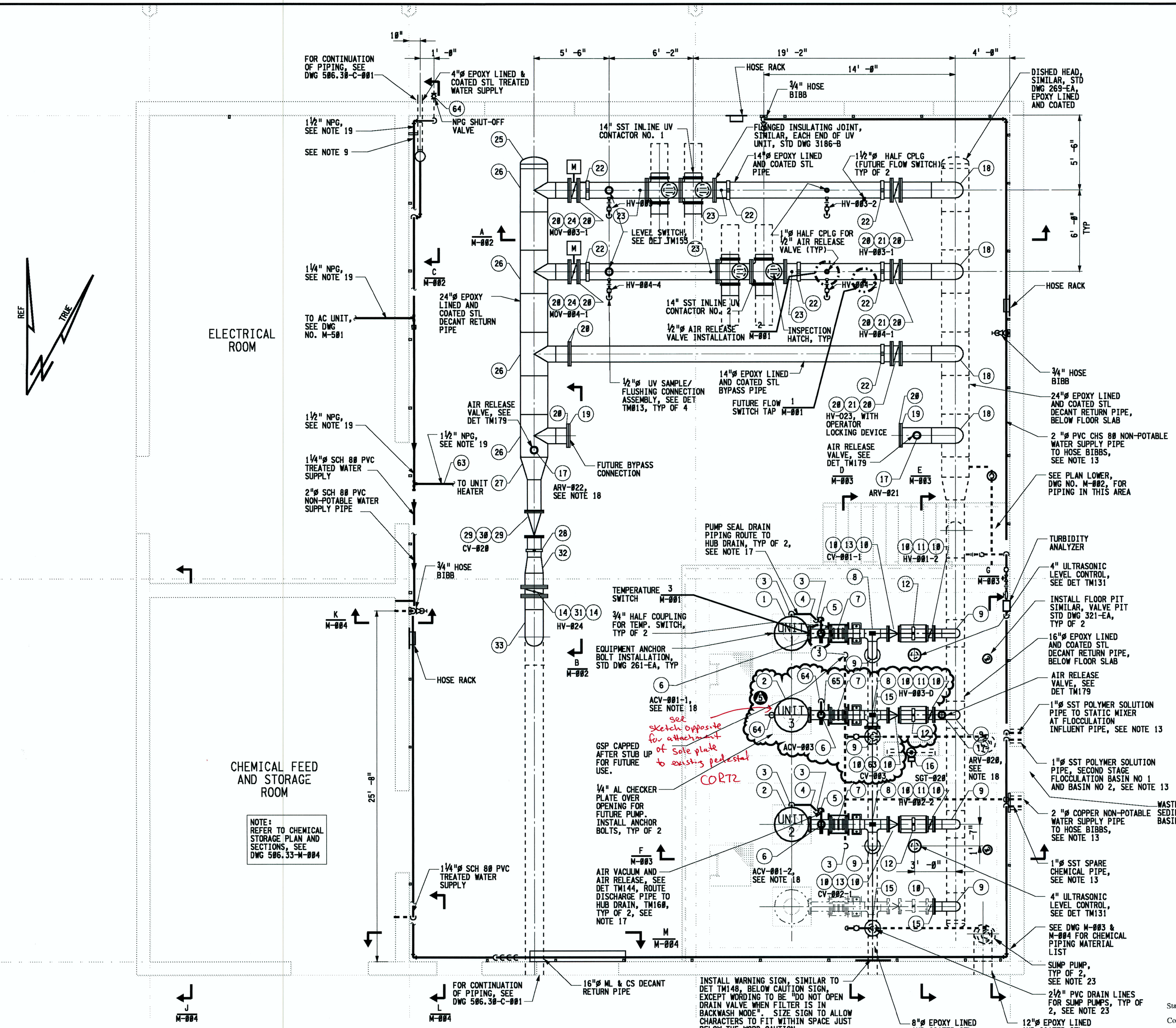
Any action or inaction by the District or the failure of the District on any occasion, to enforce any right or provision of the Contract, shall not be construed to be a waiver by the District of its rights and shall not prevent the District from enforcing such provision or right on any future

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.

29. 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.

SPEC NO. 1847

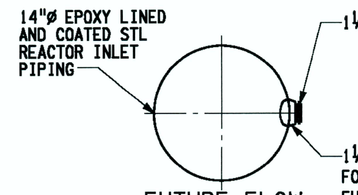


DECANT BUILDING - UPPER PLAN

1/4" = 1'-0"

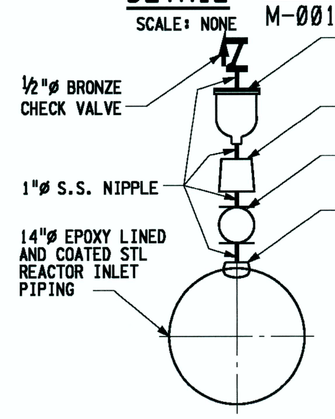
NOTES

1. ALL TYPICAL MECHANICAL DETAILS HAVE THE PREFIX "TM" REFER TO DRAWING SERIES 506.00-M-900 THRU 506.00-M-918.
2. ALL STEEL PIPE FLANGES 12" DIA AND SMALLER SHALL BE INSTALLED PER EBMUD ENGINEERING STD DWG 198-EA.
3. ALL BUTT JOINTS FOR ML & CS SHALL BE INSTALLED PER EBMUD ENGINEERING STD DWG 237-EA.
4. STEEL PIPE NOZZLE AND SADDLE PLATE CONNECTIONS FOR 20" AND SMALLER PIPES SHALL BE INSTALLED PER EBMUD ENGINEERING STD DWG 238-EA.
5. ALL MORTAR LINED STEEL FITTINGS FOR PIPE 4" DIA THRU 20" DIA SHALL BE INSTALLED PER EBMUD ENGINEERING STD DWG 309-EA.
6. ALL STEEL PIPE FLANGES 16" AND LARGER SHALL BE INSTALLED PER EBMUD ENGINEERING STD DWG 323-EA. STEEL PIPE TAP, SEE DET TM011.
7. ALL ML & CS PIPE 20" DIA AND SMALLER SHALL BE INSTALLED PER EBMUD ENGINEERING STD DWG 1216-A.
8. ALL STEEL GROOVED COUPLING FOR PIPE 24" DIA AND SMALLER SHALL BE INSTALLED PER EBMUD ENGINEERING STD DWG 1748-A, FLEXIBLE CONNECTION.
9. 2" REDUCING PRESSURE BACKFLOW PREVENTOR W/ VALVES, SEE ITEM 53 OF MATERIAL LIST.
10. ALL PIPE SUPPORTS AND HANGERS IN THE CHEMICAL FEED ROOM SHALL BE FIBERGLASS MATERIAL WITH SST PIPE CLAMPS.
11. ALL CAST IRON FITTINGS SHALL HAVE FLANGE INSULATING JOINT EACH END OF FITTING PER EBMUD STD DWG 3188-B.
12. CONNECTION TO PUMP VARIES IN SIZE AND LOCATION PER PUMP MFR, FIELD VERIFY CONNECTION TYPE AND SIZE AND INSTALL GSP REDUCING BUSHING, THREADED, AS REQUIRED.
13. REFER TO DWG NO. M-003 FOR CHEMICAL AND SAMPLE PIPE MATERIAL LIST.
14. ALL BUTTERFLY VALVES UPSTREAM AND DOWNSTREAM OF THE UV REACTORS SHALL HAVE EPDM SEAT MATERIAL, SEE SPECS.
15. ¼" TAP WITH ¼" BRASS NIPPLE AND ¼" BRONZE GLOBE VALVE FOR USE DURING EQUIPMENT STARTUP TO CHECK FLOW DISTRIBUTION USING TEMPORARY PRESSURE GAUGE, TYP OF 4.
16. ALL PIPES BENEATH THE FLOOR SLAB SHALL BE CONCRETE ENCASED. FOR PIPES NOT SHOWN ON STRUCTURAL DRAWINGS USE DET TM126.
17. HUB DRAIN DISCHARGES DIRECTLY TO PUMP WETWELL, DO NOT INSTALL COUPLING AND P-TRAP.
18. TAG NUMBER SHOWN SHOULD INCLUDE FACILITY AND SYSTEM CODE. REFER TO P&ID TITLE BLOCK.
19. NPG - ALL GAS PIPING WITHIN BUILDING OR ON ROOF SHALL BE WELDED STEEL PIPE.
20. ALL HOSE BIBBS TO BE INSTALLED PER DET TM149 AND ALL HOSE RACKS TO BE INSTALLED PER DET TM150.
21. FABRICATE AND INSTALL PIPING FOR UNIT 3, SIMILAR TO UNIT 1 AND SECTION F/M-003. USE ITEM 63 IN PLACE OF ITEM 13. USE ITEM 64 FOR SMALL PLUMBING. USE ITEMS 10 AND 16 IN PLACE OF ITEM 9.
22. FIELD VERIFY EXISTING PIPING DIMENSIONS.
23. FOR SUMP PUMP IMPROVEMENTS, REFER TO M-003, REV 4.



FUTURE FLOW SWITCH TAP DETAIL 1 M-001

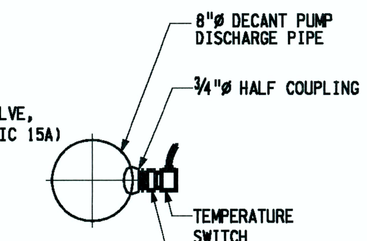
SCALE: NONE



½"ø AIR RELEASE VALVE INSTALLATION (TYP OF 2)

DETAIL 2 M-001

1" = 1'-0"



TEMPERATURE SWITCH ON 8" DECANT PUMP DISCHARGE (TYP OF 2)

DETAIL 3 M-001

1" = 1'-0"

AS CONSTRUCTED
Started 9/10 In Service 7/13
Completed
Recorded By
Approved By

NO.	DATE		BY	REC.	APP.
5	13MAY2010	REVISED PER SPEC 1992	MJE	DJA	DLP
4	14MAY2007	IN SERVICE 08DEC05 AS BUILT INSP. TAV REV:1,2,3			
3	08AUG2003	DCR # 44	KW	KW FOR MJE	KW FOR DLP
2	17JUN2002	CHANGE NPG SIZE ADD SHUT-OFF VALVE	KW	MJE	DLP
1	19OCT2001	REVISED PER ADDENDUM NO.2	KW	MJE	DLP

3" ON ORIGINAL DOCUMENT 0 1 2 3

carollo engineers

DESIGNED BY	V. ROQUEBERT
DESIGN CHECKED BY	M. MARSHALL
DRAWN BY	D. MAGLECIC
SR. PROJ ENGR. R.P.E. NO. C 45814	K.WILKINS
APPROVED	T.PATTEN
PRINCIPAL IN CHARGE, R.P.E. NO. C 28161	

EBMUD REVIEW

PROJECT MANAGER R.P.E. NO. C 38862	
PROJECT ENGR. R.P.E. NO. C 46816	
RECOMMENDED SR. MECH. ENGR. R.P.E. NO. M 25852	
APPROVED MANAGER OF DESIGN R.P.E. NO. C 39851	

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

WALNUT CREEK WTP IMPROVEMENTS PROJECT
DECANT BUILDING
MECHANICAL
UPPER PLAN

PROJ NO.	Z-009		
SCALE	1/4" 1'-0"	506.33-M-001	05
DATE	07SEPT2001	STRUCT. DISC. NUMBER	REV.

REGISTERED PROFESSIONAL ENGINEER KENNETH WILKINS No. C45814 Exp. 3/31/09 CIVIL STATE OF CALIFORNIA

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19-MAY-2010 16:58
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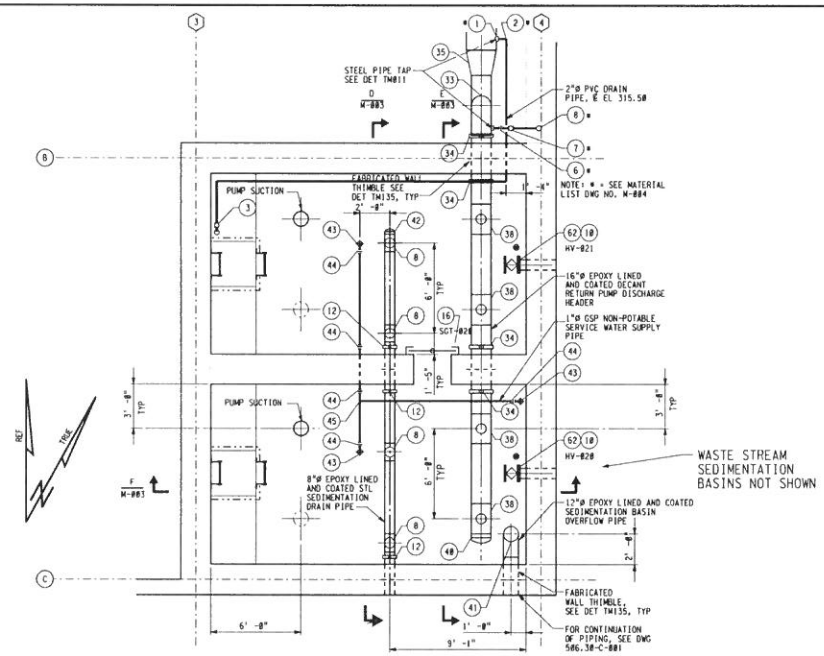
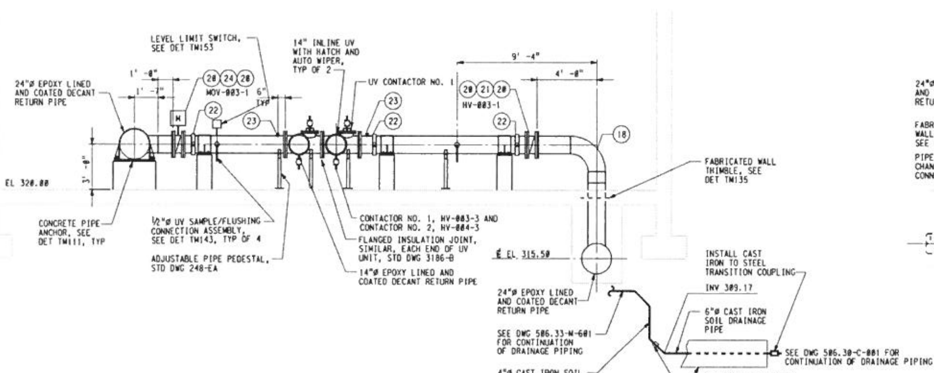
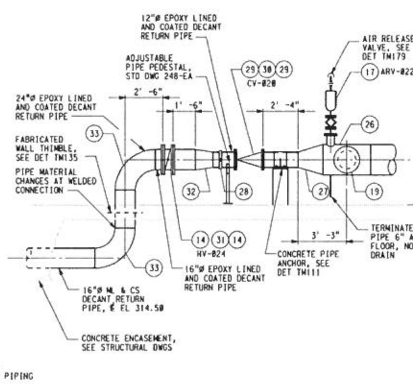


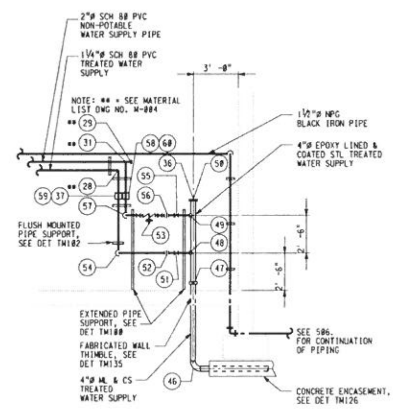
PARTIAL LOWER PLAN
1/4" = 1'-0"



SECTION A / M-001
1/4"=1'-0"



SECTION B / M-001
1/4"=1'-0"



SECTION C / M-001
1/4"=1'-0"

MATERIAL LIST

ITEM	REQUIRED NEW	REQUIRED	DESCRIPTION	REMARKS
1	1	1	DECANT PUMP, VERTICAL, PMP-001-1, WITH WATER SEAL & PMP-003	
2		1	DECANT PUMP, VERTICAL, PMP-002-1, WITH WATER SEAL	
3		4	ELBOW, 1/2" GSP, 90° THREADED	
4		4	ELBOW, 1/2" GSP, 45° THREADED	
5		5	ELBOW, 1" GSP, VARIES PER VALVE SIZE	
6	1	2	1" COMBINATION AIR VALVE, PUMP DISCHARGE	
7	1	2	RUBBER EXPANSION JOINT, 8" FLANGED, LIMIT CONTROL	
8	1	6	TEE, 8" STL, STD WT, BWE	
9		7	ELBOW, 8" STL, STD WT, 90° GROOVED END	
10	7	4	FLANGE, 8" STL, 150 LB, FF, SLIP-ON	SEE NOTE 11
11		4	BUTTERFLY VALVE, 8" FLANGED WITH HANDWHEEL OPERATOR	
12		6	GROOVED COUPLING, 8" STL, 150 LB, EPDM SEAL	
13		2	CHECK VALVE, 8" FLANGED, SILENT TYPE	
14		2	FLANGE, 16" STL, 150 LB, FF, SLIP-ON	
15	1	4	BLIND FLANGE, 8" STL, 150 LB	
16		1	SLUICE GATE, 30" X 30", EXTENDED STEM, PEDESTAL MTD OPERATOR	
17		3	VALVE, 3/4" AIR RELEASE, CONTINOUS OPERATION	
18		4	ELBOW, 14" STL, STD WT, 90° LR	
19		2	BLIND FLANGE, 14" STL, 150 LB	
20		14	FLANGE, 14" STL, 150 LB, FF, SLIP-ON	
21		3	BUTTERFLY VALVE, 14" FLANGED WITH HANDWHEEL OPERATOR	
22		7	GROOVED COUPLING, 14" STL, 150 LB, EPDM SEAL	
23		4	THREADED OUTLET, 1/4" OUTLET X 14" RUN, STL, 3000 LB W/ PLUG	SEE NOTE 15
24		4	BUTTERFLY VALVE, 14" FLANGED, MOTOR OPERATED	
25		1	DISHED HEAD, 24" STL, STD WT	
26		8	REDUCING TEE, 24" X 14" STL, STD WT	
27		1	CONCENTRIC REDUCER, 24" X 12" STL, STD WT, BWE	
28		1	GROOVED COUPLING, 12" STL, 150 LB, EPDM SEAL	
29		2	FLANGE, 12" STL, 150 LB, FF, SLIP-ON	
30		1	CHECK VALVE, 12" FLANGED, SLANTING DISK TYPE	
31		1	BUTTERFLY VALVE, 16" FLANGED WITH HANDWHEEL OPERATOR	
32		1	CONCETRIC REDUCER, 16" X 12" STL, STD WT, BWE	
33		2	ELBOW, 16" STL, STD WT, 90° BWE	
34		4	GROOVED COUPLING, 16" STL, 150 LB, EPDM SEAL	
35		1	CONCENTRIC REDUCER, 24" X 16" STL, STD WT, BWE	
36		1	BLIND FLANGE, 4" STL, 150 LB	
37		1	COUPLING, 1" GSP, THEADED	
38		4	REDUCING TEE, 16" X 8" STL, STD WT	
39		1	CONCENTRIC REDUCER, 14" X 12" STL, STD WT, BWE	
40		1	DISHED HEAD, 16" STL, STD WT	
41		1	ELBOW, 12" STL, STD WT, 90° BWE	
42		1	DISHED HEAD, 8" STL, STD WT	
43		3	ELBOW, 1" GSP, 90° THREADED	
44		5	UNION, 1" GSP, THREADED	
45		1	TEE, 1" GSP, THREADED ENDS	
46		1	ELBOW, 4" STL, STD WT, 90° BWE	
47		1	GROOVED COUPLING 4" STL, 150 LB	
48		1	THREADED OUTLET, 1 1/4" OUTLET X 4" RUN, STL, 3000 LB	
49		1	THREADED OUTLET, 2" OUTLET X 4" RUN, STL, 3000 LB	
50		1	FLANGE, 4" STL, 105 LB, SLIP-ON	
51		1	GATE VALVE, 1 1/4" BRONZE, 150 LB, THREADED ENDS	
52		1	UNION, 1 1/4" GSP, THREADED	
53		1	BACKFLOW PREVENTOR, 2" FLANGED, REDUCING PRESSURE W/ VALVES	
54		1	ELBOW, 1 1/4" GSP, 90° THREADED	
55		1	GATE VALVE, 2" BRONZE, 150 LB, THREADED ENDS	
56		1	UNION, 2" GSP, THREADED	
57		1	ELBOW, 2" GSP, 90° THREADED	
58		1	COUPLING, 2" GSP, THREADED	
59		1	MALE ADAPTER, 1 1/4" PVC, SCH 80, THD X SOCKET	
60		1	MALE ADAPTER, 2" PVC, SCH 80, THD X SOCKET	
61		2	ELBOW, 8" STL, STD WT, 45° BWE	
62		2	ECCENTRIC PLUG VALVE, 8", W/ STEM EXT & SQ NUT	
63	1		DUAL-DISC CHECK VALVE, 8" CI, WAFER	
64	AS REQD		COPPER WATER TUBE, 1" AND SMALLER, TYPE K WITH FITTINGS	
65	AS REQD		PIPE, 8" STL, STD WT, EPOXY LINED & COATED	

MATERIAL LIST NOTES:

1. MATERIAL LIST APPLIES TO ELEMENTS SHOWN ON DWG 506.33-M-001, M-002 AND SECTIONS D, E, AND F ON M-003.
2. REFER TO DWG NO. M-004 FOR CHEMICAL FEED AND STORAGE MATERIAL LIST
3. THE MATERIAL LIST ON THIS DRAWING IS NOT COMPLETE, MANY REQUIRED FITTINGS SUCH AS UNIONS, GASKETS, BOLTS, ELBOWS, REDUCERS, BUSHINGS AND PIPE SUPPORTS OR HANGERS ARE NOT LISTED OR SHOWN. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL NECESSARY TO COMPLETE THE INSTALLATION OF ALL PIPING AND EQUIPMENT

REGISTERED PROFESSIONAL ENGINEER KENNETH WILKINS No. C45810 Exp. 2/31/03 CIVIL STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
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NO.	DATE	REVISION	BY	REC.
3	13MAY2010	REVISED PER SPEC 1992		
2	14MAY2007	IN SERVICE 08DEC05 AS BUILT		
1	19OCT2001	REVISED PER ADDENDUM NO. 2		

carollo engineers

DESIGNED BY V. ROQUEBERT
DESIGN CHECKED BY M. MARSHALL
DRAWN BY D. MAGLECIC
SR. PROJ ENGR. R.P.E. NO. C 45810 K. WILKINS
APPROVED T. PATTEN
PRINCIPAL IN CHARGE, R.P.E. NO. C 28161

PROJECT MANAGER R.P.E. NO. C 38062
PROJECT ENGR. R.P.E. NO. C 48616
RECOMMENDED SR. MECH ENGR. R.P.E. NO. M 25692
APPROVED MANAGER OF DESIGN R.P.E. NO. C 39831

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

WALNUT CREEK WTP IMPROVEMENTS PROJECT
DECANT BUILDING
MECHANICAL
SECTIONS & DETAILS

SHEET 1 OF 2

PROJ NO. Z-009
SCALE 1/4" = 1'-0"
DATE 07SEPT2001

506.33-M-002 | REV. 03

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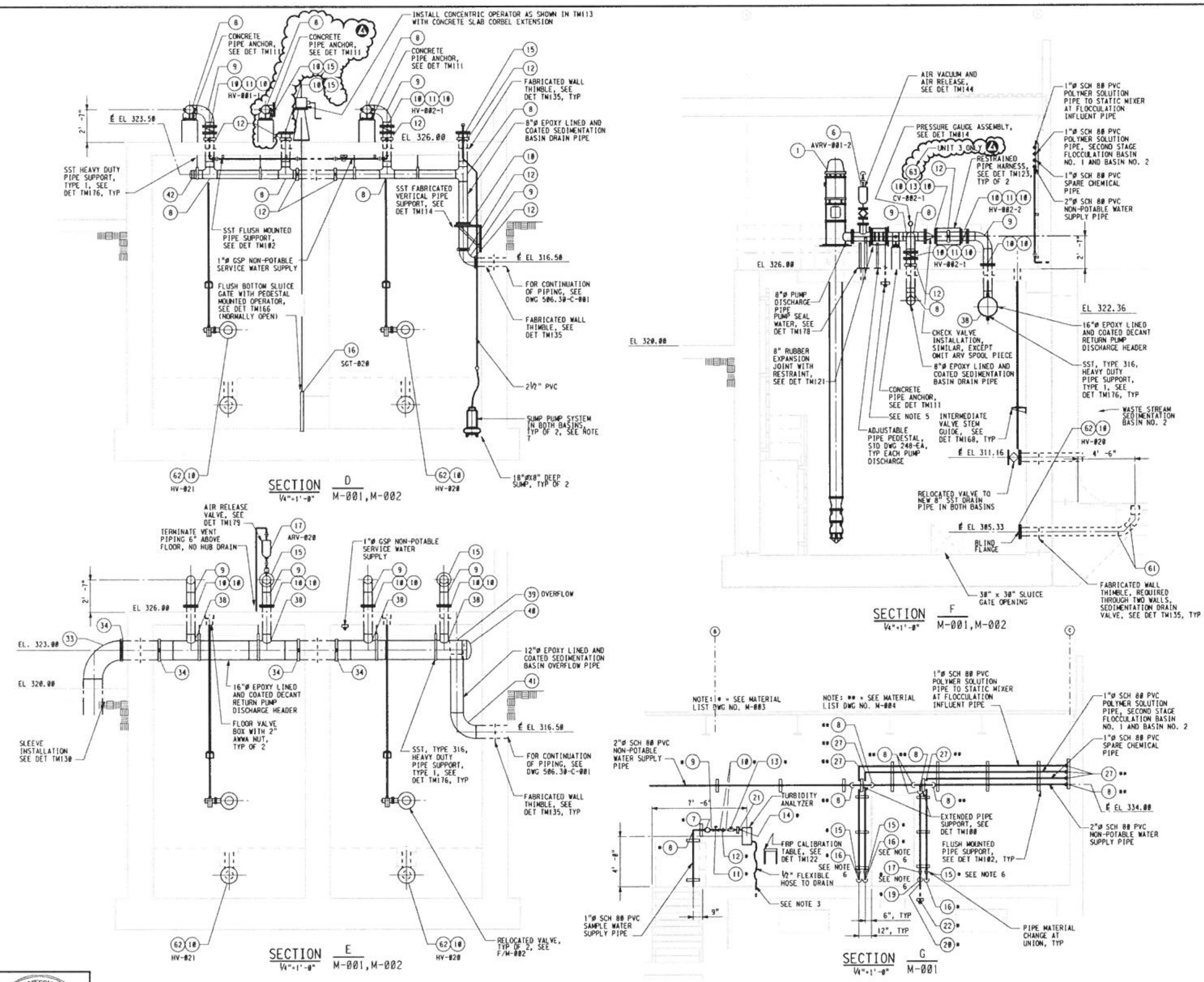
SPEC NO. 1847



MATERIAL LIST			
ITEM	REQUIRED	DESCRIPTION	REMARKS
1	1	THREADED OUTLET, 2" OUTLET X 24" RUN, STL, 3000 LB	
2	1	ELBOW, 2" PVC STD WT, 90°	
3	1	BALL VALVE, 2" PVC, 150 LB	
4			
5	1	THREADED OUTLET, 1" OUTLET X 16" RUN, STL, 3000 LB	
6	1	UNION, 1" GSP, STD WT, THREADED	
7	2	BALL VALVE, 1" BRONZE, 150 LB, THREADED ENDS	
8	2	ELBOW, 1" GSP , STD WT, 90° THREADED	
9	1	NIPPLE, 1" GSP X 2" LONG, THREADED	
10	2	NIPPLE, 1" PVC X 2" LONG, SCH 80, THREADED	
11	1	PRESSURE REDUCING VALVE, 1" BRONZE, 25 PSI RANGE, THREADED END	
12	1	UNION, 1" PVC, SCH 80, THREADED	
13	1	DIAPHARGM VALVE, 1" PVC, SCH 80, THREADED, THROTTLING	
14	1	REDUCING BUSHING, 1" X1/4" PVC, SCH 80, THREADED	
15	3	TRANSITION UNION, 1" PVC TO SST	
16	AS REQD	ELBOW, 1" SST, 90°	
17	1	TRANSITION UNION, 2" PVC TO TYPE K COPPER	
18	1	ELBOW, 2" TYPE K COPPER, 90°	
19	1	TEE, 2" TYPE K COPPER	
20	1	REDUCER, 2" x 1" TYPE K COPPER	
21	1	ROTOMETER, 100-1000ml/MIN	
22	1	ELBOW, 1" TYPE K COPPER	
23	1	3 HP TSURMNI KTZ32.2 SUMP PUMP	

MATERIAL LIST NOTES:

1. MATERIAL LIST FOR CHEMICAL AND SAMPLE PIPING ONLY LOCATED IN THE DECANT BUILDING
2. THE MATERIAL LIST ON THIS DRAWING IS NOT COMPLETE, MANY REQUIRED FITTINGS SUCH AS UNIONS, GASKETS, BOLTS, ELBOWS, REDUCERS, BUSHINGS AND PIPE SUPPORTS OR HANGERS ARE NOT LISTED OR SHOWN. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL NECESSARY TO COMPLETE THE INSTALLATION OF ALL PIPING AND EQUIPMENT

NOTES

1. GENERAL DECANT BUILDING NOTES SHOWN ON DWG NO. M-001
2. WARNING SIGN REQUIRED, SEE CALL-OUT ON DWG NO. M-001, TYP OF TWO VALVES.
3. INSTALL 2"Ø SCH 80 PVC DRAIN PIPE, EXTEND 2" ABOVE FINISH FLOOR.
4. UNLESS NOTED OTHERWISE REFER TO DRAWING NO. M-002 FOR ADDITIONAL MATERIAL LIST
5. INSTALL 1" GSP THROUGH THE CONCRETE FLOOR SLAB TO 6' ABOVE THE FINISHED FLOOR. ELEVATION. INSTALL 1" COUPLING, THREADED WITH 1" X 1/2" REDUCING BUSHING IN DOWNSTREAM END OF COUPLING, CONTINUE 1/2" GSP PIPING TO FLUSH SEAL STAND AS REQD
6. PIPE MATERIAL CHANGES FROM PVC SCH 80 TO GSP DOWNSTREAM OF UNION.
7. SUMP PUMP SYSTEM INSTALLED IN SOUTHEAST CORNER OF EACH BASIN: CORE, 180X8" DEEP SUMP, INSTALL 3 HP, 460V 3-PHASE SUBMERSIBLE PUMP. 2 1/2" DISCHARGE PIPING & CHECK VALVE, AND LOCAL MANUAL PUMP CONTROLLER.

REGISTERED PROFESSIONAL ENGINEER KENNETH WILKINS No. C45814 Exp. 3/31/ CIVIL STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE		BY	REC.	APP.
4	13MAY2010	REVISED PER SPEC 1992			
3	14MAY2007	IN SERVICE 08DEC05 AS BUILT INSP. TAV REV1,2			
2	09NOV2001	REVISED PER ADDENDUM NO.3			
1	19OCT2001	REVISED PER ADDENDUM NO.2			

carollo engineers

DESIGNED BY V. ROQUEBERT
DESIGN CHECKED BY M. MARSHALL
DRAWN BY D. MAGLECIC
SR. PROJ ENGR. R.P.E. NO. C 45814 K. WILKINS
APPROVED T. PATTEN
PRINCIPAL IN CHARGE, R.P.E. NO. C 28181

EBMUD REVIEW
PROJECT MANAGER R.P.E. NO. C 38862
PROJECT ENGR. R.P.E. NO. C 48816
RECOMMENDED SR. MECH ENGR. R.P.E. NO. M 25852
APPROVED MANAGER OF DESIGN R.P.E. NO. C 39451

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

WALNUT CREEK WTP IMPROVEMENTS PROJECT
DECANT BUILDING
MECHANICAL
SECTIONS & DETAILS
SHEET 2 OF 2

PROJ NO. Z-009
SCALE 1/4" = 1'-0"
DATE 07SEPT2001

506.33-M-003 | 04
STRUCT. DISC. NUMBER REV.

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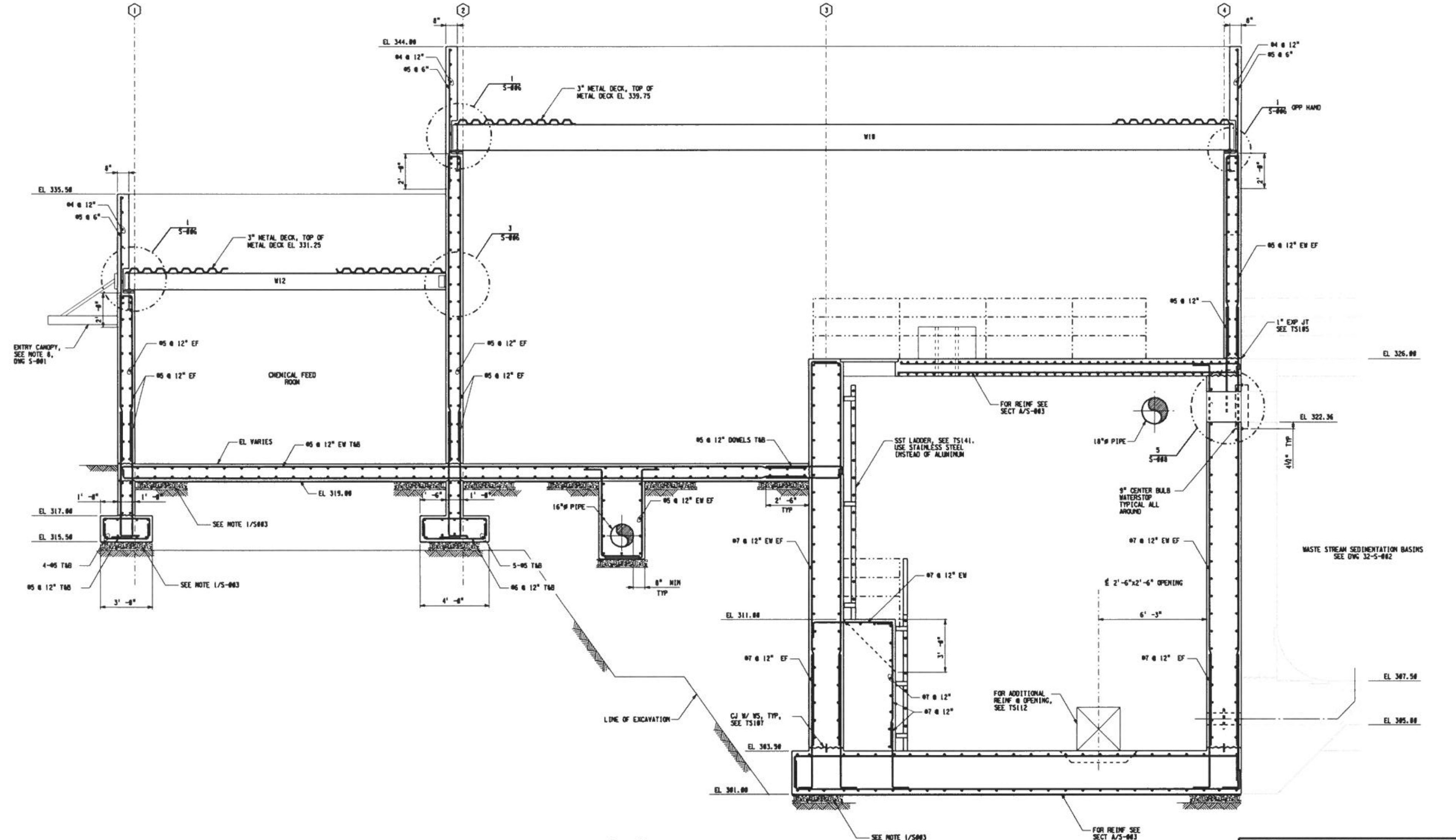


SECTION B/S-001 B/S-002
3/8"=1'-0"

B&P Beyaz & Patel, Inc.
Consulting Engineers #0034
Walnut Creek, California

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE			BY	REC.
1	14MAY2007	IN SERVICE 08DEC05	AS BUILT		

carollo engineers

DESIGNED BY C. PAO
DESIGN CHECKED BY Y. PATEL
DRAWN BY E. POSADAS
SR. PROJ ENGR. K.WILKINS
APPROVED T.PATTEN

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

WALNUT CREEK WTP IMPROVEMENTS PROJECT
DECANT BUILDING
STRUCTURAL
TYPICAL SECTION

SHEET 2 OF 2

FREQ NO. Z-009
SCALE 3/8"=1'-0"
DATE 07SEPT2001

506.33-S-004 | 01

1. THIS DRAWING IS APPLICABLE FOR LOW PRESSURE SERVICES UP TO:
   A. 175 PSI FOR FLANGES 12" AND SMALLER
   B. 150 PSI FOR FLANGES 16" AND LARGER
   C. SEE DRAWING 324-EA FOR HIGHER PRESSURES

FLANGES

2. FLANGES SHALL BE IN ACCORDANCE WITH AWWA C207 CLASS D FLAT FACED RING OR HUB FLANGES. AWWA C207 CLASS E RING OR HUB FLANGES ARE ACCEPTABLE ALTERNATIVES WITH PRIOR APPROVAL OF THE DISTRICT. IN CASE OF CONFLICT BETWEEN THIS DRAWING AND AWWA C207, AWWA C207 SHALL GOVERN. THE MINIMUM FLANGE THICKNESS, NUMBER OF BOLTS AND BOLT DIAMETER FOR AWWA C207 CLASS D FLANGES ARE LISTED IN THE TABLE ON THIS DRAWING.

3. ASME B16.5 CLASS 150 SLIP-ON OR B16.47, SERIES A, CLASS 150 FLANGES ARE ACCEPTABLE ALTERNATIVES.
   A. RAISED FACE ASME FLANGES MAY BE USED ONLY IF THE MATING FLANGE IS STEEL, STAINLESS STEEL OR DUCTILE IRON.
   B. ASME FLANGES THAT ARE FLAT FACED WITHOUT PROJECTION MAY BE USED IN ALL INSTALLATIONS.
   C. ASME FLANGES SHALL BE FLAT FACED IF THE MATING FLANGE IS CAST IRON OR IF THE MATERIAL OF THE MATING FLANGE IS UNCERTAIN.

4. IN ACCORDANCE WITH AWWA C207, THE FLANGE LAYBACK, AFTER WELDING PIPE SECTION TO THE FLANGE AND BEFORE BOLTING THE FLANGE, SHALL NOT EXCEED 1° FOR A SINGLE FLANGE OR 1.5° FOR TWO MATING SURFACES. THE LAYBACK "G" FOR A SINGLE FLANGE IS SHOWN IN INCHES IN THE TABLE FOR Ø.75°.

5. ALL FLAT FACED FLANGES SHALL HAVE EITHER A SERRATED CONCENTRIC OR SPIRAL FINISH HAVING FROM 24 GROOVES/IN TO 40 GROOVES/IN SHALL BE USED. THE CUTTING TOOL SHALL HAVE AN APPROXIMATE Ø.06 IN OR LARGER RADIUS. THE RESULTING SURFACE SHALL HAVE A 250 TO 500 MICRO-INCH ROUGHNESS.

6. COAT FLANGE FACES WITH A RUST INHIBITOR OR OTHER REMOVABLE PROTECTIVE COATING AFTER WELDING PIPE TO FLANGE OR AFTER FLANGE FACE MACHINING. REMOVE PROTECTIVE COATING PRIOR TO FINAL ASSEMBLY OF FLANGES.

BOLTING

7. BOLTS SHALL HAVE REGULAR HEXAGONAL HEADS IN ACCORDANCE WITH ASME B18.2.1. NUTS SHALL HAVE HEAVY HEXAGONAL HEADS IN ACCORDANCE WITH ASME B18.2.2.

8. ALL BOLTS AND NUTS SHALL BE THREADED IN ACCORDANCE WITH ASME B1.1 FOR SCREW THREADS, COARSE THREAD SERIES (UNC), CLASS 2A OR 2B FIT. FOR BOLTS LARGER THAN 1", UN-8 SERIES THREADS WITH 8 THREADS/INCH ARE ALSO ACCEPTABLE.

9. BOLTING SHALL MEET ONE OF THE FOLLOWING AS REQUIRED BY PROJECT DRAWINGS AND SPECIFICATIONS:
   A. CARBON STEEL: BOLTS SHALL CONFORM TO SAE J429, GRADE 5, ASTM A325, ASTM A449, TYPE 1 OR ASTM A193 GRADE B7. NUTS UP TO 1-1/2" SHALL BE ASTM A563, GRADE B OR SAE J995 STANDARD HEXAGONAL FLAT NUTS. NUTS GREATER THAN 1-1/2" SHALL BE ASTM A563, GRADE A HEAVY HEXAGONAL FLAT NUTS.
   B. STAINLESS STEEL: IF STAINLESS STEEL BOLTS ARE SPECIFIED, THE BOLTS SHALL BE ASTM A193, CLASS 1, B8 (TYPE 304) OR B8M (TYPE 316) WITH NUTS AND WASHERS TO MATCH.

ANTI-SEIZE COMPOUND

10. THREAD ANTI-SEIZE COMPOUND SHALL BE USED ON ALL BOLT THREADS. SEE SECTION 05 05 26 (OR SECTION 05097) FOR ACCEPTABLE PRODUCTS. FAILURE TO USE ANTI-SEIZE COMPOUND WILL RESULT IN LOW BOLT TENSION AND INSUFFICIENT GASKET PRESSURE.

GASKETS

11. FLAT FACED FLANGES SHALL USE RUBBER OR NON-ASBESTOS FIBER GASKETS. RAISED FACE FLANGES SHALL USE NON-ASBESTOS FIBER GASKETS.

12. RUBBER GASKETS SHALL BE USED WITH STAINLESS STEEL BOLTING.

13. RUBBER GASKETS SHALL BE FULL-FACED EPDM WITH A THICKNESS OF 1/16" OR 1/8".

14. NON-ASBESTOS FIBER GASKETS SHALL MEET THE REQUIREMENTS OF AWWA C207.

15. FLANGES 24" AND SMALLER SHALL USE FULL FACED GASKETS. FLANGES OVER 24" SHALL USE RING GASKETS.

DIMENSIONS

16. THE FLANGE ID "B" SHALL BE 1/8" LARGER THAN THE PIPE OUTSIDE DIAMETER FOR PIPES UP TO 16" AND 3/16" LARGER FOR PIPES 20" AND LARGER. NOTE THAT DISTRICT STANDARD PIPE DIAMETERS ARE DIFFERENT FROM ASME B36.10 AND B36.19 PIPE. VERIFY ACTUAL PIPE DIAMETER BEFORE FABRICATING FLANGES. SEE APPLICABLE PIPE DRAWINGS (SUCH AS 1884-A, 7830-GB-1 AND 9499-GB) FOR PIPE OUTSIDE DIAMETER.

17. NOTE THAT FLANGE DRILLING FOR AWWA C207, CLASS D FLANGES, ASME B16.1 CLASS 125 FLANGES, ASME B16.5 CLASS 150 FLANGES, AND ASME B16.47 SERIES A CLASS 150 FLANGES ARE IDENTICAL.

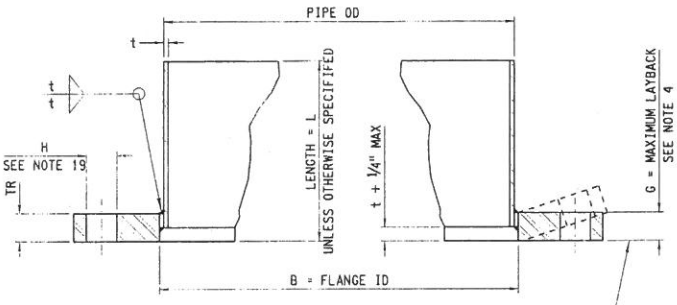
18. THE OVERALL LENGTH "L" SHALL BE 12" FOR FLANGES UP TO 20" DIAMETER AND 18" FOR FLANGES 24" AND LARGER.

19. THE BOLT HOLE DIAMETER "H" SHALL BE 1/8" LARGER THAN THE BOLT DIAMETER.

BOLTING PROCEDURES

20. FLANGE BOLTS FOR RUBBER GASKETS SHALL BE TIGHTENED TO FINAL TORQUE WITH A MINIMUM OF FOUR PASSES AS FOLLOWS:

PASS	PERCENT OF FINAL TORQUE
1	25 TO 30
2	50 TO 60
3	100
4	100



LP FLANGE & PIPE SECTION ASSEMBLY

PIPE SIZE	MIN. FLANGE THICKNESS TR		BOLTS		BOLT TORQUE		MAXIMUM FLANGE LAYBACK G
	RING	HUB	#	DIAM	RUBBER	FIBER	
4	Ø.625	Ø.500	8	5/8	35	120	Ø.029
6	Ø.688	Ø.562	8	3/4	56	200	Ø.028
8	Ø.688	Ø.562	8	3/4	70	220	Ø.031
10	Ø.688	Ø.688	12	7/8	87	300	Ø.034
12	Ø.812	Ø.688	12	7/8	104	350	Ø.040
16	1.000	Ø.750	16	1	119	450	Ø.048
20	1.125	Ø.750	20	1 1/8	137	600	Ø.048
24	1.250	1.000	20	1 1/4	205	800	Ø.051
30	1.375	1.000	28	1 1/4	207	700	Ø.056
36	1.625	1.125	32	1 1/2	304	1000	Ø.064
42	1.750	1.25	36	1 1/2	359	1000	Ø.071
48	1.875	1.375	44	1 1/2	362	1000	Ø.074
54	2.125	1.375	44	1 3/4	516	1500	Ø.079
60	2.250	1.500	52	1 3/4	526	1500	Ø.084
66	2.500	1.500	52	1 3/4	625	1500	Ø.090
72	2.625	1.500	60	1 3/4	625	1500	Ø.094
78	2.750	1.750	64	2	761	2000	Ø.097
84	2.875	1.750	64	2	877	2000	Ø.102
90	3.000	2.000	68	2 1/4	1036	3000	Ø.107
96	3.250	2.000	68	2 1/4	1252	3000	Ø.112
102	3.250	"	72	2 1/2	1458	4000	Ø.117
108	3.375	"	72	2 1/2	1820	4000	Ø.121

TABLE DIMENSIONS ARE IN INCHES, TORQUE IS FT-LBS

21. FLANGE BOLTS FOR NON-ASBESTOS COMPOSITION GASKETS SHALL BE TIGHTENED WITH A MINIMUM OF SIX PASSES AS FOLLOWS:

PASS	PERCENT OF FINAL TORQUE
1	25 TO 30
2	50 TO 60
3	100
4	100
ALLOW MINIMUM 24 HR FOR GASKET TO UNDERGO RELAXATION	
5	100
6	100

22. BOLTS SHALL IN ALL PASSES BE TIGHTENED IN DIAMETRICAL PAIRS AND IN A SEQUENCE RECOMMENDED BY THE GASKET MANUFACTURER.

23. A CALIBRATED TORQUE WRENCH SHALL BE USED ON ALL PASSES TO ENSURE UNIFORM BOLTING.

C.T.WAY
APPROVED, DIRECTOR OF ENGINEERING, C.P.E. NO. C26724

REVISED AND REDRAWN 14 JAN 99 DLH

4	06-30-08	REVISED NOTES
3	12-11-06	REVISED & REDRAWN ROUNDUP DP

DESIGNED BY: EBMUD
DRAWN BY: HUBERT LAI
CHECKED: dlh
K.CHAPMAN
W.BODE
J.M.HILLIARD/W.
D.H.DILMER

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

STANDARD DRAWING

STEEL PIPE FLANGES
LOW PRESSURE

WITH ATTACHED PIPE SECTION

SUPERSEDES
NONE
IFEB 81

323-EA

SUPERSEDES DWG. NO. 198-EA & 323-EA

USER: pho.cd21
PLOT DATE: 07-JUL-2008 06:45
FILE: X:\general\std-dwgs\revisions2008\323eq.dgn

1. THIS DRAWING IS APPLICABLE FOR HIGH PRESSURE SERVICES UP TO: 275 PSI.
   SEE DRAWING 323-EA FOR LOWER PRESSURES.

FLANGES

2. FLANGES SHALL BE IN ACCORDANCE WITH AWWA C207 CLASS E FLAT FACED RING OR HUB FLANGES. REQUIREMENTS FROM AWWA C207 ARE REPEATED BELOW FOR CONVENIENCE. IN CASE OF CONFLICT BETWEEN THIS DRAWING AND AWWA C207, AWWA C207 SHALL GOVERN.

3. ASME B16.5 CLASS 150 SLIP-ON OR B16.47 SERIES A CLASS 150 FLANGES ARE ACCEPTABLE ALTERNATIVES.

   A. RAISED FACE ASME FLANGES MAY BE USED ONLY IF THE MATING FLANGE IS STEEL, STAINLESS STEEL OR DUCTILE IRON.

   B. ASME FLANGES THAT ARE FLAT FACED WITHOUT PROJECTION MAY BE USED IN ALL INSTALLATIONS.

   C. ASME FLANGES SHALL BE FLAT FACED IF THE MATING FLANGE IS CAST IRON OR IF THE MATERIAL OF THE MATING FLANGE IS UNCERTAIN.

4. IN ACCORDANCE WITH AWWA C207, THE FLANGE LAYBACK, AFTER WELDING PIPE SECTION TO THE FLANGE AND BEFORE BOLTING THE FLANGE, SHALL NOT EXCEED 1° FOR A SINGLE FLANGE OR 1.5° FOR TWO MATING SURFACES. THE LAYBACK "G" FOR A SINGLE FLANGE IS SHOWN IN INCHES IN THE TABLE FOR Ø.75°.

5. ALL FLAT FACED FLANGES SHALL HAVE EITHER A SERRATED CONCENTRIC OR SPIRAL FINISH HAVING FROM 24 GROOVES/IN TO 40 GROOVES/IN SHALL BE USED. THE CUTTING TOOL SHALL HAVE AN APPROXIMATE Ø.Ø6 IN OR LARGER RADIUS. THE RESULTING SURFACE SHALL HAVE A 250 TO 500 MICRO-INCH ROUGHNESS.

6. COAT FLANGE FACES WITH A RUST INHIBITOR OR OTHER REMOVABLE PROTECTIVE COATING AFTER WELDING PIPE TO FLANGE OR AFTER FLANGE FACE MACHINING. REMOVE PROTECTIVE COATING PRIOR TO FINAL ASSEMBLY OF FLANGES.

BOLTING

7. BOLTS SHALL HAVE REGULAR HEXAGONAL HEADS IN ACCORDANCE WITH ASME B18.2.1. NUTS SHALL HAVE HEAVY HEAXAGONAL HEADS IN ACCORDANCE WITH ASME B18.2.2.

8. ALL BOLTS AND NUTS SHALL BE THREADED IN ACCORDANCE WITH ASME B1.1 FOR SCREW THREADS, COARSE THREAD SERIES (UNC), CLASS 2A OR 2B FIT. FOR BOLTS LARGER THAN 1", UN-8 SERIES THREADS WITH 8 THREADS/INCH ARE ALSO ACCEPTABLE.

9. BOLTS SHALL CONFORM TO SAE J429, GRADE 5, ASTM A325, ASTM A449, TYPE 1 OR ASTM A193 GRADE B7. NUTS UP TO 1-1/2" SHALL BE ASTM A563, GRADE B OR SAE J995 STANDARD HEXAGONAL FLAT NUTS. NUTS GREATER THAN 1-1/2" SHALL BE ASTM A563, GRADE A HEAVY HEXAGONAL FLAT NUTS

ANTI-SEIZE COMPOUND

10. THREAD ANTI-SEIZE COMPOUND SHALL BE USED ON ALL BOLT THREADS. SEE SECTION Ø5 Ø5 26 (OR SECTION Ø5Ø97) FOR ACCEPTABLE PRODUCTS. FAILURE TO USE ANTI-SEIZE COMPOUND WILL RESULT IN LOW BOLT TENSION AND INSUFFICIENT GASKET PRESSURE.

GASKETS

11. GASKETS SHALL BE NON-ASBESTOS FIBER COMPOSITION GASKETS MEETING THE REQUIREMENTS OF AWWA C207.

12. FLANGES 24" AND SMALLER SHALL USE FULL FACED GASKETS. FLANGES OVER 24" SHALL USE RING GASKETS

13. GASKETS SHALL BE LUBRICATED WITH FOOD GRADE ANTI-SEIZE COMPOUND.

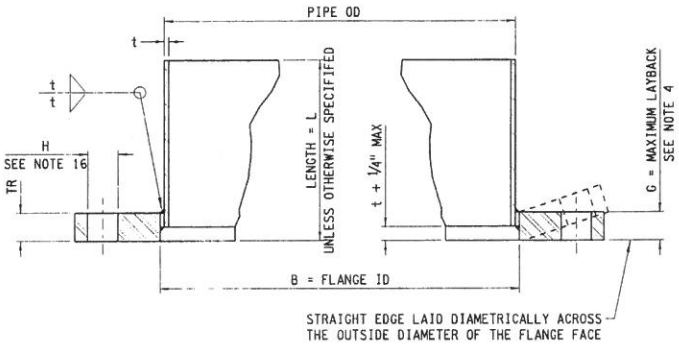
DIMENSIONS

14. NOTE THAT FLANGE DRILLING FOR AWWA C207, CLASS E FLANGES, ASME B16.5 CLASS 150 FLANGES, AND ASME B16.47 SERIES A CLASS 150 FLANGES ARE IDENTICAL.

15. THE OVERALL LENGTH "L" SHALL BE 12" FOR FLANGES UP TO 20" DIAMETER AND 18" FOR FLANGES 24" AND LARGER.

16. THE BOLT HOLE DIAMETER "H" SHALL BE 1/8" LARGER THAN THE BOLT DIAMETER.

17. THE FLANGE ID "B" SHALL BE 1/8" LARGER THAN THE PIPE OUTSIDE DIAMETER FOR PIPES UP TO 16" AND 3/16" LARGER FOR PIPES 20" AND LARGER. NOTE THAT DISTRICT STANDARD PIPE DIAMETERS ARE DIFFERENT FROM ASME B36.10 AND B36.19 PIPE. VERIFY ACTUAL PIPE DIAMETER BEFORE FABRICATING FLANGES. SEE APPLICABLE PIPE DRAWINGS (SUCH AS 1884-A, 7830-GB-1 AND 9499-GB) FOR PIPE OUTSIDE DIAMETER.



HP FLANGE & PIPE SECTION ASSEMBLY

PIPE SIZE	MIN. FLANGE THICKNESS TR		BOLTS		BOLT TORQUE	MAXIMUM FLANGE LAYBACK G
	RING	HUB	#	DIAM		
4	1.125	Ø.938	8	5/8	120	Ø.029
6	1.313	1.ØØØ	8	3/4	2ØØ	Ø.Ø28
8	1.5ØØ	1.125	8	3/4	22Ø	Ø.Ø31
1Ø	1.563	1.188	12	7/8	3ØØ	Ø.Ø34
12	1.75Ø	1.25Ø	12	7/8	35Ø	Ø.Ø4Ø
16	2.ØØØ	1.438	16	1	45Ø	Ø.Ø48
2Ø	2.375	1.688	2Ø	1 1/8	6ØØ	Ø.Ø48
24	2.625	1.875	2Ø	1 1/4	8ØØ	Ø.Ø51
3Ø	2.875	2.125	28	1 1/4	7ØØ	Ø.Ø56
36	3.125	2.375	32	1 1/2	1ØØØ	Ø.Ø64
42	3.375	2.625	36	1 1/2	1ØØØ	Ø.Ø71
48	3.5ØØ	2.75Ø	44	1 1/2	1ØØØ	Ø.Ø74
54	3.75Ø	3.ØØØ	44	1 3/4	15ØØ	Ø.Ø79
6Ø	3.875	3.125	52	1 3/4	15ØØ	Ø.Ø84
66	4.25Ø	3.375	52	1 3/4	15ØØ	Ø.Ø9Ø
72	4.375	3.5ØØ	6Ø	1 3/4	15ØØ	Ø.Ø94
78	4.75Ø	3.875	64	2	2ØØØ	Ø.Ø97
84	4.75Ø	3.875	64	2	2ØØØ	Ø.1Ø2
9Ø	5.125	4.25Ø	68	2 1/4	3ØØØ	Ø.1Ø7
96	5.125	4.25Ø	68	2 1/4	3ØØØ	Ø.112
1Ø2	5.5ØØ	-	72	2 1/2	4ØØØ	Ø.117
1Ø8	5.5ØØ	-	72	2 1/2	4ØØØ	Ø.121

TABLE DIMENSIONS ARE IN INCHES, TORQUE IS FT-LBS

BOLTING PROCEDURES

18. FLANGE BOLTS FOR NON-ASBESTOS COMPOSITION GASKETS SHALL BE TIGHTENED WITH A MINIMUM OF SIX PASSES AS FOLLOWS:

PASS	PERCENT OF FINAL TORQUE
1	25 TO 3Ø
2	5Ø TO 6Ø
3	1ØØ
4	1ØØ
ALLOW MINIMUM 24 HR FOR GASKET TO UNDERGO RELAXATION	
5	1ØØ
6	1ØØ

19. BOLTS SHALL IN ALL PASSES BE TIGHTENED IN DIAMETRICAL PAIRS AND IN A SEQUENCE RECOMMENDED BY THE GASKET MANUFACTURER.

2Ø. A CALIBRATED TORQUE WRENCH SHALL BE USED ON ALL PASSES TO ENSURE UNIFORM BOLTING.

DESIGNED BY	ROBERT DAVIS	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA
DESIGN CHECKED BY	NATHAN GRONLUND	
DRAWN BY	EBMUD	STANDARD DRAWING
CORROSION CHECK BY		STEEL PIPE FLANGES HIGH PRESSURE
SR. MECH. ENG. R.C.E. NO. M 25694	DAVID BAILEY	WITH ATTACHED PIPE SECTION
RECOMMENDED MGR. OF DESIGN R.C.E. NO. C 39861	DAVID PRATT	STRUCTURE OR ZONE DESIGNATION: —
APPROVED, DIRECTOR OF ENGINEERING R.C.E. NO. C 44765	XAVIER IRIAS	SCALE: NONE
		DATE: 22 DEC. 2006
		324-EA

NO.	DATE	REVISION	BY	APPROVED
2	30JUNE08	REVISED NOTES	M.ST.	MA

USER: bkolodzi
PLOT DATE: 07-JUL-2008 06:46
FILE: H:\general\std-dwgs\revisions2008\324ea.dgn

NOTES

1. THIS DRAWING IS APPLICABLE FOR COLD WATER SERVICE WITH EXTRA-HIGH PRESSURES UP TO: 600 PSI

   SEE DRAWING 324-EA FOR PRESSURES 275 PSIG AND LOWER.
   SEE DRAWING 323-EA FOR PRESSURES 175 PSIG AND LOWER.

FLANGES

2. FLANGES 4-INCH THRU 24-INCH SHALL BE IN ACCORDNACE WITH ASME B16.5 CLASS 300, SLIP-ON OR WELDING-NECK. FLANGES 24-INCH THRU 60-INCH SHALL BE IN ACCORDNACE WITH ASME B16.47 CLASS 300 SERIES A, WELDING-NECK.

   A. FLANGE MATERIAL SHALL BE CARBON STEEL OR STAINLESS STEEL AS SPECIFIED.

   B. ONLY RAISED FACE ASME FLANGES SHALL BE USED IN ORDER TO PROVIDE A PROPER SEAL AT THE TORQUES SHOWN ON THE TABLE.

   C. THE MATING FLANGE SHALL ALSO BE CARBON STEEL OR STAINLESS STEEL. MATING TO CAST OR DUCTILE IRON FLANGES IS NOT PERMITTED.

   D. NOTE THAT ASME FLANGES WERE PREVIOUSLY REFERRED TO AS ANSI FLANGES.

3. COAT FLANGE FACES WITH A RUST INHIBITOR OR OTHER REMOVABLE PROTECTIVE COATING AFTER WELDING PIPE TO FLANGE OR AFTER ANY FLANGE FACE MACHINING. SEE SPEC SECTION 33 11 06 FOR ACCEPTABLE PRODUCTS. REMOVE PROTECTIVE COATING PRIOR TO FINAL ASSEMBLY OF FLANGES.

SKIRT

4. PROVIDE A PIPE SECTION (SKIRT) ON FLANGES WHEN SPECIFIED.

5. IN ACCORDANCE WITH AWWA C207, THE FLANGE LAYBACK, AFTER WELDING THE SKIRT TO THE FLANGE AND BEFORE BOLTING THE FLANGE, SHALL NOT EXCEED 1° FOR A SINGLE FLANGE OR 1.5° FOR TWO MATING SURFACES. THE LAYBACK "G" FOR A SINGLE FLANGE IS SHOWN IN INCHES IN THE TABLE FOR 0.75°.

6. THE OVERALL SKIRT LENGTH "L" SHALL BE 12" FOR FLANGES UP TO 20" DIAMETER AND 18" FOR FLANGES 24" AND LARGER.

7. FILLET WELD MINIMUM SIZE SHALL MATCH THE PIPE THICKNESS. GROOVE WELDS SHALL BE FULL PENETRATION.

BOLTING

8. BOLTS SHALL HAVE HEAVY HEXAGONAL HEADS IN ACCORDANCE WITH ANSI/ASME B18.2.1. BOLTS SHALL CONFORM TO ASTM A193 GRADE B7.

9. NUTS SHALL HAVE HEAVY HEAXAGONAL HEADS IN ACCORDANCE WITH ANSI/ASME B18.2.2. NUTS SHALL CONFORM TO ASTM A194 GRADE 2H, OR ASTM A563 GRADE DH.

10. ALL BOLTS AND NUTS SHALL BE THREADED IN ACCORDANCE WITH ANSI B1.1 FOR SCREW THREADS. BOLTS 1-INCH AND SMALLER SHALL BE UNIFIED COARSE THREAD SERIES (UNC), CLASS 2B FIT. BOLTS LARGER THAN 1-INCH, SHALL BE UNC CLASS 2B, OR UN-8 SERIES THREADS WITH 8 THREADS/INCH.

11. BOLTING SHALL BE COATED TO MINIMIZE CORROSION:

   A. BURIED FLANGE SETS SHALL BE COMPLETELY COATED WITH PETROLEUM (WAX) TAPE.

   B. EXPOSED FLANGE SETS SHALL HAVE THE BOLTING FINISH COATED WITH HIGH-BUILD EPOXY WITH COLOR TO MATCH PIPING.

GASKETS

12. GASKETS SHALL BE 1/16-INCH THICK NON-ASBESTOS FIBER IN EPDM BINDER COMPOSITION GASKETS MEETING THE REQUIREMENTS OF AWWA C207. DO NOT USE A THICKER GASKET AS IT REQUIRES A HIGHER TORQUE THAN THAT SHOWN ON THE TABLE AND MAY RESULT IN LEAKAGE. RUBBER GASKETS ARE NOT ACCEPTABLE.

13. ALL FLANGES SHALL USE RING TYPE GASKETS THAT EXTEND TO THE INSIDE EDGE OF THE BOLTS. FULL-FACE GASKETS ARE NOT PERMITTED.

14. GASKETS SHALL BE LUBRICATED ON BOTH SIDES WITH FOOD GRADE ANTI-SEIZE COMPOUND.

15. INSULATING GASKETS REQUIRE DIFFERENT TORQUE VALUES. USE THE GASKET MANUFACTURER'S TORQUE RECOMMENDATIONS.

DIMENSIONS

16. FLANGE DIMENSION SHALL BE PER ASME B16.5 OR ASME B16.47. DIMENSIONS GIVEN IN THE TABLE ARE FROM THESE STANDARDS.

17. THE PIPING OD SHALL ADHERE TO ASME B36.10. THE DISTRICT STANDARD PIPING DIMENSIONS ARE NOT ACCEPTABLE FOR THIS PRESSURE SERVICE.

BOLTING PROCEDURES

18. THREAD ANTI-SEIZE COMPOUND OF HIGH-PURITY MINERAL OIL AND ALUMINUM SHALL BE USED ON ALL BOLT THREADS. SEE SPEC SECTION 05 05 26 FOR ACCEPTABLE PRODUCTS. FAILURE TO LUBRICATE THE BOLTING THREADS PRIOR TO INSTALLATION AND TORQUING WILL RESULT IN LOWER PRESSURE CAPABILITIES AND POSSIBLE LEAKAGE.

19. TORQUE VALUES SHOWN PROVIDE THE MINIMUM REQUIRED GASKET COMPRESSION. IF NECESSARY, TORQUE MAY BE INCREASED BY UP TO 100% FOR 4"-24" AND 50% FOR 30"-60".

20. FLANGE BOLTS FOR NON-ASBESTOS FIBER COMPOSITION GASKETS SHALL BE TIGHTENED WITH A MINIMUM OF SIX PASSES AS FOLLOWS:

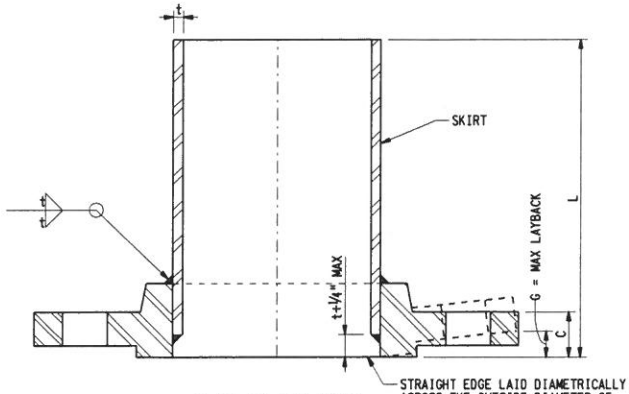
PASS	PERCENT OF FINAL TORQUE
1	25 TO 30
2	50 TO 60
3	100
4	100

ALLOW MINIMUM 24 HR FOR GASKET TO UNDERGO RELAXATION

5	100
6	100

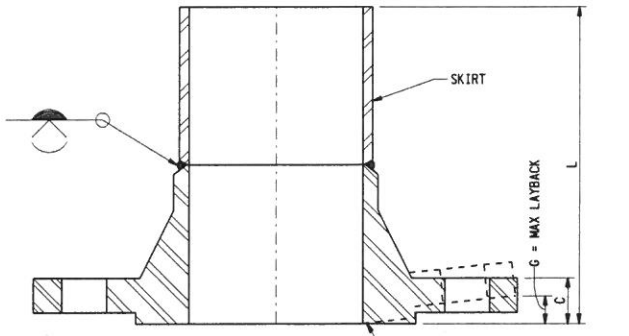
21. BOLTS SHALL IN ALL PASSES BE TIGHTENED IN DIAMETRICAL PAIRS AND IN A SEQUENCE RECOMMENDED BY THE GASKET MANUFACTURER.

22. A CALIBRATED TORQUE WRENCH SHALL BE USED ON ALL PASSES TO ENSURE UNIFORM BOLTING.



SLIP-ON WELDING

STRAIGHT EDGE LAID DIAMETRICALLY ACROSS THE OUTSIDE DIAMETER OF THE FLANGE FACE



WELDING NECK

STRAIGHT EDGE LAID DIAMETRICALLY ACROSS THE OUTSIDE DIAMETER OF THE FLANGE FACE

XHP FLANGE & PIPE SECTION ASSEMBLY

NTS

ASME STANDARD	PIPE SIZE	MIN. FLANGE THICKNESS C	BOLTS		LUBRICATED BOLT TORQUE, MINIMUM NOTES 18, 19	MAXIMUM FLANGE LAYBACK G
		SLIP-ON AND WNF	#	DIAM		
B16.5	4	1.25	8	3/4	95	0.029
	6	1.44	12	2/4	100	0.028
	8	1.62	12	7/8	160	0.031
	10	1.88	16	1	185	0.034
	12	2	16	1 1/8	270	0.040
	16	2.25	20	1 1/4	330	0.048
	20	2.5	24	1 1/4	410	0.048
	24	2.75	24	1 1/2	580	0.051
B16.47	30	3.62	28	1 3/4	1150	0.056
	36	4.12	32	2	1500	0.064
	42	4.69	32	1 5/8	1250	0.071
	48	5.25	32	1 7/8	2150	0.074
	54	6.00	28	2 1/4	3350	0.079
	60	6.44	32	2 1/4	3550	0.084

TABLE DIMENSIONS ARE IN INCHES, TORQUE IS FT-LBS

DESIGN
DESIGNED BY Nathan E. Hildebrand
DESIGN CHECKED BY Scott Davis
DRAWN BY K. ENG
REVIEW
SR. MECH. ENGR. R.P.E. NO. M 29634 Richard Ridgley
RECOMMENDED MANAGER OF DESIGN R.P.E. NO. C 39851 David L. Pratt
APPROVED, DIRECTOR OF ENGINEERING & CONST. R.P.E. NO. C 44702 Frank Delgado

EAST BAY MUNICIPAL UTILITY DISTRICT
OAKLAND, CALIFORNIA

STANDARD DRAWING

STEEL PIPE FLANGES,
EXTRA-HIGH PRESSURE (XHP)
SLIP-ON, WELDING-NECK, & SKIRTED

PROJECT NO.
SCALE NONE
DATE 18MAY2009

325-EA

USER: pcariaso
DATE: 21-MAY-2009 12:34
FILE: H:\stds\v8\stddwgs\325-EA.R00

NIDEC MOTOR CORPORATION

8050 WEST FLORISSANT AVE.
ST. LOUIS, MO 63136

Page No:	1
Date:	10/25/2013
Customer:	6098150
Brn/Plt:	DIOD
Work Order:	3687299
Order No:	30724723 SO
Customer PO:	858717

Xylem Inc Texas Turbine Operations
2881 East Bayard Street Ext Suite B
Seneca Falls NY 13148
United States

Ship To: Xylem Inc Texas Turbine Operations
3878 S. Willow Ave, #104
Fresno CA 93725
United States

ATTN: RUDY SAUCEDA

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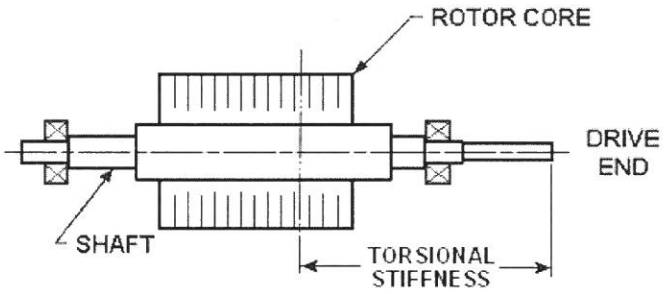
Model Number.....
or Order Number..... 2187936
Line Number..... 100
Document Type..... SO
Discount Symbol: NA

TORSIONAL ANALYSIS DATA

ORDER NO: 02187936-100

FRAME SIZE 364VP,TVCI4



SHAFT DATA			
DRAWING NO.	**MATERIAL**	**DENSITY**	**YIELD**
XB656472-000	AISI 1040 –1045 HR	.283 LBS/IN^3	45,000 psi
TENSILE	**YOUNG'S MODULUS**	**SHEAR MODULUS**	
82,000 psi	30 x10^6 psi	12 x 10^6 psi	

MOMENT OF INERTIA - ROTOR ASSEMBLY:

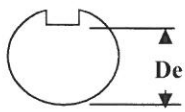
WR^2 = 16.2 LB-FT^2

SHAFT TORSIONAL STIFFNESS:

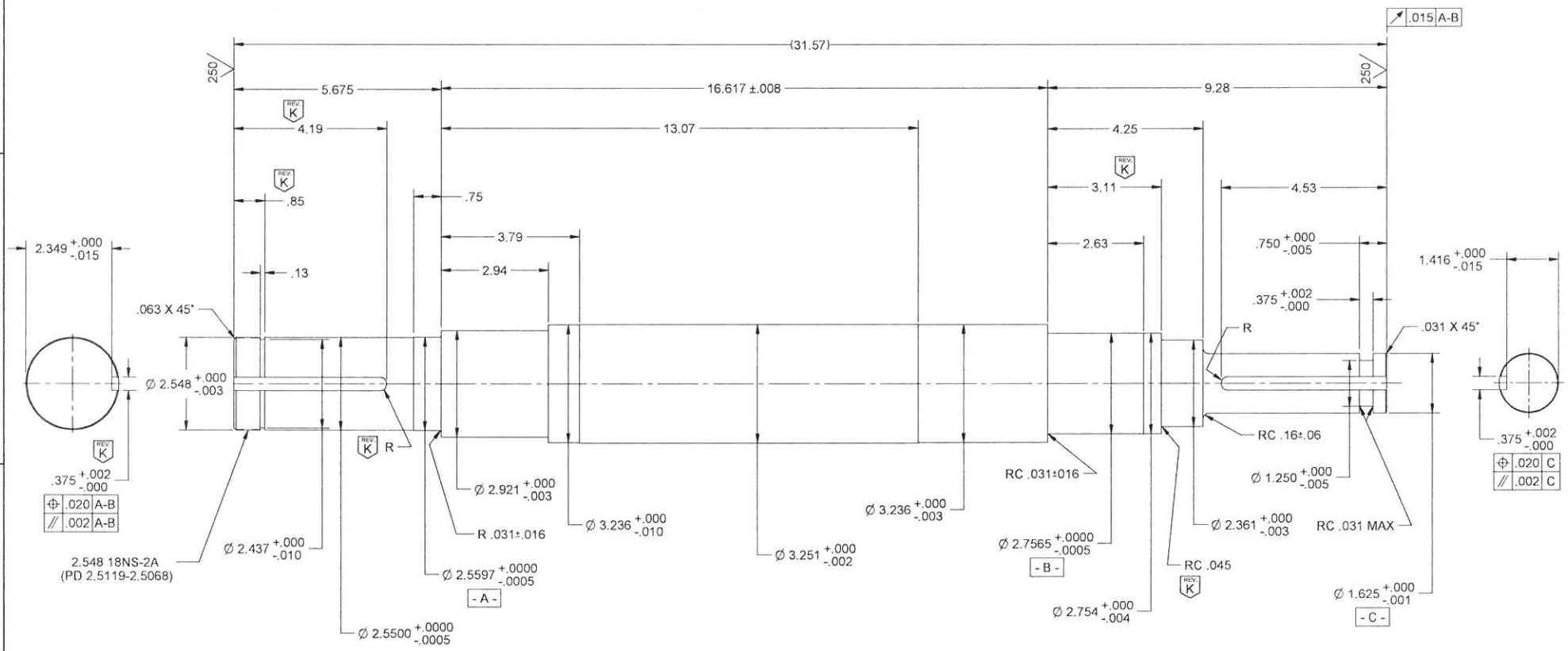
1.11 X 10^6 LB-IN/RADIAN

Torsional stiffness is the spring rate or constant which allows a user to determine the amount of twist or angular deflection in a shaft based on the amount of torque applied. The portion of the shaft for which the shaft stiffness has been calculated from 1/3 the length of the rotor core to the end of the drive end of the shaft (shafts with an annular keyways are measured from inboard side of the ring groove). It is the users responsibility to correct for coupling mounting effects.

SHAFT EXTENSION
De - EFFECTIVE DIAMETER WITH KEYWAY 1.416 INCHES



NIDEC MOTOR CORPORATION
ST. LOUIS, MISSOURI **10/29/2013**



NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL DIAMETERS TO BE: Ⓜ Ø .002 A-B
2. NO AXIAL RELATIONSHIP BETWEEN KEYWAYS

ENGINEERING REFERENCE
AH= 4.50 (STD) KEY TPL: X747925-50 TPL: X657213 FOR 2 POLE 7314 BRG

NIDEC CONFIDENTIAL
NIDEC MOTOR CORPORATION 18-Jan-13

REVISION DESCRIPTION FOR: MISC

STL0113-00 ADDED "XB" TO P/N, RC WAS R,
3.11 WAS 3.13, 4.19 WAS 4.69, .85 WAS .81,
KWY TOL +.003 WAS +.002, ADDED "R",

MATERIAL
HR STEEL, AISI 1045
MUST BE COMPLIANT TO RoHS DIRECTIVE EU 2002/95/EC AND REGULATION EC 1907/2006 (REACH) AS AMENDED

PROCESS PER GROUP 91500 -

SCALE 1:2 | UNITS INCHES

TOLERANCES ON DIMENSIONS (UNLESS OTHERWISE SPECIFIED)

INCHES	mm
.XX = ± .03	
.XXX = ± .015	
ANGLES X° = ±1°	

CSTG NO.	PART NO.	FRAME	TYPE
- - - -	XB 656472-000	365VP	ENCL, EXPL

TITLE: SHAFT, ROTOR

NIDEC MOTOR CORPORATION

ISSUED BY	APPROVED BY	REVISION DATE
R. KING	J. O'BRIEN	18-JAN-13

CODE	DWG NO.	REV.	SHEET NUMBER	DWG SIZE
	0656472	K	1 OF 1	C

SOLIDEDGE

NMCC (MAR-2011)

Nidec USEMToday
All for dreams

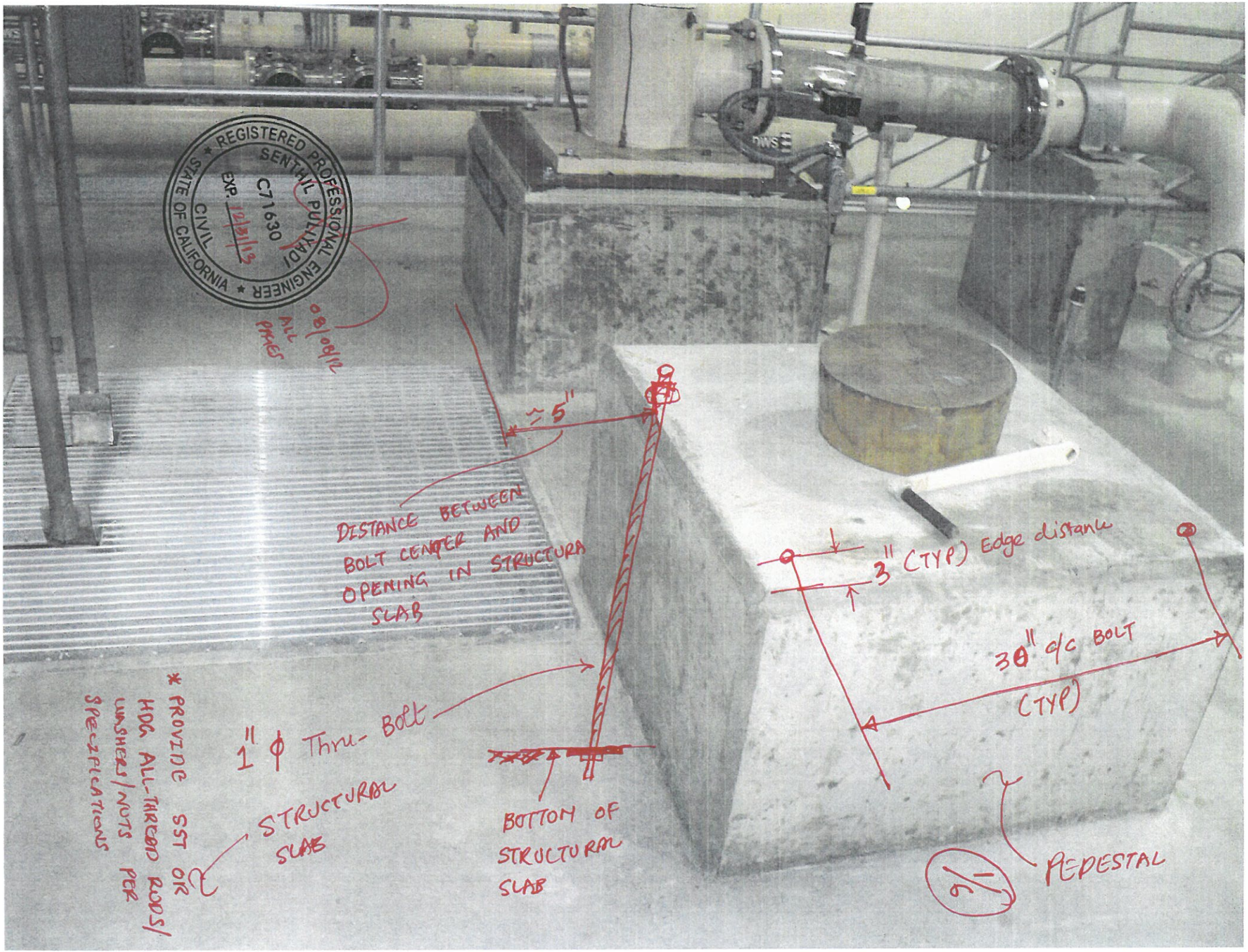
HOME
SYSTEMS
DIRECTORIES

TYPICAL REED CRITICAL FREQUENCY DATA

USEM MODEL NO: NA
USEM CATALOG NO: NA

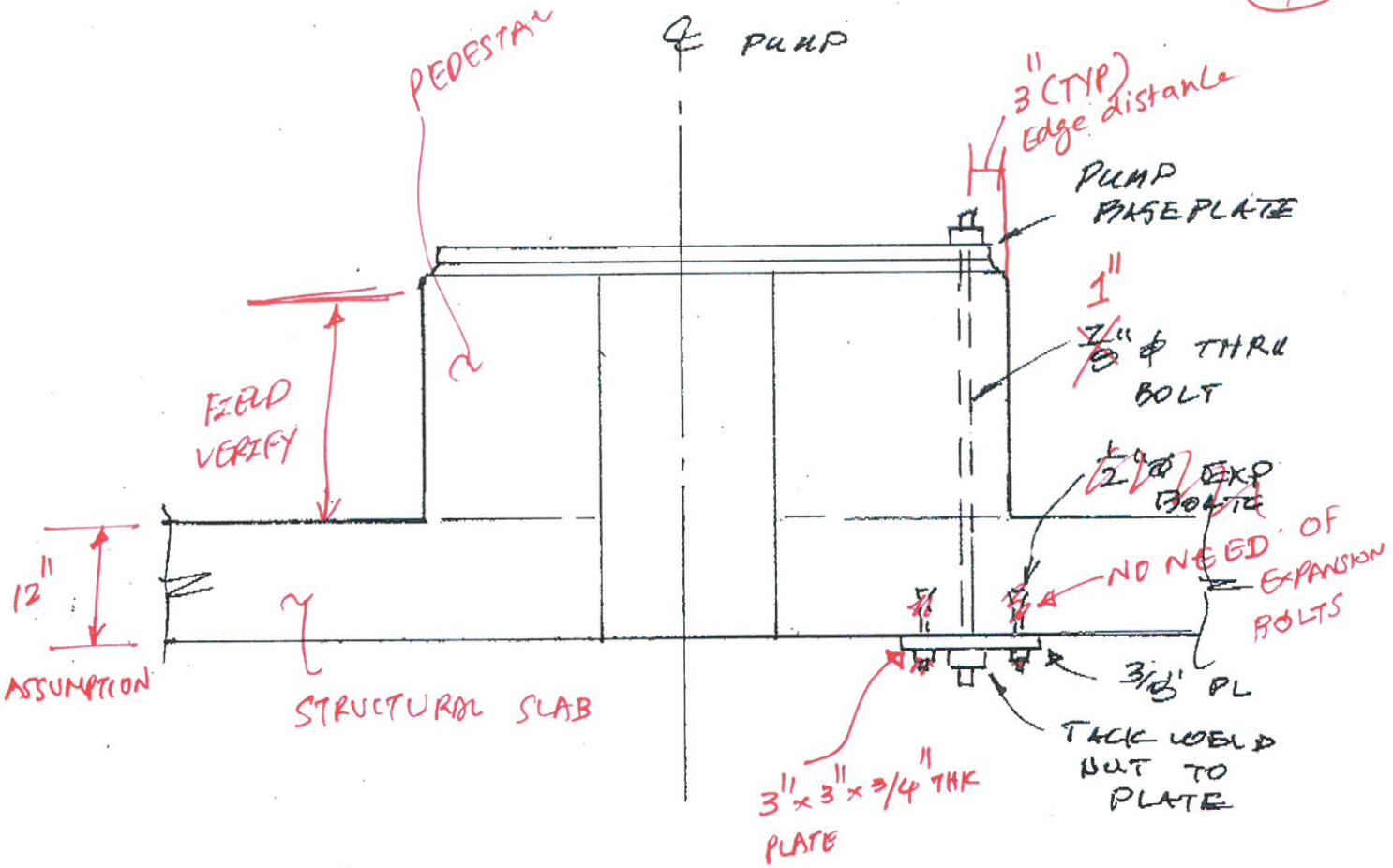
Frame: 364VP Type: TV4

REED CRITICAL FREQUENCY:	67	HZ
CENTER OF GRAVITY:	14	IN
DEFLECTION @ CENTER OF GRAVITY:	0.0022	IN
UNIT WEIGHT:	900	LBS.
BASE DIAMETER:	ALL	IN.
MAXIMUM MOTOR DIAMETER:	18.75	IN.
DATE:	1/24/2013	


REGISTERED PROFESSIONAL ENGINEER
SENTHIL PUNITHADI
C71630
EXP. 12/31/13
CIVIL
STATE OF CALIFORNIA
08/08/12
ALL PAGES
≃ 5"
DISTANCE BETWEEN BOLT CENTER AND OPENING IN STRUCTURAL SLAB
3" (TYP) Edge distance
30" c/c BOLT (TYP)
1" ϕ Thru-Bolt
STRUCTURAL SLAB
BOTTOM OF STRUCTURAL SLAB
* PROVIDE SST OR HDG ALL-THREAD RODS/ WASHERS/NUTS PER SPECIFICATIONS
PEDESTAL

EBMUD WCWTP

7-10-12



SECTION @ DECANT PUMP

NTS

* USE OF 1" ϕ THRU-BOLTS ENTIRELY CHANGES THE LOAD-RESISTING MECHANISM.

* PROBLEMS ASSOCIATED W/ EDGE DISTANCES BECOME IRRELEVANT BECAUSE THE TENSION IN BOLT WILL BE RESISTED BY STRUCTURAL SLAB (TENSION IN BOLT WILL IMPART A POINT LOAD TO STRUCTURAL SLAB) AND THE SHEAR IN BOLT WILL BE RESISTED BY

EXHIBIT E - TECHNICAL SPECIFICATIONS

SECTION 01 45 27

SHOP INSPECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

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 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 cancelation 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 (http://travel.state.gov/travel/cis_pa_tw/cis_pa_tw_1168.html) for "Travel Warnings" to countries and regions to determine the safety of international travel. Areas with travel warnings shall not be considered for procurement of items that require District inspection.

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 $61 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.

Spec. Section	Section Title and Description
33 12 23.10	Vertical Turbine Pumps – Weld Inspection, Dimensional Check, Check against approved submittals, hydrotests, coatings inspections, factory performance tests

END OF SECTION

SECTION 33 12 23.10

VERTICAL TURBINE PUMPS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:

1. Furnish two identical vertical turbine pumps as specified herein. Pumps shall operate correctly using the existing 60-hp vertical motors.

B. Related work specified elsewhere:

1. Section 01 45 27 – Shop Inspection (preceding RFQ section).

2. Appendix A (found in RFQ attachment Exhibit F).

1.2 DEFINITIONS

A. Vertical Turbine Pumps

1. See ANSI/HI 2.1-2.2-2008.

2. Guarantee Point: see ANSI/HI 14.6-2011.

3. Minimum Continuous Stable Flow (MCSF): The lowest flowrate at which the pump can operate without exceeding the vibration limits, imposed by this specification, due to recirculation of the fluid that results in cavitation and vibration.

B. Welding

1. American Welding Society Certified Welding Inspector (AWS CWI) – A person qualified as a welding inspector as given in AWS QC1-2007, Standard for AWS Certification of Welding Inspectors.

2. Nondestructive Examination (NDE) – The act of determining the suitability of some material or component for its intended purpose using techniques that do not affect its serviceability.

3. Procedure Qualification Record (PQR) – A record of welding variables used to produce an acceptable test weldment and the results of tests

conducted on the weldment to qualify a welding procedure specification.

4. Welding Procedure Specification (WPS) – A document providing the required welding variables for a specific application to assure repeatability by qualified welders and welding operators.

5. See AWS 3.0-2010, Standard Welding Terms and Definitions, for other terms and definitions.

1.3 APPLICABLE CODES AND STANDARDS

A. American Petroleum Institute (API):

1. API-610-2010, "Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries ", American Petroleum Institute.

B. American Society for Testing and Materials (ASTM):

1. ASTM A802-2006, “Standard Practice for Steel Castings, Surface Acceptance Standards, Visual Examination”.

2. ASTM A834-2006, “Standard Specification for Common Requirements for Iron Castings for General Industrial Use”.

3. ASTM A903-2007, “Standard Specification for Steel Castings, Surface Acceptance Standards, Magnetic Particle and Liquid Penetrant Inspection”.

C. American Welding Society (AWS)

1. AWS 2.4-2012, “Standard Symbols for Welding, Brazing, Nondestructive Examination”.

D. American Water Works Association (AWWA)

1. AWWA E-103-2007, “Standard for Horizontal and Vertical Line-Shaft Pumps”.

E. Hydraulic Institute (HI):

1. ANSI/HI 2.1-2.2-2008, "Vertical Pumps for Nomenclature, Definitions and Operation".

2. ANSI/HI 2.3-2008, ” Vertical Pumps for Design and Application”.

3. ANSI/HI 9.8-2008, "Rotodynamic Pumps, for Pump Intake Design".

4. ANSI/HI 14.6, “Rotodynamic Pumps For Hydraulic Performance Acceptance Tests”.

F. Manufacturers Standardization Society (MSS):

1. MSS SP-54-2007, “Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components – Radiographic Examination Method”.

2. MSS SP-55-2006, “Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components – Visual Method for Evaluation of Surface Irregularities”.

G. International Standards Organization (ISO):

1. ISO 1940/1:2003, "Mechanical Vibration - Balance Quality Requirements for Rotors in a constant (rigid) State - Part 1: Specification and Verification of Balance Tolerances".

2. ISO 9001:2008, “Quality Management Systems – Requirements”.

H. American Society of Civil Engineers (ASCE):

1. ASCE 7 - 2010, American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures.

I. American Society of Mechanical Engineers (ASME):

1. B16.5, Pipe Flanges and Flanged Fittings.

2. B16.36, Orifice Flanges.

3. B16.47, Large Diameter Steel Flanges.

4. B36.19, Stainless Steel Pipe.

J. 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.

K. Fabricated Pipe Specials

1. AWWA C200, Steel Water Pipe – 6-inch and Larger.

2. AWWA C208, Dimensions for Fabricated Steel Water Pipe and Fittings.

3. AWWA C210, Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.

L. Pipe Welding References:

1. ASME Boiler & Pressure Vessel Code, Section V, Nondestructive Examination, 2010 Edition including addenda, supplements, and interpretations.

2. ASME Boiler & Pressure Vessel Code, Section VIII, Rules for Construction of Pressure Vessels, 2010 Edition including addenda, supplements, and interpretations.

3. ASME Boiler & Pressure Vessel Code, Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators, 2010 Edition including addenda, supplements, and interpretations.

4. AWS D1.1:2010, Structural Welding Code – Steel.

5. ASME Boiler & Pressure Vessel Code, Section VIII, Rules for Construction of Pressure Vessels, 2010 Edition including addenda, supplements, and interpretations.

6. AWS A2.4-2012, Standard Symbols for Welding, Brazing, and Nondestructive Examination.

M. Coating References:

1. SSPC-1, Solvent Cleaning

2. SSPC-SP 5, White Metal Blast Cleaning.

3. SSPC-SP 11, Power Tool Cleaning to Bare Metal

4. AWWA C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. The manufacturer shall have been regularly engaged in design and manufacture of pumps of similar horsepower (50 horsepower or greater), type, and rating for use in municipal water supply for not less than five years.

B. Design Criteria:

1. Efficiency:

a. If the pump(s) fails to meet the minimum efficiency the manufacturer shall improve the impeller performance characteristics by polishing or other method as approved by the Engineer.

C. Coordination with existing motor & existing VFD Manufacturers:

1. The Pump Manufacturer shall coordinate with the existing Motor Manufacturer and the existing VFD Manufacturer, and shall design his pump to match with motor dimensions, and shall obtain all necessary information from the existing motor manufacturer and the existing VFD manufacturer as necessary for complete rotodynamic analysis that is not contained herein.

D. Manufacturer's Services:

1. The Pump Manufacturer shall furnish the services of a qualified field representative who shall be present at the project site during installation of the pump and motor units and again at the time the units are started and placed in service.

2. The Pump Manufacturer’s field representative shall inspect the equipment, shall advise the Engineer and District Forces of the proper procedures for installing and aligning the unit, shall adjust the pump impellers for the proper running clearance, shall adjust the mechanical

seals as required, and shall advise the proper procedures for starting and operating the pump.

3. The Pump Manufacturer shall submit certification of proper installation (See Appendix A).

E. Dynamic Analysis for Variable Speed Pumps:

1. As part of this requirement, a complete dynamic analysis is required for the pump, motor, and VFD systems, including, but not limited to:

a. Compliance with resonance frequencies separation requirements contained in API-541, paragraph 2.4.6.1.1.

b. Lateral Critical Speed Analysis as detailed in API-541, paragraphs 2.4.6.2.1, 2.4.6.2.2 and 2.4.6.2.3, except this analysis shall also include all masses of the rotating elements, including motor rotor, entire coupling, pump shaft and impellers, and any other rotating items. Any effects of the VFD units on the lateral critical speed shall also be included in the analysis.

c. Steady State and Transient Torsional and Stress Analysis of complete mechanical and electrical systems as detailed in API-541, paragraph 2.4.6.2.4.

d. All analysis shall be performed and stamped by a licensed Professional Engineer.

F. Welding:

1. Welding Procedure Specifications:

a. All welds shall be completed in accordance with a qualified WPS.

b. All WPS's that are not pre-qualified as given above shall be qualified in accordance with one of the following:

1) ASME Boiler & Pressure Vessel Code, Section IX, or

2) AWS D1.1 - Clause 4.

c. An AWS Certified Welding Inspector (CWI) shall review and stamp all WPS's.

d. An AWS CWI shall witness and stamp all PQR's.

2. Qualification of Welders:

   a. Welders shall be qualified under ASME Boiler & Pressure Vessel Code, Section IX, Part QW; or AWS D1.1 - Clause 4, for the welding processes, positions, and procedures to be used for this project.

   b. Welders shall have verifiable evidence they have maintained their qualifications in accordance with AWS D1.1 - Clause 4, or ASME Boiler & Pressure Vessel Code, Section IX, Part QW-322.

   c. Welder Qualification(s) shall be witnessed and stamped indicating acceptance by an AWS CWI qualified per AWS D1.1 - 6.1.4.

3. Nondestructive Examination of Production Welds:

   a. The Engineer may elect to perform additional NDE of in-process or completed shop welds to verify weld quality.

   b. Types of NDE:

      1) Radiographic Examination (RT) per Paragraph UW-51, Section VIII, ASME Boiler & Pressure Vessel Code.

      2) Ultrasonic Examination (UT) per Paragraph UW-53, Section VIII, ASME Boiler & Pressure Vessel Code.

      3) Other non-destructive tests such as Liquid Penetrant (PT) and Magnetic Particle (MT) in accordance with Section V, ASME Boiler & Pressure Vessel Code. Acceptance criteria shall be as given by AWS D1.1 - Clause 6, Part C.

   c. The use of the GMAW-S (Short Circuit) process is not allowed. GMAW Globular or Spray modes are allowed.

   d. Cost of Examinations:

      1) The cost of NDE identified in the Contract Documents for specific welded connections shall be borne by the Contractor.

      2) The cost of additional NDE requested by the District will be borne by the District in the event that all examined welds are found to be acceptable. In the event of a rejected weld, the

Contractor shall bear the costs of all NDE, including NDE of weld seams found to be acceptable, as well as the costs of repairs, re-inspection and re-examination of the rejected weld.

3) The cost of NDE performed by District personnel will be borne by the District. The costs of repairs, re-inspection and re-examination resulting from a rejected weld shall be borne by the Contractor.

G. Manufacturer's Field Services

Field Services Required	**Minimum Days Required**
Inspection of existing pump conditions (Measurement of flanges, pipes, existing pump barrel)	1
Manufacturer's Field Service Representative during start-up (Certification of proper installation, noise, performance vibration testing, field functional testing	3

1. Manufacturer's Representative: the pump manufacturer shall furnish the services of a factory trained field representative designated by the equipment manufacturer, who shall be present at the project site during installation of the unit and again at the time the unit is started and placed in service. The manufacturer's representative shall have superior knowledge of all aspects of the equipment being furnished in this section. The manufacturer, through his field representative, shall advise the Engineer and District Forces of the proper procedures for installing and testing the equipment, and shall advise the proper procedures for starting the equipment.

2. The manufacturer's representative shall oversee all pump and motor testing and shall witness all performance, vibration and sound level testing.

H. Shop Inspection:

1. Shop inspection will be performed during all phases of fabrication per Section 01 45 27. Specific points of inspection shall include:

a. Weld inspection.

1) Welds not subjected to a shop hydrostatic test shall be examined by NDE as indicated in Part F of this section. The NDE method shall be approved by the District. NDE procedures shall be submitted to the District for approval prior to commencement of testing activities.

b. Dimensional check.

c. Check of pump fabrication against approved submittals, including materials of construction.

d. Check of pump fabrication against these specifications.

e. Witness hydrotests of bowl assemblies, column, and pump head assemblies.

f. Inspect coatings of bowl assemblies and pump head.

1.5 SUBMITTALS

A. GENERAL INSTRUCTIONS

1. Engineering Calculation Submittal:

   a. Include in the “Technical Submittal”; see the “Vertical Turbine Pump Technical Submittal Checklist” attached at the end of this section.

   b. All calculations shall be completed and stamped by a Professional Civil or Mechanical Engineer registered in the State of California, unless otherwise noted.

2. All calculations shall be completed and stamped by a Professional Civil or Mechanical Engineer registered in the State of California, unless otherwise noted.

3. Submit samples, drawings, and data for the Engineer's approval which demonstrate fully that the 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.

4. Submittals shall be accompanied by a letter of transmittal and shall be in strict accordance with the provisions of this section.

5. Compact disks or DVDs shall be packaged in a hard plastic case. The case and media shall be labeled as to content.

    a. Submit priority of processing when appropriate.

    b. Submittals shall include the following information:

        Specification Requirements:

        1) A copy of the applicable section(s), 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, 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.

        3) 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.

4) Any deviation from the specification not specifically requested and clearly identified, although accepted through oversight, may be rejected at any stage of the Work. The manufacturer 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.

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 PDF (compatible with Adobe Acrobat Version 7.0). Submit scanned copy on CD +/-R, DVD +/-R or e-mail attachment.

c) Submit five (5) copies of each Operations & Maintenance (O&M) manual unless specified otherwise

B. TECHNICAL SUBMITTAL CHECKLIST

1. See the submittal content requirements listed in "Vertical Turbine Pump Technical Submittal Checklist" attached as a supplement at the end of this section.

2. The technical submittal shall be separated by tabs into logical groupings (references, manufacturer's catalog information, calculations, certifications, drawings, etc.). Each page of the submittal within each tab section 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 "Vertical Turbine Pump 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 "Vertical Turbine Pump 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.

5. Submittals shall include the vertical turbine pump motors submittal information; see the Motor Specification for additional requirements.

C. LIST OF SUBMITTALS

1. Submit Prior to Pump Manufacture

a. Calculations demonstrating that the existing motor thrust bearing size is acceptable, including:

1) Total thrust load including: motor rotor weight, weight of pump's shafting and impellers and coupling, hydraulic thrust load. Thrust load shall include normal at pump design conditions and momentary maximum.

2) Momentary upward thrust shall also be given, if any.

3) Calculation of bearing life for motor.

4) For known information on the existing motor, see the "Existing Motor Data".

b. Calculations demonstrating compliance with the natural frequency separation requirements in Article "Natural Frequency" hereinafter.

c. Dynamic Analysis Calculations, as outlined in API Standard 541, Sections 2.4.6.1.1, 2.4.6.2.1, 2.4.6.2.2 and 2.4.6.2.3, and 2.4.6.2.4, including lateral critical speed analysis and torsional analysis calculations of pump, motor, and VFD "complete mechanical and electrical train".

d. Calculations for pump stiffness taking into account maximum hydraulic loading. Maximum hydraulic load shall be calculated using the maximum pump suction pressure and the pump shut-off head. The calculations shall identify the maximum pump deflections, and certify pump system stiffness and maximum deflections are suitable for all operating conditions including shut-off. The calculation shall assume that the pipe supports are not providing any support for the pump.

e. All seismic calculations shall be completed and stamped by a Professional Civil or Structural Engineer, registered in the State of California, in accordance with this Section and 2013 California

Building Code (CBC) requirements. **See attached "EBMUD WCWTP Decant Pump Pedestal Seismic Sketch".** Approved calculations shall demonstrate the adequacy of the anchorage system for seismic forces of:

1) Pump head structure, including pump head weld to base flange.

2) Motor to pump fastening bolts.

3) Pump base flange to sole plate flange bolts.

4) Use the following values for seismic calculations:

    a) Design spectral acceleration at short periods, SDS = 1.176g

    b) Component importance factor, Ip = 1.50

5) The equipment and all components shall not undergo loss of their intended function after application of the Code prescribed seismic forces. Certification that the equipment is seismically qualified for the above requirements shall be demonstrated as prescribed in Section 13.2 of ASCE 7-10.

f. Line-shaft critical speed calculations.

g. Fabricated Pipe Specials

1) Submit for approval shop drawings showing weld symbols and the welding processes and procedures to be used, prior to welding of pipe specials. All welding symbols shall be in accordance with AWS A2.4.

2) Submit certification of welders for each approved process prior to work.

3) Shop drawings shall include all dimensions and a list of materials with ASTM designations.

4) Shop drawings shall include locations of temperature control joints.

5) Material traceability records including certified mill test reports and inspection certificates for the proposed fabrication material.

6) Submit design calculations for review prior to manufacture of steel pipe fabricated specials and fittings.

7) Submit external coating system to be used for fittings and specials and provide the following data for each:

a) Manufacturer's product information.

b) Recommended repair procedures and materials.

c) Technical information.

d) Field application procedures.

e) Submit coating adhesion testing data.

h. Welding Submittals

1) Qualification of welders:

a) Submit verifiable evidence of initial qualification for each welder.

b) Submit verifiable evidence indicating each welder has maintained current qualification under the applicable code.

2) Submit WPS's with supporting PQR's for approval.

3) Submit verifiable evidence of the certification of all personnel performing NDE or interpreting the test results to ASNT-TC-1A Level 2 as a minimum.

4) Provide all submittals to Engineer at least 14 days prior to commencing pipe welding, except that WPS's and PQR's shall be submitted two months prior to commencing pipe welding

i. Coating Submittals

1) Product data: Submit manufacturer's current specifications or technical information that proves compliance with the specified requirements.

2) Manufacturer's instructions: Submit manufacturer's written instructions and recommendations for field coating and repair of coating system.

3) Submit list of all coatings proposed for use.

a) Identify each coating by brand name and manufacturer, and indicate what items will be painted with the coating.

j. Submit six weeks (minimum) prior to Factory Testing:

1) Factory Test Procedures:

a) Factory testing shall not be scheduled sooner than thirty days after the approval of the factory test procedures.

b) Submit detailed factory test procedures for all equipment specified in this section including the following minimum information:

i. Test procedures following the guidelines given in HI Standard 2.6-2000.

ii. List of all instruments including accuracies and calibration data.

iii. Detailed sketch of test installation including locations of all instruments, depth of water in test well, sizes of piping, height of discharge pipe centerline, etc.

iv. Information on test flow meter including calibration data.

v. Information on test power meter including accuracy, multipliers or other factors, if

applicable. Also, state whether the power meter is owned by the pump manufacturer, or the local electric company.

vi. Motor nameplate data used for calculating brake horsepower delivered to pump, including all efficiencies.

vii. Procedures for vibration measurements and noise measurements, including proposed units of measurements.

k. Submit the following for approval prior to shipping:

1) Factory Performance Tests Results:

a) Certified and guaranteed factory pump test data sheet for each pump assembly including:

i. Speed, in rpm

ii. Flow, in gpm

iii. Discharge pressure, in psi

iv. Velocity head, in feet

v. Elevation above wet pit, in feet (or suction pressure, in psi)

vi. Total head, in feet

vii. Watt meter reading and multiplier

viii. Input power to motor, electrical bhp

ix. Pump efficiency

x. Total Indicated Runout (T.I.R.), of pump and motor shafts, in inches.

xi. Vibration levels, inches/ second velocity, peak to peak (unfiltered), measured at the pump head top flange, two readings @ 90 degrees

apart. Readings shall also include axial vibration measured at the pump head top flange.

b) Certified and guaranteed curves showing pump performance characteristics based on the factory test:

i. Total head (feet) vs. flow (gpm)

ii. Brake horsepower vs. flow

iii. Overall efficiency vs. flow

iv. Pump efficiency vs. flow (may be calculated from overall efficiency and motor efficiency curves)

v. NBSHr vs. flow (test data from a similar pump is acceptable)

c) Certified test motor calibration curves (when job motors not used) showing % load vs. current, input power, speed, power factor, and efficiency.

d) Hydrostatic Test for discharge head, column, and bowl assembly.

e) Factory performance test instrumentation calibration sheets.

2) Certified Residual Unbalance Reports, in accordance with ANSI/API 610, Figure J-1 and J-2, documenting the equipment supplied under this specification meets the balance quality requirements specified herein.

3) Operations and Maintenance Manuals

a) All O&M material for the vertical turbine pump motors (as specified in Section the Motor Specification) and mechanical seals shall be incorporated and submitted with Vertical Turbine Pump O&M manuals.

b) Detailed procedures for coupling alignment, impeller clearance adjustment and mechanical seal installation.

c) Installation guidelines including: storage, handling, setting equipment, recommended rigging procedures, component weights, lifting diagram, alignment specifications, and allowable total indicator runout for pump shaft, motor shaft, and coupled unit.

d) Recommended maintenance including: assembly/disassembly instructions for the rotor, bearings, and seal; allowable wear of running clearances; fits and clearances for rebuilding; and routine maintenance procedures and intervals.

e) Certified Outline and Installation Drawing.

f) Certified Performance Curves as Tested including Preferred Operating Region.

g) Include all test setup requirements and testing equipment. Also include additional field test procedures recommended by the pump manufacturer.

l. Submit the following prior to Field Testing:

1) Manufacturer's Certificate of Proper Installation for vertical turbine pumps.

2) Recorded data of the pump-to-motor coupling alignment dial indicator readings.

M. submit the following prior to the startup test:

1) Field Test Reports for vertical turbine pumps.

1.6 DISTRICT WITNESS INSPECTIONS

A. The District will perform inspections and witness the inspections and tests specified in Section 01 45 27 and this section.

B. See Section 01 45 27 for advanced notification requirements and District travel and expense reimbursement requirements.

1.7 JOB CONDITIONS

A. Site Climate and Environmental Conditions:

1. Site Climatic Conditions:

District Location	Value
Summer	97° F DB 68° F WB
Winter	21° F
Mean Daily Range:	30° F

2. Environmental Conditions:

a. Site Elevations (above mean sea level): 325 feet

b. Max Seal Water Temperature: 66° F

B. Service Conditions (decant water service):

1. 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.

C. The supplied pumps will replace two existing pumps of a four pump wet well that houses three existing pumps.

1. Refer to drawing 506.33-M-001, 506.33-M-002, and 506.33-M-003 for dimensions of the facility.

2. The two existing pumps are Goulds model 12CHC, 2 stage, 1800-rpm, with an 8.375-inch impeller diameter. These existing pumps were determined to have soft heads and wide line bearing spacing (120-inch). This combination caused a natural frequency to occur at approximately 1300-rpm, which is within the normal pump VFD speed range. The new pumps are expected to have stiffer heads with vertical welded reinforcement plates and closer line bearing spacing (48-inch or less) to

raise the system natural frequency. The existing pumps will be disposed.

3. The existing motors will be reused on the new pumps. Refer to article 2.2 for additional information.

D. The Manufacturer shall not ship or install the pumps until the certified factory performance test results submittal has been approved by the Engineer.

E. The pump manufacturer shall be responsible for evaluating the discharge piping system stiffness as shown on the Drawings for suitability with the pump discharge head nozzle load requirements. The discharge piping systems shown on the Drawings equal or exceed the minimum requirements of the current ANSI/AWWA M-11 manual, but are not designed to the nozzle load criteria of the Hydraulic Institute Standard for Centrifugal and Vertical Pumps for allowable nozzle loads. If the piping system rigidity does not meet the pump manufacturer's standard pump design requirements, the pump manufacturer shall have sole responsibility for designing a custom pump assembly as necessary to meet the specific requirements of their equipment under all specified service and operating conditions. All proposed modifications shall be designed and stamped by a Professional Mechanical or Civil Engineer registered in the State of California, and submitted to the Engineer for review. The cost for all proposed custom designs shall be included in the bid.

PART 2 - PRODUCTS

2.1 PUMP ASSEMBLY

A. Pump Design Criteria:

1. The pump type shall be a vertically suspended, single casing, diffuser type with discharge through the column and head. This corresponds to API 610 type VS1, wet well pump with no barrel.

2. The pump will be started, operated and stopped with a VFD unit. The pump shall be capable of continuous operation at speeds from 50% to 100% of synchronous speed.

3. Pump and Motor Synchronous Speed: The pump selection shall match the existing motor synchronous speed of 1785-rpm nominal.

4. The pumps shall require no more than 60-hp at any point on the flow-capacity curve.

5. Pump Test Acceptance Grade (at Guaranty Point per ANSI/HI 14.6-2011): Grade 1U including flow, head, and efficiency.

6. Secondary Design Points: Pumps shall be able to operate continuously at, or near the secondary design points without damage. The pump acceptance tolerance at the secondary design point is ±9% of specified flow rate, and ±7% of specified TDH.

7. Pump Design Points and performance shall be as shown on the attached EBMUD "Vertical Turbine Pump Data Sheet".

8. Pump head capacity curve shall have a continuous downward slope without dips or hollows.

9. Static suction head at the pump inlet bell varies from 3 to 20 ft-H2O.

10. Flanges: All flange face shall be machined flat and square, with a surface flatness of 0.002-inch/linear-ft or less, after welding. The flange face finish shall be serrated concentric or serrated spiral having 24-55 grooves/inch, using a 0.06-inch minimum radius cutting tool. The flange roughness shall be 125 to 250 micro-inches. Flange faces shall be free of lining and coating materials.

11. Vibration: The pump installed vibration limits shall meet the criteria given on the Vertical Pump Data Sheet.

12. These pump vibration levels shall not increase by more than 20% within the warranty period. The motors are existing and do not have a warranty period.

B. Pump Design Details:

1. The pump shall be designed in accordance with ANSI/AWWA Standard E103-07 and Hydraulic Institute Standards for vertical turbine pumps except as modified herein:

    a. General Materials:

        1) All elastomeric components in contact with water shall be suitable for 2.5 mg/l chloramine content. The use of

chloramines shall not have any effect on the manufacturer's warranty.

2) All bolting materials shall be stainless steel conforming to the same material requirements as the flange bolting requirements.

b. Impellers, Bowls, Bushings, and Bearings:

1) Pump Bowls: cast iron.

2) Pump Impeller: Aluminum-bronze having not more than 0.25% lead in compliance with ASTM B271-08. The pump impeller type shall be enclosed. Silicon-bronze is not acceptable. The alloy shall be inhibited against de-aluminization by receiving a temper anneal or some other method

3) Pump Bowl Wear Rings, Bushings and Bearings: bronze having not more than 2% lead and not more than 16% zinc. Rubber or elastomers for bearings or bushings are not acceptable.

4) Line-shaft Bearing Spacing: As required by the line-shaft critical calculation, but no greater than 48-inches.

5) Each impeller shall be dynamically balanced to ISO 1940-2003, Quality Grade G-2.5 or better.

c. Shafting and Couplings:

1) The pump top shaft, line shaft, bowl-assembly shaft, shaft couplings, keys, and shaft sleeves shall be stainless steel.

2) Line-shaft couplings shall be the keyway with key type. Threaded couplings are not acceptable.

3) A fully adjustable spacer-type coupling shall be furnished, bored and keyed to match motor shaft with bore diameter tolerances equal to +0.001"/-0.000" of nominal shaft diameter. Spacer height shall be large enough to permit coupling removal and seal cartridge removal without raising motor. Key length shall match the key slot.

4) The coupling shall be dynamically balanced.

d. Head:

1) The pump discharge head shall be fabricated steel and shall be of the above grade discharge type. The minimum discharge head wall thickness shall be 0.375-inch. The head wall thickness shall be thicker or suitably stiffened as required to provide the correct unit natural frequency. All welds on the interior of the pump head shall be full penetration and ground smooth. All weld spatter, surface defects, and other deleterious material shall be removed. Minimum corner radius shall be 1/8 inch. Vertical welded steel reinforcement plates shall span from motor flange to base flange on the head exterior to provide additional stiffness to meet vibration and critical speed requirements.

2) Pump Head Motor Mounting Flange: 8 equally spaced holes, minimum, to allow motor rotation at 45° increments. The flange shall match the existing motor flange dimensions and bolting pattern as required for proper connection.

3) Pump Head Discharge Flange: 8-inch, ASME Class150 steel flange with ASME dimensions and drilling. The flange face shall be 15.0-inches minimum from the pump discharge centerline. This flange shall not be directly above the pump head base flange bolting in a manner that would restrict access to the bolt heads with tools.

4) Pump Head Base Flange:

a) Square or round, 1.25-inch minimum flange thickness after fabrication and machining. The mounting shall be to a sole plate provided by the pump Manufacturer.

5) A test tap (3/8-inch FNPT) measuring discharge pressure shall be included on the horizontal centerline of the discharge nozzle adjacent to the discharge flange.

6) Access Openings: The openings shall be large enough to assemble and disassemble the spacer coupling and the mechanical seal, without removal of motor. The openings shall

be small enough or reinforced as not to compromise rigidity. Care shall be exercised during design to ensure the openings do not compromise the pump rigidity. The center of opening shall be located 90-degreees CW of the discharge nozzle.

7) Head drain tap: The discharge head shall be provided with a seal area drain (3/4-inch FNPT or larger), 45o counterclockwise from the discharge nozzle, which shall be correctly located to provide for complete draining of the seal area. This drain shall be field piped by District Forces to the building floor drain system. Refer to TM080.

e. Column:

1) The pump column shall be welded steel of 0.375-inch minimum thickness.

2) The pump column sections shall use threaded coupling connections.

3) The pump column shall include lifting lugs suitable for vertical lifting and laydown. These lugs shall not increase the total diameter such that it would interfere with passing through the existing 12-1/4-inch diameter sump opening.

4) The column shall be provided in separate lengths that match each provided bearing edge.

f. Mechanical Seal:

1) The head shall be equipped with a cartridge type, externally adjustable, internally sleeve mounted, hydraulically balanced, non-fretting, elastomeric bellows type, mechanical seal with silicon carbide rotating to a silicon carbide sealing faces. There shall be no “O” rings subject to wear against rotating surface. All metallic parts and hardware shall be stainless steel, type 316. The bellows material shall be EPDM or FKM. The seal shall have a threaded NPT flushing connection to be field piped by District Forces to the pump suction side of the discharge head per API Plan 13 and as shown on the drawings. The minimum seal pressure rating, with service multiplier factors, and at 70-degF, shall be 150-psig.

a) Acceptable Products: Chesterton 155, John Crane 5610, Flowserve ISC2-68PX, or equal as approved by the Engineer.

g. Accessories:

1) Each pump shall be equipped with a stainless steel nameplate permanently mounted to the pump head in a readily visible location. The nameplate shall indicate at a minimum the manufacturer's name and address, model number, serial number, rated head in feet, rated capacity in gpm, impeller size in inches, number of stages, direction of rotation, and rotational speed corresponding to the pump rating. Also the nameplate shall be stamped: "EBMUD – WCWTP Decant"

2) An OSHA compliant expanded metal guard screen shall be provided over the opening for the coupling.

3) Suction strainer: None required.

h. Sole Plate:

1) The pumps shall be provided with a separate A36 steel sole plate, 1-¼-inch thick, for bolting and grouting to the foundation. The sole plate shall be 34-inches square with a 1-1/8-inch bolt hole located at each corner, 2-inches from each plate edge. This plate shall be machined on its top surface for mounting of the discharge head. Refer to API 610, Figure 38. The sole plate shall be drilled and tapped for mounting the pump head.

2. Welding:

a. All groove welds shall be full penetration welds with root melt-through unless specifically approved otherwise.

b. The size of fillet welds shall not be less than the thickness of the thinner material being joined. All slip-on flanges shall be fillet welded both inside and out.

c. All welded joints other than groove welds shall be seal welded on the back side to prevent corrosion.

d. All welded couplings (half couplings, threaded outlets, welding outlets, etc) shall have full penetration bevel welds, and shall have holes drilled and be welded prior to application of coatings.

e. All taps shall be factory welded.

C. Castings:

1. Bowl castings:

a. Visible defects after machining and blasting, but before coating shall be per MSS-SP-55-2006 acceptance levels or its listed Castings Technology International (i.e. SCRATA) equivalent, including, but are not limited to: hot tears and cracks; shrinkage; sand inclusions; gas porosity; veining; rat tails; wrinkles, laps, folds, and cold shunts; cutting marks; scabs; chaplets; and surface roughness.

b. Surface defects shall also be within the tolerances of the coatings manufacturer requirements for proper application of the required coating.

c. Based upon the visual findings, District Plant Inspection might require an inspection by NDE methods.

1) The NDE methods may be either magnetic particle or liquid penetrant at the discretion of Plant Inspection.

2) The surface inspection criteria shall be per ASTM A903-2007, Level I, in which the individual indication size shall be less than 1/16-inch linear or 1/8-inch non-linear. The additional indication grouping, in-line and clustering acceptance criteria set forth in A903 shall also be met.

3) Interior examination by radiographic inspection method (RT) per MSS-SP-54-2007 as spacing allows.

d. The steel casting standards referenced above shall be equally applied to iron castings.

D. Factory Finish:

1. The ferrous surfaces of the interior and exterior of the discharge head, and column pipe spool shall be coated with fusion-bonded epoxy.

2. Coating Requirements

    a. Coating: 100% solids, fusion bonded, thermo-setting resin powder.

        1) Approved products:

            a) Electrostatic spray: Scotchkote No. 134W (green), 3M.

            b) Fluidized bed: Scotchkote No. 203 or No. 206N, 3M.

            c) Or equal as approved by the Engineer.

3. The following surfaces shall not be coated:

    a. The machined surface between the pump head and motor.

    b. Flanged faces including pump head discharge flange face, and the mating surfaces of the pump head.

        1) Stress relieving is required for flanges which have been fabricated from segments of plate. Flanges shall be stress relieved after they are welded to pipe sections and before machining.

    c. Stainless steel or bronze materials.

    d. After interior and exterior coatings have been applied and cured, uncoated machine surfaces and flange faces shall be coated with a rust inhibitor (LPS Laboratories LPS-3 or equal as approved by the Engineer) or other easily removable protective coating.

4. The interior water passageways of pump bowls shall be coated with manufacturer's NSF-61 approved coating as approved by the District.

5. The District's representative will inspect all surface preparations and coatings.

E. Natural Frequency:

1. Pump and motor combination, including pump, motor, VFD, coupling, and all other appurtenances, shall have no critical or resonant frequencies within ±20 percent of the running speeds from 65% to 100% rpm.

2. Calculations by a California Licensed Professional Mechanical or Civil Engineer shall be submitted to the Engineer to verify compliance with the above Natural Frequency separation requirements.

F. ISO 9001 Certification:

1. The pump manufacturer shall be ISO 9001 certified or registered. This shall be inclusive of the fabrication, assembly and testing of the pump and all sub-assemblies including, but not limited to, the head, bowls, impellers, and column.

G. Piping Requirements

1. STEEL PIPE, AND STEEL AND IRON FITTINGS, [STL]		
PIPE	Materials, Manufacture & Testing:	Varies by pipe size, see below.
	NPS 24" and Smaller:	ASTM A53, Type E or S, Grade B.
	NPS 48" and Smaller:	ASTM A106-S1, Grade B.
	52" and Larger:	API 5L-2004, Grade B, PSL 2. See API 5L Stipulations hereinafter.
	Construction / Dimensions:	NPS 48" and smaller: ASME B36.10, Standard weight (unless otherwise shown) 52" and larger: Steel cylinder OD, wall thickness, lining and coating as shown on the drawings. See API 5L Stipulations hereinafter.
FLANGES	Materials:	ASME Steel Forgings: ASTM A105 Grade B, or, ASTM A182 Grade F2. AWWA Steel Forgings: ASTM A105 Grade B, or, A181 Class 70. AWWA Steel Plate: ASTM A36; ASTM A516 grade 65 or 70; or ASTM A283 Grade D; or ASTM A1011-SS Grade 36; or A1018-SS Grade 36.
	Construction / Dimensions:	Service pressures 175 psig and under: All flanges shall be flat faced and as specified herein unless otherwise shown. ASME Slip-On or Welding Neck Type, NPS 24" and smaller: ASME B16.5, Class 150 unless otherwise shown. ASME Welding Neck Type, NPS 26" thru 60": ASME B16.47, Series A, Class 150 unless otherwise shown. AWWA Steel Forged or Plate Flanges, 12" and smaller: AWWA C207-07, Class D unless otherwise shown. AWWA Steel Forged or Plate Flanges, 16" and larger:

1. STEEL PIPE, AND STEEL AND IRON FITTINGS, [STL]		
		AWWA C207-07, Class D unless otherwise shown. (150 psig max service pressure) Refer to Standard Drawing 323-EA.
		Service pressures 275 psig and under: All flanges shall be flat faced and as specified herein unless otherwise shown. ASME Slip-On or Welding Neck Type, NPS 24" and smaller: ASME B16.5, Class 150 unless otherwise shown. ASME Welding Neck Type, NPS 26" thru 60": ASME B16.47, Series A, Class 150 unless otherwise shown. AWWA Steel Forged or Plate Flanges, 108" and smaller: AWWA C207-07, Class E unless otherwise shown. Refer to Standard Drawing 324-EA.
		Service pressures from above 275 psig to 600 psig maximum: All flanges shall be raised face and as specified herein unless otherwise shown. ASME Slip-On or Welding Neck Type, NPS 24" and smaller: ASME B16.5, Class 300 unless otherwise shown. ASME Welding Neck Type, NPS 26" thru 60": ASME B16.47, Series A, Class 300 unless otherwise shown. Refer to Standard Drawing 325-EA.
		Marking Requirements: Refer to "Fittings, Flange and Union Markings" hereinafter.
		Orifice Flanges: ASME B16.36
END OF [STL]		

2. API 5L Stipulations

    a. Where API 5L pipe is specified, the following stipulations shall apply:

        1) Product Specification Level (PSL) 2 and all the related requirements.

        2) The manufacturing process shall be limited to one of the following:

            a) Seamless

            b) Electric Welding with Filler Material:

                i. Submerged-arc single longitudinal (straight) seam weld.

                ii. Gas Metal-arc single longitudinal (straight) seam weld.

            c) Electric Resistance Welding without filler material, single longitudinal (straight) seam weld, with post-weld heat treatment.

        3) No jointer welds allowed.

        4) Certificate of compliance, with test results.

        5) Fracture toughness tests.

        6) Ultrasonic or electromagnetic examination of welds.

        7) Hydrostatic tests.

        8) Marking requirements.

        9) Purchaser inspection at both the pipe manufacturing plant and piping fabrication facility.

        10) Pipe certified as PSL 1 is also acceptable providing all of the requirements for PSL 2 listed in API-5L Appendix J of are proven to be met.

3. Fitting, Flange and Union Markings

    a. All fittings, flanges and unions used in piping connections which include (but are not limited to) flanged, soldered, brazed, threaded, or welded joints, shall be marked to identify the manufacturer, the rating description, materials of construction,

and service limitations per MSS SP-25. Components not stamped with the markings per this requirement will be rejected.

4. Manufactured Fittings

    a. Threaded Outlet: 3000 lb., materials same as pipe. Acceptable products: Grinnell Fig. 1812; Threaded Trans-O-Con, Phoenix Forging Co.; Bonney Forge Thred-O-let; or equal as approved by the Engineer.

    b. Welding Outlet: Standard weight, materials same as pipe. Acceptable products: Grinnell, Fig. 1811; Bonney Forge Weldolet; or equal as approved by the Engineer.

    c. Stub-end flanges and backing rings: Type 304L stainless steel. Acceptable products: Alaskan Copper Works Fig SK38P, or equal as approved by the Engineer.

5. Pipe Specials, 54-inch and larger: In accordance with AWWA C200 and Standard Drawing 7830-GB-1.

6. Pipe Fittings, 6-inch thru 144 inch: In accordance with AWWA C208.

7. Steel plate used in fabricating pipe specials shall be ASTM 283, Grade C and/or ASTM A 1011 or A1018, SS Grades 30, 33 or 36, or ASTM A 36.

2.2 MOTORS (EXISTING)

A. The existing motors were manufacturer in 2003.

1. Below is the motor nameplate data:

    a. Emerson US Motors (now NIDEC)

    b. Horsepower: 60

    c. RPM: 1785

    d. Refer to the attached “Nameplate Data” for additional nameplate data.

2. Additional known motor data includes:

    a. Reed critical frequency: 67-Hz.

b. Mass: 900-lbs

c. C.G.: 14-inches

d. Maximum rotor diameter: 18.75-inches

e. Deflection @ C.G.: 0.0022-inch

f. Refer to the attached NIDEC motor shaft rotor drawing number 0656472 for additional motor shaft data.

3. The pump manufacturer shall obtain any additional information required from the motor manufacturer.

4. See attached “NIDEC 364VPTC14 Motor Data” for additional information on the existing motors.

2.3 FACTORY INSPECTION AND TESTING

A. General:

1. Pump components shall be inspected at the manufacturer’s shop or test facility for manufacturing defects and/or damage during transportation.

2. Each pump shall be tested in accordance with ANSI/HI 14.6-2011 except as modified herein. Tests shall include shop inspection, hydrostatic test of discharge head, column, and bowl assembly, and standard performance test.

3. Dated copies of the most recent calibration curves for all instruments and factory motors used shall be furnished to the Engineer prior to the start of the tests.

4. At its option, the District will witness the shop inspection and performance tests.

B. Hydrostatic Tests: Per ANSI/HI 14.6-2011 and as follows:

1. Tests shall be witnessed by the Engineer.

2. All hydrostatic tests shall be completed prior to application of coatings. All welds shall be visually examined for leakage. No leakage is permitted.

3. For each pump discharge head, column and bowls, the test pressure shall be 130% of the shutoff head pressure that would occur in that part of the pump when the pump is operating at rated speed for a minimum duration of 10 minutes, or the time required to visually inspect all welded and flanged joints, whichever is greater. The shutoff head shall be based upon the maximum allowable shutoff head in the Pump Datasheet include the addition of the system static suction pressure.

C. Performance Tests:

1. Tests shall be witnessed by the Engineer.

2. Each pump shall be tested fully assembled with its own discharge head, column, shaft, and bowl assembly.

3. Each pump shall be tested for performance per ANSI/HI 14.6-2011.

4. Tests may be made in an open sump at the manufacturer's option.

5. Measurement Device Uncertainties at Guaranty Point: in accordance with ANSI/HI 14.6-2011 for Grade 1.

6. A minimum of seven different test points shall be plotted on a head-capacity curve to verify a continuous downward slope with no dips or hollows. The head-capacity curve shall follow the format provided in Appendix H of ANSI/HI 14.6-2011. One test point will be at pump shut-off head and one will be at pump run-out.

7. Power Measurement: per ANSI/HI 14.6.-2011, except that the use of dynamometers or torque gauge measurement devices is prohibited.

8. Test Acceptance Criteria (for each pump assembly):

   a. Pump Test Acceptance Grade at Guaranty Point: as specified hereinbefore under “Pump Design Criteria” including minimum efficiency. Values for flow, head, and efficiency less than what is specified are not acceptable.

   b. Secondary Design Point: meet the pump acceptance tolerances specified hereinbefore under “Pump Design Criteria” for the secondary design points.

c. Pump Power Input: does not exceed the nameplate horsepower at any point on the pump curve.

d. The efficiency calculations shall be carried to within ±0.1%.

9. Tests shall be conducted with a calibrated factory motor. The minimum acceptable pump efficiency at the design point shall be per the Vertical Turbine Pump Data Sheet.

2.4 SHOP FABRICATION

A. Tolerances:

1. Tolerances shall be per PFI Standard ES-3 and as follows:

a. Linear Dimensions (intermediate or overall), including: face-to-face, face-to-end, and end-to-end of straight piping; center-to-end or center-to-face of nozzles and other attachments; or center-to-face of bends. Tolerances are not accumulative.

1) Refer to Figure 1 in PFI ES-3 for illustration.

2) 10-inch and smaller: ± 1/8-inch maximum

3) 12-inch thru 24-inch: ± 3/16-inch maximum

4) 24-inch thru 36-inch: ± ¼-inch maximum

5) Larger than 36-inch: ± ¼-inch plus ± 1/16-inch for each 12-inches over 36-inch.

b. Angularity:

1) Refer to Figure 1 in PFI ES-3 for illustration.

2) Alignment of flange facings or pipe ends shall not deviate by more than 3/64-inch per foot or 1/32-inch total, whichever is greater.

3) End preparation for field buttwelds shall not deviate by more than 1/32-inch per foot across the land for inert gas weld or 3/32-inch for other welds.

4) Rotation of flanges shall be 1/16-inch maximum.

2.5 COATING

A. SURFACE PREPARATION

1. Grind smooth all surface irregularities, welds, and weld spatter.

2. Grind smooth and round all sharp metal edges.

3. Abrasive blast surfaces to white metal in accordance with SSPC-SP 5.

4. Surface anchor profile: 1.5 to 4.0 mils.

5. Oxidation of the steel prior to coating in the form of “blueing” or other apparent oxide formation is not acceptable. If such oxidation occurs, the pipe shall be cooled to ambient temperature and re-cleaned.

6. The heat surface shall not leave a residue or contamination on the pipe surface. Graduated “Tempilstik” crayons shall be used and supplied to the District by the Contractor to measure the temperature. Only a small spot of pipe shall be touched with the “Tempilstik”. Optical pyrometers may be used in addition to, or in lieu of “Tempilstik”. The calibration of the optical pyrometer shall be checked at least twice daily.

B. COATING APPLICATION

1. Preheating, coating application, and post-curing shall be in accordance with the coating manufacturer's instructions and AWWA C213.

2. Dry film thickness of cured coating shall be 12 mils minimum, unless otherwise shown.

3. Coating shall be free of holidays and pinholes.

4. Finished coating shall be well bonded and have no sags and runs.

5. Coating applicator should be regularly engaged in application of similar coatings for at least two years immediately prior to this work, and workers shall be experienced and knowledgeable in preparation for and application of fusion-bonded epoxy coatings.

C. QUALITY CONTROL

1. District may inspect surface preparation and application of the coating system. Provide notification for Engineer to be present for abrasive blasting.

2. The finished coating shall be inspected and tested at the coating plant by the applicator for holidays and for coating thickness. All testing shall be done in the presence of the Engineer.

3. Thickness shall be measured with a non-destructive paint film thickness gauge such as Mikrotest.

4. As directed by the Engineer, test using either a low voltage wet sponge holiday detector or a high voltage holiday detector.

    a. Low voltage wet sponge holiday detector, for coatings to 20 mils dry film thickness, shall be equal as approved by the Engineer to K-D Bird Dog or Tinker-Rasor M-1. Add a non-sudsing wetting agent, such as Eastman Kodak Photo-Flo to the water used to saturate the sponge.

    b. High voltage holiday detector, for coatings more than 20 mils dry film thickness, shall be equal as approved by the Engineer to Tinker-Rasor AP-W or D. E. Stearns Model 14/20. Use in accordance with coating manufacturer's recommendations except use voltage of 125 volts per mil of coating.

5. The finished coating shall have the following physical properties:

    a. Adhesion test: 3,000 psi minimum when pulling the appropriate sized dolly from survace coating to which it has been adhered using a DeFelsko PosiTest Automatic Adhesion Tester Model AT-A, or equal as approved by the Engineer.

6. Any work found deficient shall be repaired and brought to full compliance with these specifications. Retest after coating repairs.

2.6 WELDING

A. GENERAL PROCEDURES

1. Use Shielded Metal Arc Welding (SMAW), Flux Cored Arc Welding (FCAW); Gas Tungsten Arc Welding (TIG); or Gas Metal Arc Welding (Spray or Globular modes only) process unless the Engineer approves another process prior to use.

2. Welds shall be fused with base metal, uniform in appearance, free from cracks and reasonably free from irregularities. Weld toes shall blend smoothly and gradually into the base material

3. Restart in weld zone on clean and sound metal.

4. Limit porosity and slag inclusions in accordance with Section VIII, ASME Boiler & Pressure Vessel Code.

5. Remove defective welds by chipping, grinding, flame gouging, or air-arc gouging and repair by re-welding.

6. No undercut is allowed.

7. Use procedures or welding sequences that will minimize eccentric stresses, shear or distortion in the weld.

8. Butt welds, where authorized, shall have complete penetration and fusion.

9. Finished weld bead shall be central to the seam.

10. Artificial or forced cooling of welded joints is not permitted.

11. Low hydrogen electrode storage shall be in accordance with AWS D1.1 - 5.3.2.1.

12. See District Standard Drawings 323-EA, 324-EA, and 325-EA for welding of flanges.

13. Joining Dissimilar Metals

    a. When joining carbon steel to various stainless steels, the following filler material shall be used unless otherwise called out on the drawings:

        1) Carbon steel to stainless steel: 309L filler material.

2) Carbon steel to type 316 or 316L stainless steel: 309L or 316L filler material.

B. MANUAL WELDING

1. Welding shall be performed in at least two layers and in accordance with approved WPS.

2. Passes shall not exceed 1/4 inch in throat dimension and shall be in accordance with approved WPS.

3. Welds shall be thoroughly cleaned after each pass.

C. QUALITY VERIFICATION

1. Shop Inspection

a. The District will perform inspections and witness tests during all phases of pipe fabrication.

b. Provide notification for Engineer to be present for testing. See Section 01 45 27 for inspection advance notification requirements and District travel expenses.

c. Failure to notify the Engineer to inspect or witness tests at the manufacturer's plant will result in rejection of all materials and items processed.

D. CHARPY V-NOTCH (CVN) TESTING

1. For welding of steel pipe, specials and fittings with a thickness of 0.406-inch and greater, heat input control and CVN testing is required.

a. WPS for shop welding shall be qualified in accordance with ASME Boiler Pressure Vessel Code Section IX and shall include Supplementary Essential Variables.

b. WPS for field welding shall be qualified in accordance with AWS D1.1 – Clause 4, Part B.

c. PQRs shall be qualified for notch tough welding with consideration for thickness of steel, test temperature, and CVN values. Refer to AWS D1.1 - Clause 4, Part D, “Requirements for CVN Testing”.

d. The number of CVN test specimens shall be per AWS D1.1 - 4.36.1, Option A - 3 specimens.

e. As required to be specified by AWS D1.1 - 4.36.6, the CVN test temperature shall be 40-deg F. Other test temperatures shall be proposed for approval by the Engineer.

f. The CVN test requirements for the minimum absorbed energy values, the minimum average percent shear area value, and the minimum average lateral expansion value shall be per AWS D1.1 - Table 4.14.

2.7 FABRICATED PIPE SPECIALS

A. DESIGN REQUIREMENTS

1. Contractor shall design reinforcement for fittings and specials, unless otherwise shown. Design shall be in accordance with AWWA Manual M-11, AWWA C200, AWWA C208, and these specifications.

B. INSPECTION OF FABRICATED FITTINGS AND PIPE SPECIALS

1. District will inspect all phases of pipe fabrication work. Provide notification for Engineer to be present for fabrication. See Section 01 45 27 for inspection advance notification requirements and District travel expenses.

C. FABRICATION

1. Fabricate pipe specials from schedule pipe and plate as shown on the drawings.

2. Stress relief:

   a. Stress relieve all tees and wyes having girder reinforcement plates greater then 1-inch in thickness after complete fabrication.

   b. Stress relieving is required for flanges which have been fabricated from segments of plate. Flanges shall be stress relieved after they are welded to pipe sections and before machining.

3. Conform to ASME Boiler & Pressure Vessel Code, Section VIII, Paragraphs UW-40 and UCS-56 for post-weld heat treatment.

4. Coat flange faces with a rust inhibitor (LPS Laboratories LPS-3 or equal as approved by the Engineer) or other easily removable protective coating.

5. Apply coating and lining as indicated.

6. District will witness the following operations: coating, lining, and hydrostatic tests.

7. Welds not subjected to a shop hydrostatic test shall be examined by NDE as. The NDE method shall be approved by the District. NDE procedures shall be submitted to the District for approval prior to commencement of testing activities.

PART 3 - EXECUTION

3.1 PUMP DELIVERY

A. Notify the Engineer of the scheduled delivery date for the pumps five working days prior to the actual delivery. The Contractor will inspect the pumps in the presence of the Engineer within three days upon delivery to the jobsite. Pumps shall not be installed prior to inspection, but shall be uncrated and ready for examination. Any defects or damage shall be repaired prior to installation.

B. Protection Prior to Installation:

1. All products shall be transported, handled and stored in accordance with the manufacturer's recommendations.

2. All products shall be protected from excessive heat, moisture, and other adverse environmental conditions during storage and handling.

3. All plastic materials shall be stored out of direct sunlight.

4. All materials that will not be installed the same day as delivered to the site shall be stored in the original manufacturer's packaging. Loose items with no original packaging shall be boxed to protect the products from scratches, abrasion, or breakage.

C. Pumps shall be delivered to:

EBMUD Walnut Creek Water Treatment Plant

Attn: Stephen Lackenbauer
2201 Larkey Lane
Walnut Creek, CA 94597

3.2 PUMP INSTALLATION (BY DISTRICT FORCES)

A. Mount and grout the sole plate per the pump manufacturer's instructions. Pump sole plates shall be installed to true horizontally level within 0.015-inch from edge to edge.

B. Install pump and motor from instructions supplied by the pump manufacturer and in accordance with the drawings. Adjustment of the pump impellers, mechanical seal, and startup of the pump shall be completed in the presence of the pump manufacturer's representative. The manufacturer's representative shall complete and submit Certificate of Proper Installation (see Appendix A).

C. Installation of all electrical conduit and mechanical piping shall not interfere with access to the pump coupling and seal access opening(s) on the side(s) of the pump head.

D. Prior to mating up the coupling, the direction of motor rotation shall be confirmed by a "bump test" lasting not more than one second. Direction of the motor rotation shall be compared with the arrow on the pump nameplate.

E. Pump and motor coupling alignment, coupling bolting, adjustment of the pump impeller, installation of the mechanical seal, and startup of the pump shall be done by a millwright, experienced in coupling vertical turbine pumps and motors of the type specified, and under the supervision of the pump manufacturers' representative.

The millwright shall check the following:

1. Motor shaft runout, which shall be 0.002-inches or less. This is measured to assure minimal effect to E.2. Any required correction is the responsibility of the District.

2. With the pump and motor coupled, the total indicated runout (TIR) shall not exceed 0.004-inch or twice the measured motor shaft runout, whichever is greater. Meeting this requirement requires that the motor meets the requirements of E.1.

F. Final coupling alignment readings shall be recorded and signed by District witness and submitted for approval. Final readings shall be included in the O&M Manual.

G. Route the seal flushing piping to the pump suction as shown on the drawings.

H. Route the pump head drain piping to building drain system as shown on the drawings.

I. Install Equipment ID Tags.

3.3 FIELD TESTING

A. General:

1. Field testing data shall be recorded by the Engineer and witnessed by the Manufacturer's Field Representative on the test data forms attached to this Section.

2. Prior to any and all tests, air shall be completely vented from suction piping, pump head, pump seal, discharge piping, and all pipelines.

B. Field Functional Testing:

1. The complete pump normal automatic start-up and shut-down cycle for each unit shall be tested. These tests shall include verification of the proper operation of each pump, motor and VFD unit. VFD unit speed shall be varied from 65% to 100% speed. During these tests the pump shut-off pressure shall be measured and recorded.

2. Complete the testing using the attached "Field Functional Test Data Form," and as directed by the Engineer.

C. Field Performance Testing:

1. Complete the testing using the attached "Vertical Turbine Pump Test Data Form," and as directed by the Engineer.

2. See the Motor Specification for motor performance criteria.

3. Flow: The minimum flow of each pump shall be measured and confirmed to meet the design point(s) given hereinbefore (the discharge valve may be adjusted to obtain head within the indicated range).

4. Shut-off Head: The shut-off head for each pump shall be measured and shall be within 3% of the shut-off head indicated in the final approved factory performance test data for each pump.

5. Pump Efficiency: Calculate the pump efficiencies at each recorded point as shown on the test data form. The calculated field efficiency of each pump shall be within 3% of the required minimum efficiency.

6. Vibration: Vibration levels shall be measured by the Contractor and witnessed by the Engineer for each pump and motor assembly at full flow. Levels shall not exceed 0.14-in/sec velocity peak to peak in either horizontal direction, measured at upper and lower motor bearings. Measurements shall be taken at the motor bearings in directions both parallel and orthogonal to the connected discharge piping. Also, vibration shall be measured at top of pump head or lower motor bearing, and shall not exceed 0.08-in/sec peak to peak velocity (unfiltered). Also, vibration shall be measured at top of the motor in the vertical axis, and shall not exceed 0.08-in/sec peak to peak velocity (unfiltered). In addition, the vibration levels shall not exceed 0.04-in/sec peak to peak velocity at the following bearing frequencies: ball spin (BSF), ball pass inner race (BPFI), ball pass outer race (BPFO) and cage frequency (FTF). If these criteria are not met, then the Contractor shall work with the pump and motor manufacturers to analyze and resolve the issue utilizing field spectral analysis equipment. Any modifications proposed to meet the vibration requirements, e.g. balancing, bearing replacement, etc., are subject to the approval of the Engineer. After modifications are complete, repeat the vibration tests to confirm the above acceptance criteria has been achieved. Submit the results for review. The District will resolve any excessive motor induced vibration. The pump manufacturer shall work with the District to resolve any excessive pump induced vibration.

7. Natural Frequency: A field spectral analysis shall be performed and the natural frequency of each unit shall be measured and recorded.

a. VFD units: vibration readings shall be taken and recorded at 100 rpm increments, from 65% rpm to 100% rpm. There shall be no natural frequencies within 20% of the operating speed range of 65% to 100% rpm for the VFD units.

b. If these criteria are not met, then the Contractor shall work with the pump and motor manufacturers to design and install any pump or motor modifications required to change the unit natural frequency to meet the criteria. Any modifications are subject to the approval of the Engineer prior to fabrication and installation. After modifications are complete, repeat the vibration tests to confirm the above acceptance criteria has been achieved. Submit the results for review.

8. Pump Deflections: Measure maximum pump deflections in three perpendicular plains using digital indicators suitable for accurate readings of at least 0.001-inches. Measurement points shall be consistent with the locations identified in the pump deflection technical submittal. The maximum system deflections shall be less than or equal to the deflections predicted by the pump manufacturer in the technical submittal. Include the recorded deflection values as part of the performance test in the field test results submittal.

D. Field Variable Speed Tests:

1. The Manufacturer's Field Representative shall perform field tests and develop a set of curves for each type of VFD unit.

2. The unit shall be field operated at variable speeds to verify acceptable performance of assembled pump/motor/VFD packages and to develop a set of pump curves to be used for planning of operations and programming of the programmable logic controllers (PLC). For all testing the speed shall be recorded from the VFD package speed indicator.

3. Curves will be developed at 65% rpm, 70% rpm, 80% rpm, 90% and 100% rpm. Each curve shall have five evenly spaced points (head conditions). At 100% rpm, one head condition shall be within 2 percent of the pump primary head condition. The pump discharge valve shall be throttled as necessary to establish the required test discharge head conditions.

4. Head (feet) vs. Flow (gpm): Head shall be measured with the plant suction and discharge pressure transmitters and flow with the plant flow meter. Five evenly spaced points shall be determined for each speed, including shutoff and the primary head condition for 100% rpm.

5. Electric Horsepower vs. Flow (gpm): Based on the measured electric HP. Measured at the same five head conditions. The VFD unit power supply instrumentation shall be used to measure power and flow shall be measured with the plant flow meter.

6. Water Temperature: The water temperature shall be measured during testing with a thermometer in a water bath. Water shall be tapped from a conveniently located vent or drain on the discharge piping. The temperature data shall be used to determine actual water specific gravity (density) of the water during the tests.

7. Calculated Overall Efficiency (%) vs. flow (gpm): Calculated for the conditions given above, using Electric HP, flow, head and motor nominal nameplate efficiencies at the specified load conditions.

3.4 SUPPLEMENTS

A. The following supplements follow END OF SECTION are a part of this Section:

1. The “Vertical Turbine Pump Datasheet”.

2. Vertical Turbine Pumps Technical Submittal Checklist.

3. Field Functional Test Data Form.

4. Vertical Turbine Pump Performance Test Data Form.

END OF SECTION

VERTICAL TURBINE PUMP DATA SHEET
Walnut Creek Water Treatment Plant – Decant Pump

Manufacturer: *	Model #: *

Tag #	Serial #
239-DWS-PMP-001	*
239-DWS-PMP-002	*

Pump Size	*
Pump Type	*
Number of Stages	*
NPSHr (ft-H2O abs) required, as calculated at pump head bottom flange elevation.	*
NPSHa (ft-H2O abs) available, as calculated at pump head bottom flange elevation.	37

Performance Data

Point @ synchronous speed	Flow (gpm) [Required / Proposed]	Total Discharge Head (ft) [Required / Proposed]	Pump Efficiency (%) [Required / Proposed]
Guarantee	1,120 / *	135 / *	81.0 min / *
Secondary Design	1400 / *	105-115 / *	75 / *
Tertiary Design	700 / *	155-170 / *	70 / *
Max. Efficiency	*	*	81.0

Parameter	**Value**
Maximum Brake Horsepower (bhp), at any point [Required: 60 max]	*
Maximum Allowable Shutoff Head (ft-H2O)	*
Thrust at Design Point (lbs)	*
Maximum Thrust including shutoff (lbs)	*
Minimum Pump Speed (rpm) [Required: 1150]	*
Maximum Pump Speed (rpm) [Required: 1800]	*

Required Dimensions

Length of pump bowl assembly (ft) (from face of inlet bell to bottom side of pump base flange)	*
Maximum overall height of the pump & motor assembly (ft) (from bottom of pump base flange to top of motor)	*
Maximum OD of pump bowl assembly including bell & lifting lugs (in)	*
Pump Discharge Nozzle Diameter (in)	8
Minimum pump head wall thickness (in)	0.375
Maximum Allowable Pump Shaft Runout (in)	*
Line-shaft Bearing Spacing (ft) [Required: 48-inch maximum]	*
Pump Weight not including motor (lbs)	*
Guaranteed noise level measured 3.3-ft from the motor (dBA) [Required: 77 dBA max]	
Outline Drawing Number	*

NOTES: * = Pump supplier shall complete all blank data and submit prior to manufacture.

VERTICAL TURBINE PUMPS TECHNICAL SUBMITTAL CHECKLIST

(Manufacturer's Representative to complete one form per submittal)

SPEC. SECTION TITLE & NO:	

SUBMITTAL CONTENT REQUIREMENTS	**Tab/Page Number(s)**
1. List of at least three references (owner names, contact phone numbers, year, location and project name) demonstrating the pump manufacturer meet the experience requirements specified in Article, "Manufacturer's Qualifications"	/
2. EBMUD "Vertical Turbine Pump Data Sheet" with all data fields completed by the manufacturer.	/
3. Catalog Data: Manufacturer's literature for the pumps, motors, VFDs, pump mechanical seals, and spacer coupling.	/
4. Documentation to show ISO 9001:2008 certification or registration of the pump manufacturer.	/
5. Calculations (ref, Submittal Engineering Calculations or Reports for additional requirements)	
a. Motor thrust bearings	/
b. Natural frequency	/
c. Pump stiffness	/
d. Seismic	/
e. Line-shaft critical	/
f. Rotodynamic analysis	/
6. Catalog performance curve of the closed impeller/bowl assembly.	/
7. Predicted Performance Curves: Total Pump Head-Capacity, Brake Horsepower (BHP), Pump Efficiency, Net Positive Suction Head Required (NPSHr), and minimum and maximum allowable flow rates for continuous operation.	/
8. For VFD units, furnish the following:	
a. Multiple curves for various operating speeds, starting at 50% RPM, ending at 100% RPM, at 50 RPM increments for all the performance variables given above in item 7.	/
b. Predicted curves showing pump required torque (foot pounds) vs. running speed (RPM) and expected motor output torque (foot pounds) vs. running speed (RPM). Curves shall be from 50% rpm through 100% RPM. Motor output torques should be based on the power being supplied by the actual VFDs to be furnished.	/
~~9. Maximum Allowable Variation of Surface Flatness for Pump Barrel Flange (high point to low point in thousandths of an inch).~~	NA / NA
10. Mechanical seal model number and catalog information, including recommended seal flushing cooling flow, and discharge to suction, in gpm. Furnish cross sectional drawing of mechanical seal, showing all parts with parts list, materials of construction and part numbers suitable for ordering parts. Include clear description of seal facing materials.	/
11. Certified outline and installation drawings (prints of pump drawings showing):	
a. Weld Map: Cross-section of actual pump head being supplied showing all dimensions with material thickness including weld symbols in accordance with AWS 2.4 illustrating the details of all welded joints	
b. Cross-section view of actual pumps being supplied showing overall dimensions with all parts and all materials by ASTM specification and UNS designation numbers. Wall thickness of all pressure retaining components shall be given.	/
c. Detailed pump cross-section showing:	/

SPEC. SECTION TITLE & NO:	
SUBMITTAL CONTENT REQUIREMENTS	**Tab/Page Number(s)**
i. Overall dimensions, with motor installed.	/
ii. Bearing sizes and tolerances.	/
iii. Shaft sizes and tolerances.	/
iv. Impeller to shaft clearance.	/
v. Impeller to wear ring clearances.	/
12. Recommended spare parts identified.	/
13. If ball or roller bearings are used, provide a statement of the pump bearing frequencies including ball spin (BSF), ball pass inner race (BPFI), ball pass outer race (BPFO) and cage frequency (FTF).	/
~~14. Shop Drawings: prints of pump barrels (see Section 01 33 00 for format requirements)~~	NA / NA
15. Certification of Welders per,Pipe Welding Specs.	/
16. Submit coating information as per Fusion Bonded Epoxy Coating Specifications	/

FIELD FUNCTIONAL TEST DATA FORM

I. Pretest Documentation/Setup

Documents:	Yes	No	NA	Comments:
~~a) Interconnection & Loop diagrams provided.~~	☐	☐	☒	
b) Technical Submittal complete (contractor show EDOCs record).	☐	☐	☐	
~~c) Spare Parts provided.~~	☐	☐	☒	
c) Final O&Ms provided.	☐	☐	☐	
d) All fields on Asset List Spreadsheet completed for device.	☐	☐	☐	
e) Pipe pressure tests completed for adjacent piping.	☐	☐	☐	
f) Confirm piping has been properly flushed.	☐	☐	☐	
g) Verify District approved motor alignment records have been inserted into the O&M manuals.	☐	☐	☐	
~~h) Discharge flow control valve (FCV) functional test completed (FCV Tag#).~~	☐	☐	☒	

Field Test Setup (Identify any test instrument, special setups like tanks, hoses, etc)**:** Amp meter, volt meter, torque wrench, infrared thermometer

II. Field Functional Test

1. Calibration/Loop/Electrical	Yes	No	NA	Comments:
~~1.1 Instrument commissioning complete.~~	☐	☐	☒	
~~1.2 Loop Checks complete.~~	☐	☐	☒	
1.3 Electrical commissioning complete.	☐	☐	☐	

FIELD FUNCTIONAL TEST DATA FORM

	Pass	Fail	NA	Comments:
2. Installation Check (manufacturer's representative shall coordinate these checks and then certify the pump systems are ready for operation)				
2.1 Correct equipment tags have been installed (tags shall match P&IDs)	☐	☐	☐	
~~2.2 Verify Field Calibration Tag for discharge temperature switch (TSH-___) has been properly filled out and installed.~~	☐	☐	☒	
2.3 Complete installation checks for pump and motor listed in the manufacturer's O&M manual.	☐	☐	☐	
2.4 Verify equipment nameplate data matches the O&M manual.	☐	☐	☐	
2.5 Inspect anchorage, mechanical and accessible electrical bolted connections with a torque wrench. Values shall be in compliance with manufacturer's written recommendations.	☐	☐	☐	
2.7 Verify correct lubrication has been installed. Check bearing sumps for oil leaks.	☐	☐	☐	
2.8 Sign and date the Manufacturer's Certificate of Proper Installation. No running tests can proceed prior to receipt of this document.	☐	☐	☐	
3. Operations Check (Will be completed as part of the Control Systems Functional test)	☐	☐	☒	
4. Controls Check (Will be completed as part of the Control Systems Functional test)	☐	☐	☒	
5. Alarms Check (Will be completed as part of the Control Systems Functional test)	☐	☐	☒	

FIELD FUNCTIONAL TEST DATA FORM

6. Run Check

Pass Fail NA

6.1 Run the pump near the design point for a minimum of 1 hour. Adjust the discharge control valve as necessary to achieve the design conditions (____ gpm @ ____ ft). It might be necessary to recirculate the water using the plant surge/relief valve; adjust as necessary. ☐ ☐ ☐

6.2 Record amps and volts at each lead every 15 minutes during the run test.

6.3 Monitor the discharge water temperature throughout the run test and record the value every 15 minutes (may use an infrared thermometer measured at the pump discharge piping. **STOP THE TEST** if the water temperature reaches 95 °F

Start Time: _____ End Time:_____

Time	Volts	Amps	Temp (°F)
Start	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Comments:

Pumps shall operate smoothly and at a consistent sound level without unusual noises throughout the test. The manufacturer's field representative shall account for any unusual vibration and/or noise (including potential bearing noise), and shall stop the test and investigate any abnormalities. If the run test is stopped for any reason, it shall be started again until the pump operates without incident for the full time specified.

7. Other Tests and Checks

Pass Fail NA

Comments:

7.1 District Engineers might monitor vibration, sound, and/or displacement at any time and at any location during the functional test. ☐ ☐ ☐

~~7.2 At the conclusion of the functional test, the Contractor shall follow the manufacturer's instruction for long-term storage. (This might include dewatering the pump suction/discharge lines and the barrel.)~~ ☐ ☐ ☒

FIELD FUNCTIONAL TEST DATA FORM

III. Participants/Witness

Test conducted:

By (signature): _____ Date: _____

Title: _____ Company Name: _____

By (signature): _____ Date: _____

Title: _____ Company Name: _____

EBMUD Witness:

By (signature): _____ Date: _____

Title: _____

Vertical Turbine Pump Performance Test Data Form

PO# _____ Section: 33 12 23.10 Tag: _____ P&ID Drawing: _____ Pumping Plant Name: WCWTP Decant

Date: _____ Time Test Start: _____ Time Test Stop: _____ Nominal Test RPM: _____

Unit No. _____ Pump S/N: _____ Motor S/N: _____ Measured

Pump Design Condition: _____ gpm @ _____ ft. Pump Design Shutoff: _____ Resonant Frequency: _____ Hz

Static Discharge at Start: _____ Static Suction at Start: _____ Motor Nameplate hp: _____

Static Discharge at End: _____ Static Suction at End: _____ Motor Minimum Efficiency: _____ %

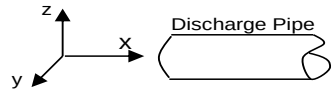
Background Sound dBA: _____ Sound Level dBA measured @: _____ ft. Motor Nominal Efficiency: _____ %

	Manufacturer Representative	Contractor	District Witness
Print			
Signature			

Test Instrument Tags:

Pres.(suction) _____ Pres.(discharge) _____

RPM _____ Flow _____



Condition	Flow (gpm)	RPM	Discharge Pressure (PSIG)	Suction Pressure (PSIG)	Electrical Power (kW or hp)	Motor Guaranteed Efficiency (%)	Overall Efficiency (%)	Pump Efficiency (%)	Sound Level (dBA)	Vibration (in/sec velocity) Motor Sensor Reading Upper Bearing X	Y	Z	Hand Held Upper Bearing X	Y	Z	Hand Held Lower Bearing X	Y
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	

Calculate Overall Efficiency at Design Condition: _____ %

Calculate Pump Efficiency at Design Condition: _____ %

A P P E N D I X A

FORMS AND SCHEDULES

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	
☐	☐	Installed in accordance with Manufacturer's recommendations.
☐	☐	Inspected, checked, and adjusted.
☐	☐	Serviced with proper initial lubricants.
☐	☐	Electrical and mechanical connections meet quality and safety standards.
☐	☐	All system instruments are calibrated.
☐	☐	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)

Operations and Maintenance Manuals

Additional Instructions

1) 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:

2) 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.

    a. Binder Spine Label: Include the system or equipment name as shown on the binder cover along with the specification section number.

    b. Title page including applicable equipment tag numbers and equipment manufacturer's name, address, and telephone number. In addition, provide name, address and telephone number of the local manufacturer's representative.

    c. Table of contents organized and referenced to manual section dividers.

    d. Complete instructions regarding storage, handling, installation, operation, servicing, and maintenance of all equipment involved.

    e. 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.

    f. Detailed description of handling, replacement, and disposal of all fluids and replacement parts.

    g. Copies of Material Safety Data Sheets (MSDS) as required.

    h. 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.

    i. Copies of drawings with all data concerning changes made during construction.

    j. 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.

    k. All field and factory test data.

l. Engineering calculations or reports pertinent to the content of the O&M manual. See Article 2.8 Engineering Calculations or Reports.

m. 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.

n. Materials shall be word-processed.

o. 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.

p. 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.

q. 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.

r. O&M Manual Review Checklist:

    i) 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.

    ii) 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.

s. O&M Manual Review Process

    i) Preliminary O&M Manuals: Submit five (5) copies of the O&M Manuals for review. The District may return all copies of the O&M Manuals to the Contractor along with comments identifying necessary corrections or additions to the manuals. The District reserves the right to keep possession all of the O&M manuals, and have the Contractor arrange to correct the manuals to comply with the reviewer comments.

t. Final O&M Manuals:

i) The manuals shall not be consider final until the submittal has received an "Approved" review status, and the District has possession of all five manuals.

ii) Final O&M manuals shall be submitted and accepted prior to the delivery of the respective equipment or system.

iii) Electronic Files:

1. After the District has approved each O&M Manual, one copy of an electronic version shall be supplied in addition to the required number of hard copies.

2. Electronic files shall be created in both Portable Document Format (PDF) compatible with Adobe Acrobat Version 7.0 and Word format compatible with Microsoft Word 2007 or 2010. The security features of all submitted files shall be disabled so that the District can perform future editing. 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 District. For AutoCAD files, the associated PDF files shall be saved such that all AutoCAD 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 CD +/-R 700 MB CD or DVD +/-R4.7 GB DVD if the file is larger than 700 MB along with the approved O&M manuals.

u. 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.

i) 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.

ii) Information on the form shall be word-processed, or typewritten.

iii) 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.

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

Reference Symbol List symbols used in Item 8 below	Lubricant Description 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 [$] _____

9. MAINTENANCE REQUIREMENTS

Maintenance Task Briefly list each required preventive maintenance activity	Frequency List required frequency of each operation (daily, weekly, monthly, annual, etc)	Task Duration Time needed to complete each task (with units: hours, days, weeks, etc)	Lubricant Refer by symbol to lubricant list (Item 6)	Task Details Location List O&M Manual Tab and page number which provides additional details on the maintenance activity

I, _____ certify that the information on this form is an accurate and complete summary of all typical, routine, and preventive maintenance tasks required to ensure satisfactory performance during warranty period and the overall longevity of the equipment or systems.

_____ _____

(Manufacturer's Representatives Signature) (Date)