

EAST BAY MUNICIPAL UTILITY DISTRICT

REQUEST FOR QUOTATION (RFQ) No. 2210 for FIBERGLASS REINFORCED PLASTIC TANKS FOR AMMONIA STORAGE AT WALNUT CREEK WTP

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

Bids Due
by
1:30 p.m.
on
May 24, 2023

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

**RESPONSE DELIVERED IN-PERSON, BY
COURIER, OR PACKAGE DELIVERY
SERVICE (UPS, FedEx, DHL, etc.)**

**EBMUD—Purchasing Division
375 Eleventh Street, First Floor
Oakland, CA 94607**

RESPONSE DELIVERED BY MAIL (USPS) to:

**EBMUD—Purchasing Division
P.O. Box 24055
Oakland, CA 94623**

EAST BAY MUNICIPAL UTILITY DISTRICT

RFQ No. 2210 for FIBERGLASS REINFORCED PLASTIC TANKS FOR AMMONIA STORAGE AT WALNUT CREEK WTP

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I. STATEMENT OF WORK**A. SCOPE**

It is the intent of these specifications, terms, and conditions to describe the design, fabrication, inspection, and delivery of two (2) custom fiberglass reinforced plastic (FRP) tanks compatible with aqueous ammonia for delivery to the Walnut Creek Water Treatment Plant (WTP) in Walnut Creek, California. The design of the tanks has been completed by the District's subconsultant as part of a separate contract.

In June 2021, one out of two existing plastic aqueous ammonia tank walls buckled due to low pressure in the tank interior. The tank did not leak but was visibly deformed, removed from service, and drained. A second tank is required at Walnut Creek WTP to provide redundant storage for an essential water treatment chemical. The 6,000 gallon tank described in this RFQ will be installed in the same location and concrete pad as failed second plastic ammonia tank. A new 470-gallon scrubber tank to be used to remove ammonia vapor from the tank vent is also required as part of this RFQ. Additional information is provided under the Article C. SPECIFIC REQUIREMENTS of this document and Exhibit E attachments.

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

The terms contractor, fabricator, contractor, and manufacturer are used interchangeably in this RFQ and its attachments and refer to the individual, partnership, joint venture, or corporation with whom the contract is made by the District for the scope of work described in this RFQ and its attachments.

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 manufacturing and providing FRP tanks for industrial and/or municipal end users for at least 5 years. Bidder, bidder's principal, or bidder's staff may be a distributor but (1) must be engaged in the business of tank distribution for more than 5 years and (2) must procure the tank from a manufacturer who has engaged in the construction of FRP tanks for a minimum of 5 years.
- b. Bidder shall be authorized to manufacture and certify ASME RTP-1 Tanks.
- c. Bidder shall possess all permits, licenses, and professional credentials necessary to supply product and perform services as specified under this RFQ.

C. SPECIFIC REQUIREMENTS

The RFQ is written for the intended purchase of one (1) NSF-61 approved 6,000-gallon fiberglass reinforced plastic (FRP) tank suitable for 19% aqueous ammonia chemical storage and service and one (1) scrubber tank to be filled with non-potable water that will scrub or remove ammonia from the venting system. The 6,000 gallon FRP tank must also be compatible with liquid ammonium sulfate. The scrubber tank will contain <19% aqueous ammonia solution. A summary of the aqueous ammonia characteristics is provided in Table 1.

Table 1. Aqueous Ammonia Schedule

Process Fluid:	Aqueous Ammonia (19% NH ₃)
pH:	13
Process Temperature (PT):	65-95 deg F (Average: 77 deg F)
Specific gravity (at PT)	0.920-0.935
Viscosity (at PT):	< 5 cps

The FRP tanks shall conform to all technical specifications in Exhibit E. The 6,000-gallon bulk chemical storage tank must be rated to withstand a minimum of -1 psi gauge pressure and +3 psi gauge pressure.

The following documentation must be included with the submission of the bid:

1. A summary list of the proposed tank design information, including tank weight, capacity, material information, and brief description of fittings.
2. Current lead time for fabrication and delivery.
3. Itemized cost of the tank design and fabrication, delivery, and field services. Services are not subject to sales taxes.
4. A sample cut sheet drawing of an FRP tanks compatible for use with aqueous ammonia as described in Table 1. The sheet must include plan view, elevation view, nozzle and manhole locations, and relevant tank details.
5. See Article 1.5.A in Section 43 41 45 In Exhibit E – Technical Specifications.

The vendor shall provide installation manuals, maintenance manuals, and plan and elevation drawings as part of their submittals. The vendor must also be available for field services, including tank certification. See specification 43 41 45 for a full description of submittal and tank field service requirements.

The tank shall be delivered to Walnut Creek Water Treatment Plant located in 2201 Larkey Lane, Walnut Creek, CA 94597, United States. The selected vendor is required to deliver and offload the tank into a location within the treatment plant specified by the District.

Materials in Contact with Drinking Water.

1. All materials, equipment, or products that will be in contact with drinking water (potable water) shall be tested and certified as meeting the specifications of NSF/ANSI 61 Standard in accordance with California Code of Regulations, Title 22, Section 64591. Examples include, but are not limited to, valves, pumps, flow meters, protective materials (coatings, linings, liners), joining and sealing materials, pipes, tanks, pipe fittings, filters, cleaning chemicals, and lubricants.
2. All materials, equipment, or products that will be in contact with drinking water (potable water) shall be tested and certified as “lead-free” per California Health and Safety Code Section 116875 and NSF 61 Annex G or NSF 372. The FRP tank specified in this bid must be NSF 61 approved.
3. All chemicals that will be in contact with drinking water shall be certified by NSF to NSF/ANSI Standard 60.
4. For materials:
 - a. Documentation which demonstrates current NSF/ANSI Standard 61 certification shall be submitted by the bidder in their bid package.
 - b. If awarded, contractor is responsible for informing the District within 5 days, if and when their certification lapses or expires. Failure to inform the District within the allotted time will be sufficient grounds for immediate termination of the contract.
5. For chemicals:
 - a. Documentation which demonstrates current NSF/ANSI Standard 60 certification shall be submitted by the bidder in their bid package.
 - b. If awarded, contractor is responsible for informing the District, within 5 days, if and when their certification lapses or expires. Failure to inform the District within the allotted time will be sufficient grounds for immediate termination of the contract.

D. DELIVERABLES / REPORTS

1. Equipment
 - a. One (1) 6,000 gallon fiberglass reinforced plastic tank for aqueous ammonia service that is compliant with all requirements set forth in this RFQ and its Exhibits.
 - b. One (1) 470 gallon fiberglass reinforced plastic tank for non-potable water with <19% aqueous ammonia service that is compliant with all requirements set forth in this RFQ and its Exhibits.
2. Submittals
 - a. See Exhibit E, Specification Section 01 33 00 - Submittal Procedures and Section 43 41 45 – Fiberglass Reinforced Plastic Tanks.
 - b. Liquidated Damages will apply to Submittals, see Section III., I. “Liquidated Damages”.
 - c. Revisions to submittals must be re-submitted to the District within ten (10) business days or less of receipt of submittal review comments from the District.
3. Equipment Storage, Transport and Delivery
 - a. Equipment must be delivered within four months of the Notice to Proceed issuance from the District.
 - b. Equipment must be delivered to the District’s Walnut Creek Water Treatment Plant located at 2201 Larkey Lane, Walnut Creek, CA 94597, United States. After inspection and verification of the equipment by District upon delivery by Contractor, Contractor shall off-load the equipment in a manner to avoid soiling or damage in a location directed by the District or its representative.
 - c. Delivery shall be coordinated with the District or its representative a minimum of 5 workdays in advance of delivery. Schedule deliveries only between the hours of 7:00 a.m. to 3:00 p.m. Monday through Friday. No deliveries will be accepted on Saturdays, Sundays, or District Holidays. Contact Walnut Creek WTP staff at (925) 943-6601 to schedule delivery.
 - d. During storage and transport, equipment shall be protected from the elements in covered storage, protected from moisture and dust, and in a manner that protects flanges and valve interiors.

- e. Equipment shall be shipped in containers that can be accessed at the ship-to location for inspection of shipping damage to equipment. Contractor shall provide access to the crate interior for inspection by the District.
- f. Contractor shall be present at the time of inspection and shall facilitate the inspection as requested by the District.
- g. Contractor shall allocate minimum of 6 hours of onsite from time of delivery for inspection assistance.
- h. Once the inspection is complete, Contractor shall remove any debris from shipping that is not needed for the storage of the tank.

E. INSPECTION

Contractor must comply with inspection requirements described in Section 01 45 27 – Shop Inspection and Section 43 41 45 Fiberglass Reinforced Plastic Tanks in Exhibit E.

All materials furnished and Work completed under the contract is subject to inspection by the Engineer. The Engineer's inspections are solely for the District's benefit and do not constitute acceptance of any of the Contractor's work or waiver of the requirement that the Contractor's work conform to the requirements of the Contract Documents. The Contractor shall furnish, without extra charge, all necessary test pieces and samples, including facilities and labor for obtaining those pieces, as requested by the Engineer. The Engineer will have safe access to the work site or shop where the work, material or equipment subject to inspection is being performed or manufactured or where any off-site work is being performed, including shops, sites, and assembly facilities of Subcontractors and Suppliers.

All material, equipment or Work that does not conform to the Contract Documents is non-conforming work and will be rejected regardless of whether it may have been inspected by the Engineer or its representative. Installation of unapproved materials and equipment is non-conforming work until the materials or equipment are approved by the Engineer. Deficiency Notices may be issued by the Engineer to advise the Contractor of non-conforming work. However, lack of a Deficiency Notice shall not waive the Contractor's obligation to correct any and all non-conforming work, patent or latent, through the expiration of the warranty period, or other such longer period as specified in the Contract Documents.

Within 10 working days after receipt of a Deficiency Notice, the Contractor shall submit its proposal and schedule for correcting all non-conforming work. The District may withhold 150% of the installed value identified or such reasonable costs as determined by the Engineer until the non-conforming work is completed in accordance with the requirements of the Contract Documents. Additional costs for engineering, observation,

administrative, clerical or other work associated with or resulting from the Contractor's failure to perform its work in conformance with the Contract Documents shall be borne solely by the Contractor, and the Engineer may elect to deduct the District's additional costs from any future payments to the Contractor. If the Contractor refuses or neglects to replace the non-conforming work, the District may correct or replace the non-conforming work at the Contractor's expense. The District's expenses in correcting any non-conforming work will be calculated as fully burdened costs for labor, plus actual costs for materials and equipment, plus a 15% markup on materials and equipment.

Work completed without the Engineer's inspection and approval may be required to be reconstructed or replaced upon the Engineer's inspection. Work covered without prior approval of the Engineer may be required to be uncovered to the extent necessary for the Engineer to determine if the covered Work is satisfactory. The entire cost of replacing or uncovering and re-covering the Work, including the cost of materials furnished by the District, shall be borne by the Contractor, whether or not the Work uncovered or replaced is found to be defective.

The District reserves the right-of-access to the Contractor's facility to verify conformance to this specification.

SHOP INSPECTION:

The Engineer will witness the following tests described in Exhibit E. If any part of the FRP tank is found not to comply with the specifications, the FRP tank will not be accepted until the deficiencies are corrected in a manner satisfactory to the District.

Provide notification for Engineer to be present for testing. See Section 43 41 45 – Fiberglass Reinforced Plastic Tanks and Section 01 45 27 – Shop Inspection in Exhibit E for inspection advance notification requirements, travel restrictions, nondisclosure agreements, and District travel expenses reimbursement.

Failure by the Engineer to inspect or witness tests at the manufacturer's plant shall not be construed as waiving inspection upon delivery.

The District will inspect material during fabrication and 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.

In the case that an item or lot is rejected, District Inspectors will provide the Contractor and the EBMUD Purchasing Division with an Inspectors Job Report which will itemize the product deficiencies and required corrective action.

F. FAILURE TO MEET SPECIFICATIONS

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

II. CALENDAR OF EVENTS

EVENT	DATE/LOCATION
RFQ Issued	April 11, 2023
Deadline For Submission of Questions	April 20, 2023
Response Due	May 24, 2023 by 1:30 p.m. At this time all bids will be opened publicly in the EBMUD Board Room at 375 Eleventh St., Oakland, CA 94607*
Anticipated Contract Start Date	June 30, 2023

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

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

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

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

III. DISTRICT PROCEDURES, TERMS, AND CONDITIONS

A. RFQ ACCEPTANCE AND AWARD

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

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

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

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

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

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

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

RFQ responses based on equivalent products must:

1. Use Exhibit A "Exceptions, Clarification and Amendments" to clearly describe the alternate offered and indicate specifically how it differs from the product specified in this RFQ.
2. Include complete descriptive literature and/or specifications as proof that the proposed alternate will be equal to or better than the product named in this RFQ.

C. PRICING

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

D. NOTICE OF INTENT TO AWARD AND PROTESTS

At the conclusion of the RFQ response evaluation process, all entities who submitted a bid package will be notified in writing by e-mail or USPS mail with the name of the Bidder being recommended for contract award. The document providing this notification is the Notice of Intent to Award.

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

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

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

Protests must be mailed, hand delivered, or emailed to the Manager of Purchasing, Mailstop 102, East Bay Municipal Utility District, 375 Eleventh Street, Oakland, CA 94607 or P.O. Box 24055, Oakland, California 94623. Facsimile and electronic mail protests must be followed by a mailed or hand delivered identical copy of the protest and must arrive within the seven workday 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 workdays from the date which the protest determination was transmitted by the District, to the protesting party. The appeal shall focus on the points raised in the original protest, and no new points shall be raised in the appeal.

Such an appeal must be made in writing and must include all grounds for the appeal and copies of the original protest and the District's response. The bid protester must also send the Purchasing Division a copy of all materials sent to the Department Director. The Department Director will make a determination of the appeal and respond to the protester by certified mail in a timely manner. If the appeal is denied, the letter will include the date, time, and location of the Board of Directors meeting at which staff will 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. Individual order price quotations shall be provided upon request per project and shall include, but not be limited to, an identifying (quotation) number, date, requestor name and phone number, ship to location, itemization of products and/or services with complete description (including model numbers, fabric and finish grade, description, color, etc.) and price per item, and a summary of total cost for product, services, shipping, and tax.
3. POs and payments for products and/or services will be issued only in the name of Contractor.
4. Any and all change orders shall be in writing and agreed upon, in advance, by Contractor and the District.

F. TERM / TERMINATION

1. The term of the contract, which may be awarded pursuant to this RFQ, will be approximately one (1) year.

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

G. WARRANTY

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

H. INVOICING

1. Following the Districts acceptance of product(s) meeting all specified requirements, and/or the complete and satisfactory performance of services, the District will render payment within thirty (30) days of receipt of a correct invoice.
2. The District shall notify Contractor of any invoice adjustments required.
3. Invoices shall contain, at a minimum, District purchase order number, invoice number, remit to address, and itemized products and/or services description.
4. The District will pay Contractor in an amount not to exceed the total amount quoted in the RFQ response.

I. LIQUIDATED DAMAGES

1. A deduction for liquidated damages of \$100/day will be assessed from the required equipment submittal time frame defined in Section 01 33 00 – Submittal Procedures and 43 41 45 - Fiberglass Reinforced Plastic Tanks until the actual submittal date.
2. A deduction for liquidated damages of \$200/day will be assessed from the required delivery milestone as agreed upon by the District and winning bidder during the contract award, until the delivery and District acceptance of the scope of supply. The delivery milestone is not subject to adjustment for compensable, excusable, or inexcusable delay. Contractor shall provide sufficient personnel and resources to ensure timely completion before the deadline.
3. It being impracticable or extremely difficult to fix the actual damage, the amount set forth above is hereby agreed upon as liquidated damages and will be deducted from any money due under the agreement arising from this RFQ.
4. In the event performance and/or deliverables have been deemed unsatisfactory, the District reserves the right to withhold future payments until the performance and/or deliverables are deemed satisfactory.

IV. RFQ RESPONSE SUBMITTAL INSTRUCTIONS AND INFORMATION

A. DISTRICT CONTACTS

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

TECHNICAL SPECIFICATIONS:

Attn: Chloe Cheok, Associate Civil Engineer

EBMUD-Design Division/Engineering Department
E-Mail: chloe.cheok@ebmud.com
PHONE: (510) 287-0300

CONTRACT EQUITY PROGRAM:
Attn: Contract Equity Office
PHONE: (510) 287-0114
E-Mail: contract.equity@ebmud.com

AFTER AWARD:
Attn: Chloe Cheok, Associate Civil Engineer
EBMUD-Design Division/Engineering Department
E-Mail: chloe.cheok@ebmud.com
PHONE: (510) 287-0300

B. SUBMITTAL OF RFQ RESPONSE

1. Responses must be submitted in accordance with Exhibit A – RFQ Response Packet, including all additional documentation stated in the “Required Documentation and Submittals” section of Exhibit A.
2. Late and/or unsealed responses will not be accepted.
3. RFQ responses submitted via electronic transmissions will not be accepted. Electronic transmissions include faxed RFQ responses or those sent by electronic mail (“e-mail”).
4. All RFQ responses must be SEALED and received by 1:30 p.m. on the due date specified in the Calendar of Events. Any RFQ response received after that time/date, or at a place other than the stated addresses, cannot be considered and will be returned to the bidder unopened. The EBMUD mailroom and Purchasing Division timestamp shall be considered the official timepiece for the purpose of establishing the actual receipt of RFQ responses.
5. RFQ responses are to be addressed/delivered as follows:

Mailed (USPS):

East Bay Municipal Utility District
FIBERGLASS REINFORCED PLASTIC TANKS FOR AMMONIA STORAGE AT
WALNUT CREEK WTP
RFQ No. 2210
EBMUD–Purchasing Division
P.O. Box 24055
Oakland, CA 94623

Hand Delivered, delivered by courier or package delivery service (UPS, FedEx, DHL, etc.):

East Bay Municipal Utility District
FIBERGLASS REINFORCED PLASTIC TANKS FOR AMMONIA STORAGE AT
WALNUT CREEK WTP
RFQ No. 2210
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.

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.
11. 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. 2210 – FIBERGLASS REINFORCED PLASTIC TANKS
FOR AMMONIA STORAGE AT WALNUT CREEK WTP

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

From: _____
(Official Name of Bidder)

RFQ RESPONSE PACKET GUIDELINES

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



BIDDER INFORMATION AND ACCEPTANCE

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

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

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

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

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

Street Address Line 1: _____

Street Address Line 2: _____

City: _____ State: _____ Zip Code: _____

Webpage: _____

Type of Entity / Organizational Structure (check one):

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

Jurisdiction of Organization Structure: _____

Date of Organization Structure: _____

Federal Tax Identification Number: _____

Department of Industrial Relations (DIR) Registration Number: _____

Primary Contact Information:

Name / Title: _____

Telephone Number: _____ Fax Number: _____

E-mail Address: _____

Street Address Line 1: _____

City: _____ State: _____ Zip Code: _____

SIGNATURE: _____

Name and Title of Signer (printed): _____

Dated this _____ day of _____ 20_____



BID FORM(S)

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

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

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

Description	Unit of Measure	Estimated Quantity	Unit Cost	Extended Cost
6,000-gallon fiberglass reinforced plastic tank suitable for 19% aqueous ammonia as specified within, inclusive of submittals, and fabrication.	Each	1	\$	\$
470-gallon fiberglass reinforced plastic tank suitable for non-potable water and <19% aqueous ammonia as specified within, inclusive of submittals, and fabrication.	Each	1	\$	\$
Delivery	Total	1	\$	\$
Field Services	Total	Per RFQ/Spec	\$	\$
TOTAL COST				\$



REQUIRED DOCUMENTATION AND SUBMITTALS

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

1. **Description of the Proposed Equipment/System:** RFQ response shall include a description of the proposed equipment/system, as it will be finally configured during the term of the contract. The description shall specify how the proposed equipment/system will meet or exceed the requirements of the District and shall explain any advantages that this proposed equipment/system would have over other possible equipment/systems. The description shall include any disadvantages or limitations that the District should be aware of in evaluating the RFQ response. Finally, the description shall describe all product warranties provided by bidder. Contractor is also responsible for providing the requested information under Section C. Specific Requirements of this RFP.
2. **Sustainability Statement:** Contractors shall submit a statement regarding any sustainable or environmental initiatives or practices that they or their suppliers engage in. This information can be in relation to the specific products procured under this RFQ or in relation to the manufacture, delivery, or office practices of your firm.

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

- a. Has your firm taken steps to enhance its ability to assess, track and address issues regarding Greenhouse Gas (GHG) Emissions in answer to recent legislations such as the [Buy Clean California Act](#)? If so, please attach any data you can on the embedded greenhouse gas emissions in the production and transport of the products and/or services which will be provided via this RFQ. If this is not available, please describe the approach you plan to take in order to gather and report this information in the future. For further information in this topic, please see: <http://www.ghgprotocol.org/scope-3-technical-calculation-guidance>
3. **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.**

4. **Contract Equity Program:**

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



REFERENCES
RFQ No. 2210– FIBERGLASS REINFORCED PLASTIC TANKS
FOR AMMONIA STORAGE AT WALNUT CREEK WTP

Bidder Name: _____

Bidder must provide a minimum of three (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. 2210 – FIBERGLASS REINFORCED PLASTIC TANKS FOR AMMONIA STORAGE AT WALNUT CREEK WTP

Bidder Name: _____

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

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

*Print additional pages as necessary



CONTRACT EQUITY PROGRAM & EQUAL EMPLOYMENT OPPORTUNITY

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

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

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

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

Please include the required completed forms with your bid.

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

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

The CEP guidelines and forms can 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 email contract.equity@ebmud.com or call (510) 287-0114.



EXHIBIT B

INSURANCE REQUIREMENTS

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

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

The following provisions are applicable to all required insurance:

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

- I. Unless otherwise accepted by the DISTRICT, all required insurance must be placed with insurers with a current A.M. Best's rating of no less than A- V.
- J. CONTRACTOR shall defend the DISTRICT and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier.
- K. For any coverage that is provided on a claims-made coverage form (which type of form is permitted only where specified) the retroactive date must be shown and must be before the date of this Agreement, and before the beginning of any Services related to this Agreement.
- L. Insurance must be maintained, and updated Verification of Insurance be provided to the DISTRICT before the expiration of insurance by having CONTRACTOR's insurance broker or agent update, sign and return Exhibit B to the DISTRICT's contract manager. For all claims-made policies the updated Verification of Insurance must be provided to the DISTRICT for at least three (3) years after expiration of this Agreement.
- M. If claims-made coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the effective date of this Agreement or the start of any Services related to this Agreement, CONTRACTOR must purchase an extended reporting period for a minimum of three (3) years after expiration of the Agreement.
- N. If requested by the DISTRICT, a copy of the policies' claims reporting requirement must be submitted to the DISTRICT for review.
- O. Where additional insured coverage is required, the additional insured coverage shall be "primary and non-contributory," and will not seek contribution from the DISTRICT's insurance or self-insurance.
- P. CONTRACTOR agrees to provide immediate Notice to the DISTRICT of any loss or claim against CONTRACTOR arising out of, pertaining to, or in any way relating to this Agreement, or Services performed under this Agreement. The DISTRICT assumes no obligation or liability by such Notice but has the right (but not the duty) to monitor the handling of any such claim or claims if they are likely to involve the DISTRICT.
- Q. CONTRACTOR agrees, upon request by the DISTRICT, to provide complete, certified copies of any policies and endorsements within 10 days of such request (copies of policies may be redacted to eliminate premium details.)
- R. It is CONTRACTOR's responsibility to ensure its compliance with the insurance requirements. Any actual or alleged failure on the part of the DISTRICT to obtain proof of insurance required under this Agreement shall not in any way be construed to be a waiver of any right or remedy of the DISTRICT, in this or any regard.
- S. Notice of Cancellation/Non-Renewal/Material Reduction The insurance requirements hereunder are mandatory, and the DISTRICT may, at its sole and absolute discretion, terminate the services provided by CONTRACTOR, should CONTRACTOR breach its obligations to maintain the required coverage and limits set forth in this Agreement. No coverage required hereunder shall be cancelled, non-renewed or materially reduced in coverage or limits without the DISTRICT being provided at least thirty (30) days prior written notice, other than cancellation for the non-payment of premiums, in which event the DISTRICT shall be provided ten (10) days prior written notice. Replacement of coverage with another policy or insurer, without any lapse in coverage or any reduction of the stated requirements does not require notice beyond

submission to the DISTRICT of an updated Verification of Insurance which shall be met by having the CONTRACTOR's insurance broker or agent update, sign and return this EXHIBIT B.

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

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

INSURANCE VERIFICATION DOCUMENTS

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

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

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

Self-Insured Retention Amount: \$ _____

Policy Limit: \$ _____

Policy Number: _____

Policy Period: from: _____ to: _____

Insurance Carrier Name: _____

Insurance Broker or Agent: Print Name: _____

Insurance Broker or Agent's Signature: _____

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

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

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

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

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

Verification of Commercial General Liability (CGL) Insurance Coverage

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

Self-Insured: Amount: \$_____

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

Policy Number: _____

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

Insurance Carrier Name: _____

Insurance Broker or Agent: Print Name: _____

Insurance Broker or Agent's Signature: _____

III. Business Auto Liability Insurance Coverage

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

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

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

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

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

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

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

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

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

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

Verification of Business Auto Liability Insurance Coverage

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

Self-Insured: Amount: \$ _____

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

Policy Number: _____

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

Insurance Carrier Name: _____

Insurance Broker or Agent: Print Name: _____

Insurance Broker or Agent's Signature: _____

IV. Excess and/or Umbrella Liability Insurance Coverage

- A. CONTRACTOR's insurance shall be primary, and any insurance or self-insurance procured or maintained by the DISTRICT shall not be required to contribute to it.
- B. The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the CONTRACTOR.
- C. Minimum Requirements: It is expressly understood by the parties that CONTRACTOR's Excess and/or Umbrella Liability policies shall, at minimum, comply with all insurance requirements set forth within this Agreement.
 - 1. Coverage for Products, Completed Operations, and Ongoing Operations must be included in the insurance policies and shall not contain any "prior work" coverage limitation or exclusion applicable to any Services performed under this Agreement and, if it is a claims-made policy, it must be maintained for a minimum of three (3) years following final completion of the Services.
 - 2. Coverage shall be included for all premises and operations in any way related to this Agreement.
 - 3. There will be no exclusion for explosions, collapse, or underground damage (XCU).
 - 4. Insurance policies and Additional Insured Endorsements shall not exclude coverage for liability and damages from services performed by Subcontractor on CONTRACTOR's behalf.
 - 5. Contractual liability coverage shall be included and shall not limit, by any modification or endorsement, coverage for liabilities assumed by CONTRACTOR under this Agreement as an "insured contract."
 - 6. "Independent CONTRACTOR's Liability" shall not limit coverage for liability and/or damage arising out of, pertaining to, or in any way related to Services provided under this Agreement.
 - 7. To the fullest extent permitted by law, the DISTRICT, its directors, officers, officials, agents, volunteers, and employees must be covered as Additional Insureds on a primary and noncontributory basis on all excess and umbrella policies. The Additional Insureds must be covered for liability arising in whole or in part from any premises, Products, Ongoing Operations, and Completed Operations by or on behalf of CONTRACTOR, in any way related to Services performed under this Agreement.

8. A severability of interest provision must apply for all the Additional Insureds, ensuring that the CONTRACTOR's insurance shall apply separately to each insured against whom a claim is made, or suit is brought, except with respect to the policy's limits.
 9. CONTRACTOR and its excess and/or umbrella Liability insurance coverage must waive any rights of subrogation against the DISTRICT, its directors, officers, officials, employees, agents, and volunteers, and CONTRACTOR shall defend and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier(s).
- D. CONTRACTOR shall defend and pay any damages as a result of failure to provide the waiver of subrogation from the insurance carrier(s).

Verification of Excess and/or Umbrella Liability Insurance Coverage

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

Self-Insured: Amount: \$_____

Policy Number: _____

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

Insurance Carrier Name: _____

Insurance Broker or Agent: Print Name: _____

Insurance Broker or Agent's Signature: _____

EXHIBIT C

GENERAL REQUIREMENTS

Effective: June 9, 2021
Supersedes: September 1, 2021

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1. DEFINITIONS

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

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

Change Order is a Change Order signed by the District. An executed Change Order is a Change Order signed by both the District and the Contractor.

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

2. BOND

- a. When required in the District's bid or proposal solicitation documents, the Contractor to whom award is made shall furnish a good and approved faithful performance bond and/or payment bond within ten business days after receiving the forms for execution.
- b. The bonds shall be executed by a sufficient, admitted surety insurer (i.e.: as listed on website [http://interactive.web.insurance.ca.gov/webuser/idb_co_list\\$.startup](http://interactive.web.insurance.ca.gov/webuser/idb_co_list$.startup)) admitted to transact such business in California by the California Department of Insurance. After acceptance of the bond(s) by the District, a copy of the bond(s) will be returned to the Contractor.
- c. If, during the continuance of the Contract, any of the sureties, in the opinion of the District, are or become irresponsible, the District may require other or additional sureties, which the Contractor shall furnish to the satisfaction of the District within ten days after notice. If the Contractor fails to provide satisfactory sureties within the ten-day period, the Contract may be terminated for cause under Article 18.

3. CONTRACTOR'S FINANCIAL OBLIGATION

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

4. SAMPLES OR SPECIMENS

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

5. MATERIAL AND WORKMANSHIP

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

6. DEFECTIVE WORK

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

7. WARRANTY

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

8. NOT USED

9. SAFETY AND ACCIDENT PREVENTION

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

10. CHARACTER OF WORKFORCE

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

11. PREVAILING WAGES & DIR REGISTRATION

- a. Please see www.dir.ca.gov for further information regarding the below.
- b. All Contractors and Subcontractors of any tier bidding on, or offering to perform work on a public works project shall first be registered with the State Department of Industrial Relations (DIR) pursuant to Section 1725.5 of the Labor Code. No bid will be accepted nor any contract entered into without proof of the Contractor and Subcontractors' current registration with the DIR (LC § 1771.1).
- c. All public works projects awarded after January 1, 2015, are subject to compliance monitoring and enforcement by the DIR (LC § 1771.4) and all Contractors are required to post job site notices, "as prescribed by regulation" (LC § 1771.4).
- d. To the extent applicable, pursuant to Section 1773 of the Labor Code, the District has obtained from the Director of Industrial Relations of the State of California, the general prevailing rates of per diem wages and the general prevailing rates for holiday and overtime work in the locality in which the Work is to be performed, for each craft, classification, or type of worker needed to execute the contract. Pursuant to Section 1773.2 of the Labor Code, a copy of the prevailing wage rates is on file with the District and available for inspection by any interested party at www.dir.ca.gov.
- e. The holidays upon which such rates shall be paid shall be all holidays recognized in the collective bargaining agreement applicable to the particular craft, classification, or type of worker employed on the Work.
- f. The Contractor shall post a copy of the general prevailing rate of per diem wages at the jobsite pursuant to Section 1773.2 of the Labor Code.
- g. Pursuant to Section 1774 of the Labor Code, the Contractor and any of its Subcontractors shall not pay less than the specified prevailing rate of wages to all workers employed in the execution of the contract.
- h. As set forth with more specificity in Section 1773.1 of the Labor Code, "per diem" wages include employer payments for health and welfare, pension, vacation, travel, subsistence and, in certain instances, apprenticeship or other training programs, and shall be paid at the rate and in the amount spelled out in the pertinent prevailing wage determinations issued by the Director of Industrial Relations.
- i. The Contractor shall, as a penalty to the State or the District, forfeit not more than the maximum set forth in Section 1775 of the Labor Code for each calendar day, or portion thereof, for each worker paid less than the prevailing rates for the work or craft in which the worker is employed under the contract by the Contractor or by any Subcontractor under him. The difference between the prevailing wage rates and the amount paid to

each worker for each calendar day or portion thereof for which such worker was paid less than the stipulated prevailing wage rate shall be paid to such worker by the Contractor.

- j. The specified wage rates are minimum rates only and the District will not consider and shall not be liable for any claims for additional compensation made by the Contractor because of its payment of any wage rate in excess of the general prevailing rates. All disputes in regard to the payment of wages in excess of those specified herein shall be adjusted by the Contractor at its own expense.
- k. General prevailing wage determinations have expiration dates with either a single asterisk or a double asterisk. Pursuant to California Code of Regulations, Title 8, Section 16204, the single asterisk means that the general prevailing wage determination shall be in effect for the specified contract duration. The double asterisk means that the predetermined wage modification shall be paid after the expiration date. No adjustment in the Contract Sum will be made for the Contractor's payment of these predetermined wage modifications.

12. PAYROLL RECORDS & ELECTRONIC SUBMISSION

If prevailing wages apply, Contractor and each Subcontractor, as appropriate, shall comply with the following:

- a. Contractor and each Subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed in connection with the Work. The payroll records shall be certified and shall be available for inspection in accordance with the provisions of Section 1776 of the Labor Code. Certified payroll records shall be on the forms provided by the DIR or contain the same information required on the Department's form.
- b. The Contractor shall submit for each week in which any contract Work is performed a copy of all payroll records to the Project Manager. The Contractor shall be responsible for submission of copies of payroll records of all Subcontractors.
- c. The Contractor or Subcontractor shall certify the payroll records as shown on the DIR form. In addition, the records shall be accompanied by a statement signed by the Contractor or Subcontractor certifying that the classifications truly reflect the Work performed and that the wage rates are not less than those required to be paid.
- d. For public works projects awarded on or after April 1, 2015, or that are still ongoing after April 1, 2016, no matter when awarded, each Contractor and Subcontractor shall furnish the certified payroll related records as more specifically described above and in Labor Code section 1776 directly to the Labor Commissioner (see LC § 1771.4). These records shall be provided to the Labor Commissioner at least monthly or more frequently if required by the terms of the Contract. For exception on projects covered by collective bargaining agreements like a PLA, please see Labor Code section 1771.4.

- e. In the event of noncompliance with the requirements of Section 1776 of the Labor Code, the Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects such Contractor must comply with said Section. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1776 of the Labor Code for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due.
- f. The Contractor and every Subcontractor shall post at the workplace and comply with all required wage related workplace postings. Copies of the required postings may be downloaded or ordered electronically from the Department of Industrial Relations website at <http://www.dir.ca.gov/wpnodb.html>.

13. HOURS OF LABOR

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

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

14. EMPLOYMENT OF APPRENTICES

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

15. CHANGES

- a. Changes in the Work can only be made in writing signed by an authorized employee of the District. If the change causes an increase or decrease in the contract sum, or a change in the time for performance under the Contract, an adjustment may be made as determined by the Project Manager.
- b. The District reserves the right to make changes in the design of materials, equipment, or machinery, to make alterations or additions to or deviations or subtractions from the Contract and any specifications and drawings, to increase or decrease the required quantity of any item or portion of the Work or to omit any item or portion of the Work, as may be deemed by the Project Manager to be necessary or advisable and to order such extra work as may be determined by the Project Manager to be required for the proper execution and completion of the whole Work contemplated. Any such changes will be ordered in writing by the Project Manager. The determination of the Project Manager on all questions relating to changes, including extra work, shall be conclusive and binding.
- c. Prior to issuing an amendment or change to the Contract, the Project Manager may request that the Contractor submit a proposal covering the changes. Within 10 business days of receiving the request, the Contractor shall submit its proposal to the Project Manager of all costs associated with the proposed amendment or change and any request for an extension of Contract time. Contractor's proposal shall include detailed estimates with cost breakdowns, including labor, material, equipment, overhead, and profit. Labor shall be broken down into hours and rate per hour. If applicable, the proposal shall include a breakdown for off-site labor (including factory labor, engineering, etc.). The Contractor's proposal shall include an analysis of schedule impact when the Contractor is requesting an adjustment in contract time. The Contractor shall be responsible for any delay associated with its failure to submit its change proposal within the time specified. If the Project Manager decides not to issue an amendment or change after requesting a proposal from the Contractor, the Contractor will be notified in writing. The Contractor is not entitled to reimbursement for Change Order preparation costs if the Contractor's proposal is not accepted by the Project Manager.
- d. If the Contractor agrees with the terms and conditions of the approved Change Order, the Contractor shall indicate its acceptance by signing the original copy and returning it to the Project Manager within 10 Work Days after receipt or with reasonable promptness and in such sequence as to not delay the Work or activities of the District or of separate contractors, whichever is sooner. If notice of any change is required to be given to a surety by the provisions of any bond, the Contractor shall provide notice and the amount of each applicable bond shall be adjusted separately. Payment in

accordance with the terms and conditions set forth in the executed Change Order shall constitute full compensation for all Work included in the Change Order and the District will be released from any and all claims for direct, indirect, and impact expenses and additional time impact resulting from the Work. If the Contractor disagrees with the terms and conditions of the approved Change Order, the Contractor shall indicate specific areas of disagreement and return the approved Change Order to the Project Manager with a detailed written dispute. No payment will be made on the disputed work until the approved Change Order is returned to the Project Manager. However, whether or not the Contractor agrees with the terms and conditions of an approved Change Order, the Contractor shall immediately revise its sequence of operations as required to facilitate timely completion of the changed work and shall proceed with the revised work sequence.

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

16. EFFECT OF EXTENSIONS OF TIME

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

17. DELAYS

- a. The Contractor shall take reasonable precautions to foresee and prevent delays to the Work. When the Contractor foresees a delay event, and upon the occurrence of a delay event, the Contractor shall immediately notify the Project Manager of the probability or the actual occurrence of a delay, and its cause. With respect to all delays (compensable, excusable or inexcusable), the Contractor shall reschedule the Work and revise its operations, to the extent possible, to mitigate the effects of the delay. Within 15 days from the beginning of a delay the Contractor shall provide the Project Manager with a detailed written description of the delay, its cause, its impact and the Contractor's mitigation plans. Failure to provide the notification required above waives the Contractor's right to any additional time or compensation resulting from the delay for whatever cause. The Project Manager will investigate the facts and ascertain the extent of the delay, and the Project Manager's findings thereon shall be final and conclusive, except in the case of gross error. An extension of time must be approved by the Project Manager to be effective, but an extension of time, whether with or without consent of

the sureties, shall not release the sureties from their obligations, which shall remain in full force until the discharge of the contract.

- b. For inexcusable delays (delays caused by circumstances within the Contractor's control, the control of its subcontractors or supplies of any tier, or within the scope of the Contractor's contract responsibilities) the Contractor shall not be entitled to an extension of time or additional compensation for any loss, cost, damage, expense or liability resulting directly or indirectly from the inexcusable delay.
- c. For excusable delays (delays to completion of the Work within the time limits set forth in the Contract Documents directly caused by events beyond the control of both the Contractor and the District, which delay is not concurrent with an inexcusable delay and which could not have been avoided by the Contractor through reasonable mitigation measures the Project Manager will grant the Contractor an extension of time in an amount equal to the period of Excusable Delay based on the analysis of schedule impact and delay analysis diagram, which shall be the Contractor's sole and exclusive remedy for such delay. Excusable Delays shall include labor strikes, adverse weather as defined in Article 8.5, and Acts of God.
- d. For compensable delays (delays to completion of the Work within the time limits set forth in the Contract Documents that could not be avoided by Contractor mitigation, caused directly and solely by the District or by causes within the exclusive control of the District, and which were not concurrent with any other type of delay) the Project Manager will grant the Contractor an extension of the time to perform under the Contract and compensation in an amount that represents the Contractor's actual direct costs incurred as a direct result of the compensable delay. The Contractor may recover its direct costs only and may not recover (and waives) all other types of indirect, consequential, special and incidental damages.
- e. For concurrent delays (two or more independent causes of delay directly preventing the Contractor from completing the Work within the time limits set forth in the Contract Documents where the delays occur at the same time during all or a portion of the delay period being considered, and where each of the delays would have caused delay to the

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

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

18. TERMINATION

a. Termination by the District for Cause:

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

8. The Contractor abandons the Work. Abandonment is conclusively presumed when the District requests a written plan to cure a default and the Contractor does not submit the plan within five business days of the District's request.

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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

Contractor expressly agrees to defend, indemnify, and hold harmless 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’, subconsultants’, or other agents’ negligent acts, errors or omissions, or willful misconduct, in the operation and/or performance under this Agreement.

22. PROHIBITION OF ASSIGNMENT

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

23. NEWS RELEASES

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

24. SEVERABILITY

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

25. COVENANT AGAINST GRATUITIES

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

26. RIGHTS AND REMEDIES OF THE DISTRICT

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

27. WAIVER OF RIGHTS

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

28. CONFIDENTIALITY

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



EXHIBIT D

IRAN CONTRACTING ACT CERTIFICATION

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

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

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

CERTIFICATION FOR PARAGRAPH 1:

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

Firm: _____

By: _____ Date: _____
(Signature of Bidder)

Title: _____

Signed at: _____ County, State of: _____

OR

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

EXHIBIT E
TECHNICAL SPECIFICATIONS
AND DRAWINGS

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. The requirements of this section apply to all submittals in the Contract Documents.
2. Submit samples, drawings, and data for the Engineer's review which demonstrate fully that the construction, and the materials and equipment to be furnished will comply with the provisions and intent of this Specification. All submittals shall be written in Standard American English and all numerical data, whether in drawings, test reports, engineering calculations, manufacturer's literature, or maintenance manuals, shall be in United States Customary System (USCS) measuring units (foot, pound, gallons, etc). If original design work was completed in metric units, their equivalent USCS dimension and unit shall be indicated. All submittals, in printed or electronic format, shall be original quality and completely legible. Any obfuscation or loss of clarity of original which may result in ambiguous interpretation is not acceptable.
3. Specific items to be covered by the submittals shall include, as a minimum, the following:
 - a. For structures, submit all shop, setting, equipment, miscellaneous iron and reinforcement drawings and schedules necessary.
 - b. For pipelines, submit a detailed layout of the pipeline with details of bends and fabricated specials and furnish any other details necessary. Show location of shop and field welds.
 - c. For equipment which requires electrical service, submit detailed information to show power supply requirements, wiring diagrams, control and protection schematics, shop test data, operation and maintenance procedures, outline drawings, and manufacturer's recommendation of the interface/interlock among the equipment.
 - d. For mechanical equipment submit all data pertinent to the installation and maintenance of the equipment including shop drawings, manufacturer's recommended installation procedure, detailed installation drawings, test data and curves, maintenance manuals, and other details necessary.
 - e. Substitutions

4. Additional submittals required: See pertinent sections of this specification.
5. Submit a Schedule of Submittals including monthly updates.
6. For mechanical or electrical equipment that require submittals: provide separate submittals for each piece of equipment to be installed at each site. Title the submittals to denote which site the equipment pertains to.

B. Related sections:

1. Section 01 61 00 – Common Product Requirements
2. Section 43 41 45 – Fiberglass Reinforced Plastic Tanks

1.2 PRODUCT HANDLING

- A. Submittals shall be accompanied by a cover page and shall be in strict accordance with the provisions of this section.
- B. Submit priority of processing when appropriate.
- C. Proposals for “or equal” substitutions made prior to bid opening, pursuant to PCC Section 3400 (see Paragraph 2.4.B), shall be delivered after coordinating the delivery with the District. Contractor shall coordinate with the District’s Purchasing Division at the following telephone numbers: (510) 287-1253, or (510) 287-2017.

1.3 SUBMITTALS

- A. Submittals shall include the following information:
 1. A copy of the applicable section(s), with addendum updates included as appropriate, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
 2. A check mark shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer is the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications.
- B. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

- C. Any deviation from the contract documents not specifically requested and clearly identified, although accepted through oversight, may be rejected at any stage of the Work. The Contractor shall, at its own expense, reconstruct all work affected by the later rejection of a contract deviation that was not specifically called out and explained for review and acceptance by the District as detailed above.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

A. Scale required:

1. Make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.

B. Type of prints required:

1. Make all shop drawing prints in blue or black line on white background. Reproductions of District drawings are not acceptable.

C. Size of drawings required:

1. The overall dimensions of each drawing submitted to the Engineer shall be equal to one of the District's standard sheet sizes as listed below. The title block shall be located in the lower right hand corner of each drawing and shall be clear of all linework, dimensions, details, and notes.

Sheet Sizes
Height x Width

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

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

2.2 COLORS

A. General:

1. Unless the precise color and pattern are specified elsewhere, submit accurate color charts and pattern charts to the Engineer for his review and selection whenever a choice of color or pattern is available in a specified product. Label each chart naming the source, the proposed location of use on the project, and the project.

2.3 MANUFACTURERS' LITERATURE

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

2.4 SUBSTITUTIONS

- A. Engineer's approval required:
 - 1. The contract is based on the materials, equipment, and methods described in the Contract Documents. Any Contractor-proposed substitutions are subject to the Engineer's approval.
 - 2. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data, and all other information required by the Engineer to evaluate the proposed substitution.
 - 3. Where substitutions are proposed for consideration, Contractor shall submit a written request for the substitution and shall show that it is equal to the specified item. The proposed substitution shall be identified separately and included with the required submittal for the item. When submitting a variation or substitution the Contractor warrants that:
 - a. The contract has been reviewed to establish that the substitution, when incorporated, will be compatible with other elements of work.
 - b. The Contractor shall perform all necessary work for making substitutions workable and shall bear any additional cost necessary because of the proposed substitution.
 - 4. Substitutions not specifically requested, although accepted through oversight, may be rejected at any stage of the work. The Contractor shall, at its own expense, reconstruct all work affected by the later rejection of a substitution that was not specifically requested.
- B. Trade names and "or equal as approved by the Engineer" provision:
 - 1. For proposals for "or equal" substitutions made prior to bid opening as permitted pursuant to PCC Section 3400: Materials, products, services or equipment specified or designated in the Contract Documents are intended to indicate the measure of quality and utility. Unless the Contract Documents

specifically state that there are no substitutions, the Contractor may submit other brands of the specified product provided that the submitted product is of equal or better quality, possesses the required characteristics for the purpose intended and shall not involve additional cost to the District. By proposing a substitute, the Contractor warrants that it is equal to that specified and takes complete responsibility for any errors, omissions, conflicts, all modifications to existing piping, ductwork or electrical connections, or inconsistencies caused by using the substitute, including any additional costs of engineering or inspection, or necessary coordination with connections to make the substitute perform as specified. All submittals shall receive written approval from the Engineer prior to installation.

2. Pursuant to Section 3400 of the Public Contract Code, where a material, product, thing, or service has been designated by specific brand or trade name, and where such designation is not followed by the words, “no substitutions,” bidders may propose to substitute the designated material, product, thing or service with another of equal quality and which possesses the required characteristics for the purpose intended. It is not the intent of the prequalification process for bidders to submit all of their proposed “or equal” products during the bid period; however, any proposed substitution of a designated material, product, thing or service which if rejected, would affect the bidder’s bid amount, shall be submitted for District consideration during the bid period.

a. The bidder shall comply with the following:

1. Proposals for “or equal” substitutions, requested during the bidding period, shall be furnished in writing to:

Purchasing Division, Contract Supervisor (MS #102)
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055

Proposals shall be received by the District no later than 14 calendar days prior to the date of initial bid opening. Proposals shall be identified as described in Section 01 33 00 – Submittal Procedures, and submitted in the quantities specified. Outside of mailing envelope shall be marked “Submittal Request for Substitution, RFQ No. 2210.”

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

will be the sole judge as to such matters. If the substitution is accepted, bidders will be notified by addenda.

3. If a proposal for an “or equal” substitution is deemed incomplete by the District, the substitution may not be accepted prior to bid opening, but may be revised and resubmitted after the Notice to Proceed as a submittal pursuant to Section 01 33 00 - Submittal Procedures.

2.5 OPERATIONS AND MAINTENANCE MANUALS

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

9. Copies of all guarantees and warranties issued including the start and end dates for the warranty period or conditions for the initial start date and the duration
 10. Copies of drawings with all data concerning changes made during construction
 11. Copies of calculations or reports appropriately prepared including sketches, given or known information with the source of the data, equations with each variable defined and applicable units, cross-references, code/standard references, annotations and footnotes
 12. All field and factory test data
 13. Engineering calculations or reports pertinent to the content of the O&M manual. See Article 2.6 Engineering Calculations or Reports.
 14. Provide a separate section with tab divider for documents developed in the field after the O&M manual has been accepted. These documents include, but not limited to the following: manufacturer's certificate of proper installation, field test results, etc.
- D. Materials shall be word-processed.
- E. For mechanical or electrical equipment that require O&M manuals: provide separate O&M manuals for each piece of equipment installed at each site. Title the O&M manuals to denote which site the equipment pertains to.
- F. Manufacturer's literature shall be originals, or original quality copies. Specifically identify all equipment models and features being provided. Delete or cross out any extra information provided in standard manufacturer's literature that does not apply to the equipment furnished.
- G. Operating and Testing Procedures, and Diagrams: All manufacturers' standard procedures shall be customized or rewritten as necessary to accurately describe the system as it is installed and operated for the project. Procedures shall include District device tag numbers (as shown on the P&IDs) whenever available. All diagrams illustrating the system shall be customized to show installed conditions, and shall include District device tag numbers whenever available.
- H. Three-hole punch shall not obliterate any information. Reduce original material as necessary to provide a suitable margin for three-hole punching or provide three-hole punched clear plastic pockets for inserting single sheet material.
- I. O&M Manual Review Checklist:
1. The manufacturer's representative shall fill out a minimum of one O&M Manual Review Checklist form per submittal (See Appendix A) and include a copy in each submitted manual. Provide more than one checklist when specified in the technical specification sections. Clearly identify the location in the O&M Manual for each element in the Technical Content section (O&M tab

number and page number). If the content is in multiple locations or on multiple pages, identify each location in the space provided or in the Comments column on the form.

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

J. O&M Manual Review Process

1. Preliminary O&M Manuals: Submit preliminary O&M manuals as searchable Portable Document Format (PDF) via email. The District will return the submittals to the Contractor along with comments identifying necessary corrections or additions to the manuals. The District reserves the right to keep possession of all O&M manuals, and have the Contractor arrange to correct the manuals to comply with the reviewer comments.
 - a. Preliminary O&M manuals shall be submitted and accepted prior to the delivery of the respective equipment or system.
2. Final O&M Manuals:
 - a. The manuals shall not be considered final until the submittal has received a review status of "No Exceptions Taken"..
 - 1) Submit the Final O&M Manuals per the requirements of Paragraph 2.5.C.
 - 2) Submit requested number of Final O&M Manual hard copies as shown in Table 1 at the end of this section.
 - 3) Final O&M manuals shall be submitted and accepted prior to RFS milestone.

K. Electronic Files:

1. After the District has accepted each O&M Manual, two copies of an electronic version shall be supplied in addition to the required number of hard copies.
2. Electronic files shall be created in both searchable Portable Document Format (PDF) compatible with Adobe Acrobat version XI and Word format compatible with Microsoft Word 2010 or later. The security features (e.g. password protection) of all submitted files shall be disabled so that the District can perform future editing without restriction. Custom-developed drawings included in the O&M manuals (i.e. loop diagrams, system interconnection diagrams, etc.) shall also be submitted electronically in both PDF and the native CAD file format for future editing of the drawings by the Engineer. For CAD files, the associated PDF files shall be saved such that all CAD layering is preserved in the PDF file.

3. Electronic versions shall match the hard copy page for page with blank pages deleted. Electronic files shall be converted to PDF directly rather than using optical scanning. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide searching capability in the document.
4. All electronic files shall be submitted to the Engineer via email.

L. Maintenance Summary Forms

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

A. AS-BUILT DRAWINGS Record as-built shop and vendor drawings shall be created as described below:

1. Submit record as-built shop and vendor drawings to document any and all design work developed for this project by the Contractor, subcontractors, equipment manufacturer's, vendors, or suppliers.
2. Create record as-built shop drawings utilizing MicroStation or AutoCAD software. Drawings shall be sized 22-inch by 34-inch. Other drawing sizes are not acceptable. Manually drafted shop drawings in pencil or ink are not acceptable.
 - a. Provide one set of record as-built shop drawings in addition to the number and type of shop drawings specified in "SUBMITTAL QUANTITIES" below.
 - b. Record as-built shop drawings shall also be submitted via email, see Section 01 31 23.10, in:

- 1) MicroStation or AutoCAD format and
- 2) Searchable PDF (compatible with Adobe Acrobat version XI or later).
3. Text size used on drawings shall have a minimum height of 1/10 inch, if computer generated or typed, and 1/8" if printed by hand.
4. Drawings shall contain a 2-1/2" wide by 3/4" high blank box for the District's use, which shall be placed directly against the margin at the bottom right corner of the drawing.
5. Drawings shall also contain the manufacturer's title block at the bottom right side in a boxed area with a maximum size of 8" wide by 4" high. The manufacturer's title block shall contain the manufacturer's name, address, and telephone number, the name of the project as it appears on the cover of the project specifications, the District specification number, a descriptive title for the drawing, the date the drawing was approved, the total number of drawings included in the set of drawings, and the manufacturer's drawing number.

2.6 ENGINEERING CALCULATIONS OR REPORTS

- A. Engineering calculations/reports required by this specification shall be based on well-established engineering theories and principles. Each calculation/report shall be a complete and independent package.
- B. The calculations/reports shall be comprehensive for each structure or item, in that all calculations/reports are contained within the individual structure or item's calculation/report document (i.e., no calculation/report references to other calculation documents).
- C. Presentation format shall be similar to that described in Article 2.5 – Operations and Maintenance Manuals. As a minimum, all calculations/reports shall be bound in an appropriately labeled binder, and contain the following elements:
 1. Facility title, including substructure number, equipment description, applicable equipment tag number(s), and applicable specification section.
 2. Table of Contents
 3. Introduction, including description of structure or item, purpose of calculation/report, design assumptions with justification, software utilized for the analysis including the version, and codes/standards used
 4. A list of references used to provide the bases for assumptions, equations, or data used in the calculation/report
 5. Calculations or reports appropriately prepared, including sketches, given or known information with the source of the data, equations with each variable

defined and applicable units, cross-references, code/standard references, annotations and footnotes

6. Results shall be clearly identified. Summary tables shall be used for large amounts of data (especially if a software application is used). Results must be accompanied by a brief explanation of the design implications of the calculated value and where in the final design was this number utilized. Any safety factors must clearly be noted with a brief explanation why that factor is appropriate for this application.
 7. Final design details, ready for transmittal to design drawings or shop drawings
 8. Professional Engineer's Seal or signature, as appropriate, of the individual(s) who prepared the calculations/reports
 9. Appendices, including input and output files from computer design, and photocopies of catalog sheets for any special material or equipment (e.g., manufacturer sheet for equipment, ICBO reports for anchors, etc.), and checker markups
- D. When any part of the calculation/report has been prepared by computer software, a copy of the input and output files shall be included as part of the final design calculation.
- E. Shop drawings shall not be submitted until all design calculations/reports have been appropriately reviewed, checked and signed. The checker markups and comments shall also be included in an appendix to each calculation.

2.7 SUBMITTAL QUANTITIES

- A. Submit four (4) copies of all hard-copy (printed) items as identified herein unless specified otherwise.
- B. Submit one (1) electronic copy of the scanned data and drawings in searchable PDF (compatible with Adobe Acrobat version XI). Submit scanned copy via email.
- C. Submit three (3) of each sample, unless specified otherwise.
- D. Submit five (5) copies of each manual unless specified otherwise.
- E. Submit quantity specified of materials submitted to the EBMUD Materials Testing Laboratory.

2.8 ELECTRONIC SUBMITTALS

- A. Provide electronic submittals in searchable PDF (compatible with Adobe Acrobat version XI). All portions of the electronic submittals shall be legible and shall be in full color identical to the original material. Provide manufacturer's literature in original electronic file, if available.

- B. Provide one electronic submittal file for each submittal except as noted hereinafter. The electronic submittal file name shall use the following format: submittal number – specification section number - description (e.g.: “001.1-01 33 00-Coating of Widgets”). Providing multiple electronic files for a single submittal (except as noted hereinafter) is not acceptable. The Contractor shall merge multiple files into a single electronic file.
- C. For larger submittals containing multiple volumes, submit one electronic file for each hardcopy volume and each electronic submittal file name shall include the corresponding hard copy volume number (e.g. “001.1-01 33 00-Coating of Widgets – Volume 3”).
- D. Upon acceptance of the electronic submittal (marked as “No Exceptions Taken”, “Make Corrections Noted”, or “Acknowledged Receipt”), submit three (3) hardcopy sets of the submittal. The hardcopies shall be edited with highlighting, addressing/incorporating District review comments. A revised electronic file shall accompany the hardcopy submission, and shall match the hard copy submittal page for page including cover transmittal forms, title pages, and blank pages.
- E. Exceptions requiring hardcopy material initially, are:
 - 1. O&M processing, per Article 2.5
 - 2. When hardcopy material is originally in a form larger than 11” x 17”; the material shall not only be included in the electronic submittal, but shall also be submitted in hardcopy form along with the original electronic submittal required in Paragraphs A and B above. Seven (7) submittal copies of the large materials shall be provided unless otherwise specified.
- F. The Contractor is solely responsible for verifying that the hardcopy submittal and accompanying electronic submittal are identical and address/incorporate prior Engineer review comments.
- G. All portions of the electronic submittals shall be provided with text searching capabilities whenever possible. For any document not already in electronic format, the documents shall be scanned using optical character recognition to provide text searching capability in the document.
- H. Electronic files shall be submitted to the Engineer via email.
 - 1. Submittals and Requests for Information (RFIs) shall be linked to at least one drawing that provides the most relevant details regarding the subject equipment, material, item, or work. Submittals and RFIs received without at least one linked drawing or with a linked drawing that is not relevant will be Returned Without Review.

2.9 REVIEW CHECKLISTS

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

PART 3 - EXECUTION

3.1 GENERAL

- A. All submittals must be submitted electronically. In the event a paper copy is requested, prepare and use a transmittal form for submittals that includes the following information:
 - 1. *Project name and specification number
 - 2. *Date of submittal
 - 3. **To: Design Division, MS #502
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055
ATTN: Chloe Cheok

Or

If and only if, this submittal is a proposal for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400 (see Paragraph 2.4.B), use the following address (envelope shall be marked: “Submittal Request for Substitution, RFQ No. 2210”

“To: Purchasing Division, Contract Supervisor, MS #102
East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623-1055

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

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

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

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated into RFQ No. 2210, is in compliance with the Contract drawings and specifications, can be installed in the allocated spaces, and is submitted for District (record/review).

Certified by _____ Date _____ "

3.2 SCHEDULE OF SUBMITTALS

- A. Submit initial Schedule of Submittals within 10 days after Notice to Proceed.
- B. Submit revised Schedule of Submittals within 10 days after date of request from the Engineer. Engineer will review Schedule of Submittals and will notify Contractor that schedule is acceptable or not acceptable within 10 days after receipt.
- C. The Schedule of Submittals shall identify Contractor “or equal” substitution proposals made prior to bid opening, which have been accepted by the Engineer.

3.3 COORDINATION OF SUBMITTALS

A. General:

- 1. Prior to submittal for Engineer's review, use all means necessary to fully coordinate all material, including the following procedures:
 - a. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.
 - b. Coordinate as required with all trades and with all public agencies involved.
 - c. Secure all necessary approvals from agencies having jurisdiction and signify with agency stamp, or other means, that approvals have been secured.
 - d. Clearly indicate all deviations from the Contract Documents.

B. Grouping of submittals:

- 1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.

C. Resubmittals:

- 1. The Contractor shall include a Comment and Response sheet with each resubmittal. The Comment and Response sheet shall be the first item after the submittal transmittal form. The Comment and Response sheet shall include each review comment (word for word) from the previous submittal cycle, followed by the Contractor’s response clarifying how the comment has been addressed in the resubmittal. All responses shall at a minimum have a general description of what new information in the resubmittal addresses the review comment; and where in the resubmittal this new information can be located (tab number, page number, etc).

2. Resubmittals that do not comply with the requirements set forth in subparagraph C.1 above will be returned to the Contractor without review. The Contractor shall resubmit with an appropriate Comment and Response sheet as specified herein.

3.4 TIMING OF SUBMITTALS

- A. Article 3.4 – Timing of Submittals, is not applicable for proposals for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400 (Paragraph 2.4.B).
- B. General:
 1. Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery. See Specification 43 41 45 – Fiberglass Reinforced Plastic Tanks, Article 1.5 for required fabrication submittals.
 2. In scheduling, unless otherwise noted, allow at least twenty (20) work days for the Engineer's review, plus the transit time to and from the District office.
 3. For proposals for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400, see Paragraph 2.4.B.

3.5 REVIEW BY ENGINEER

- A. Acceptance of each submittal by the Engineer will be general only and shall not be construed as:
 1. Permitting any departures from the contract requirements.
 2. Relieving the Contractor of the responsibility for any errors and omissions in details, dimensions, or of other nature that may exist.
 3. Approving departures from additional details or instructions previously furnished by the Engineer.
- B. Submittals (excluding manuals and as-built drawings) will be returned to the Contractor marked "No Exceptions Taken", "Make Corrections Noted", "Revise and Resubmit", "Acknowledged Receipt", or “Rejected”, except that in some cases, all copies of a submittal may be returned to the Contractor marked "Returned Without Review". See Paragraph 3.5 .E for proposals for “or equal” substitutions made prior to bid opening pursuant to PCC Section 3400.
 1. "No Exceptions Taken" indicates that item covered by the submittal may proceed provided it complies with requirements of the specifications. Final acceptance will depend upon that compliance.

2. "Make Corrections Noted" indicates that item covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the specifications. Final acceptance will depend on that compliance.
 3. "Revise and Resubmit" indicates that the Contractor shall not proceed with any phase of the item covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations and requirements of the specifications.
 4. "Acknowledged Receipt" indicates that the item is required to be submitted to the Engineer primarily for information or record purposes, and is not subject to Engineer's review.
 5. "Returned Without Review" indicates that the submittal was not reviewed by the Engineer due to the submittal being incomplete, illegible, inadequate, or otherwise failing to conform to the requirements of the specification. Contractor shall prepare a new submittal for this item.
 6. "Rejected" indicates that the submittal proposes an action of which the Engineer does not approve, makes an assertion with which the Engineer disagrees, appears to show intent to violate the terms of the Contract, or is otherwise objectionable to the Engineer and is returned to the Contractor with prejudice.
- C. Resubmit revised drawings or data as indicated unless otherwise specified.
- D. Work requiring the Engineer's review and acceptance shall not begin until the submittals for that work have been returned as "No Exceptions Taken" or "Make Corrections Noted".
- E. Proposals for "or equal" substitutions made prior to bid opening pursuant to PCC Section 3400 (see Paragraph 2.4.B) will be evaluated by the Engineer, and if accepted, bidders will be notified by addenda.

3.6 CHANGES TO ACCEPTED SUBMITTALS

- A. A resubmittal is required for any proposed change to a submittal that has been marked "No Exceptions Taken" or "Make Corrections Noted". Changes which require resubmittal include, but are not limited to, drawing revisions, changes in materials and equipment, changes to installation procedures and test data. All resubmittals shall include an explanation of the necessity for the change.
- B. Minor corrections to an accepted submittal may be accomplished by submitting a "Corrected Copy".

3.7 O&M MANUAL SUMMARY LIST

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

Table 1: O&M Manual Summary (Additional O&M manuals might be required in other Sections)		Number of Hard Copy(ies) to Print
Section	System / Equipment, or Facility	
43 41 45	Fiberglass Reinforced Plastic Tanks	2

END OF SECTION

SECTION 01 43 11

SEISMIC QUALIFICATION AND CERTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

- A. All products to be furnished under this contract shall be designed, constructed, and installed in conformance with the seismic requirements contained in the California Building Code (CBC) as modified below and in the related sections.
- B. Related Sections:
 - 1. Section 01 33 00 – Submittal Procedures
 - 2. Section 01 81 02 – Seismic Design Criteria
 - 3. Section 05 50 00 – Metal Fabrications

1.2 STRUCTURAL INTEGRITY AND ANCHORAGE

- A. Structural integrity of the equipment shall be certified by calculations that demonstrate the adequacy of the equipment housing for seismic forces. These calculations may be based on principles of structural analysis and engineering mechanics, or based on approved shake table tests
- B. Provide electrical and mechanical equipment and other non-structural components with proper anchorage to the supporting structures designed to resist seismic forces as specified in Section 01 81 02.
 - 1. Provide anchors as specified in Section 05 50 00 for fastening to concrete.

1.3 PROOF OF COMPLIANCE

- A. For equipment installed in sites or structures designated as seismic design category C, D, E or F, prepare and submit the following:
 - 1. Statement of seismic qualification, or special seismic certification:
 - a. “Statement of Seismic Qualification:” Provide manufacturer’s statement that the equipment satisfies the seismic design requirements of the California Building Code including the requirements of ASCE 7, Chapter 13.
 - 1) Contractor shall submit for review and approval test data and/or calculations certified by a Civil or Structural Engineer registered in

the State of California to show compliance with the requirements of Article 1.2.

- b. “Special Seismic Certification:” Provide manufacturer’s certification of compliance when subjected to shake table testing, including both operability and containment of hazardous materials as appropriate for the unit being tested. The certification shall be prepared in accordance with:

ICC-ES AC 156 This equipment shall meet the “Post-Test Functional Compliance Verification” requirements for “Components with $I_p=1.5$.”

- 2. Substantiating test data: With seismic qualification and special seismic certification statements, submit results of testing in accordance with applicable standards.
- B. Exemptions: A “statement of seismic qualification” and a “special seismic certification” are not required for the following equipment:
- 1. Temporary or moveable equipment.
 - 2. Equipment anchored to the structure and having a total weight of 20 pounds or less.
 - 3. Distribution equipment anchored to the structure and having a total unit weight of 5 pounds per linear foot, or less.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 45 27

SHOP INSPECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes:

1. Provide the District's Plant Inspection Section with advanced notification for Short Term (three consecutive weeks or less at one facility), and Long Term (more than three consecutive weeks at one facility) inspection assignments, and reimburse the District for travel expenses described in this Section.
 - a. All materials furnished and Work completed under the contract is subject to inspection by the Engineer. The Engineer's inspections are solely for the District's benefit and do not constitute acceptance of any of the Contractor's work or waiver of the requirement that the Contractor's work conform to the requirements of the Contract Documents. The Contractor shall furnish, without extra charge, all necessary test pieces and samples, including facilities and labor for obtaining those pieces, as requested by the Engineer. The Engineer will have safe access to the work site or shop where the work, material or equipment subject to inspection is being performed or manufactured or where any off-site work is being performed, including shops, sites, and assembly facilities of Subcontractors and Suppliers.
 - b. All material, equipment or Work that does not conform to the Contract Documents is non-conforming work and will be rejected regardless of whether it may have been inspected by the Engineer or its representative. Installation of unapproved materials and equipment is non-conforming work until the materials or equipment are approved by the Engineer. Deficiency Notices may be issued by the Engineer to advise the Contractor of non-conforming work. However, lack of a Deficiency Notice shall not waive the Contractor's obligation to correct any and all non-conforming work, patent or latent, through the expiration of the warranty period, or other such longer period as specified in the Contract Documents.
 - c. Within 10 Work Days after receipt of a Deficiency Notice, the Contractor shall submit its proposal and schedule for correcting all non-conforming work. The District may withhold 150% of the installed value identified or such reasonable costs as determined

by the Engineer until the non-conforming work is completed in accordance with the requirements of the Contract Documents. Additional costs for engineering, observation, administrative, clerical or other work associated with or resulting from the Contractor's failure to perform its work in conformance with the Contract Documents shall be borne solely by the Contractor, and the Engineer may elect to deduct the District's additional costs from any future payments to the Contractor. If the Contractor refuses or neglects to replace the non-conforming work, the District may correct or replace the non-conforming work at the Contractor's expense. The District's expenses in correcting any non-conforming work will be calculated as fully burdened costs for labor, plus actual costs for materials and equipment, plus a 15% markup on materials and equipment.

2. Work completed without the Engineer's inspection and approval may be required to be reconstructed or replaced upon the Engineer's inspection. Work covered without prior approval of the Engineer may be required to be uncovered to the extent necessary for the Engineer to determine if the covered Work is satisfactory. The entire cost of replacing or uncovering and re-covering the Work, including the cost of materials furnished by the District, shall be borne by the Contractor, whether or not the Work uncovered or replaced is found to be defective. 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 (<https://travel.state.gov/content/passports/en/alertswarnings.html>) for "Travel Advisories" to countries and regions to determine the safety of international travel. Areas with travel advisories shall not be considered for procurement of items that require District inspection.

G. Confidentiality or Non-Disclosure Agreements

1. Facilities that require execution of a Confidentiality or Nondisclosure Agreement (NDA) shall submit a copy of the agreement for review to the District through the submittal process for the project or purchase agreement prior to requesting District inspection. The NDA will be considered an agreement between the District (not individual inspectors) and the requesting company. The requirements of the California Public Records Act shall supersede the terms of any NDA and language to that effect will be included in the NDA by the District.

1.3 TRAVEL EXPENSES

- A. The Contractor shall include in the bid price all travel expenses for the Engineer to conduct the witness inspections noted if any of the inspections are to be performed at a locality exceeding 125 miles one way from Oakland, CA.
- B. Travel expenses include hotel lodging at an establishment rated three diamond or better by American Automobile Association (AAA), or comparable listing, and a minimum \$74 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 all phases of manufacturing and testing 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
43 41 45	Fiberglass Reinforced Plastic Tanks

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 61 00

COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish all materials needed to complete the work required under the terms of this contract, except those materials specified to be furnished by the District.
- B. The Contractor shall submit satisfactory evidence of compliance with the specifications of such materials to be furnished and used in the work as the Engineer may require. Materials incorporated in the work and not specifically covered in the specifications shall be the best of their kind.
 - 1. **Materials and Workmanship.** All materials and equipment incorporated into the Work shall be new, unexpired, of good quality, and of current manufacture unless otherwise specified. All materials shall be of the specified quality and equal to approved samples, if samples were required.
 - 2. **Substitution of Materials or Equipment.** Materials, products, services or equipment specified or designated in the Contract Documents are intended to indicate the measure of quality and utility. Unless the Contract Documents specifically state that there are no substitutions, the Contractor may submit other brands of the specified product provided that the submitted product is of equal or better quality, possesses the required characteristics for the purpose intended and shall not involve additional cost to the District. By proposing a substitute, the Contractor warrants that it is equal to that specified and takes complete responsibility for any errors, omissions, conflicts, all modifications to existing piping, ductwork or electrical connections, or inconsistencies caused by using the substitute, including any additional costs of engineering or inspection, or necessary coordination with connections to make the substitute perform as specified. All submittals shall receive written approval from the Engineer prior to installation.
 - 3. **Procurement and Storage.** All materials and equipment shall be furnished in ample quantities and procured in a timely manner to ensure uninterrupted progress of the Work. All materials and equipment shall be properly stored and protected and any loss or damage due to improper storage or protection shall be borne by the Contractor.
 - 4. **Site Logistics.** The Contractor shall maintain its storage area and shall keep its storage areas clean, safe and secure. Any materials or equipment stored offsite shall be insured. The risk of loss shall remain on the Contractor for all materials and equipment stored off-site.

- C. Similar products shall be by the same manufacturer unless otherwise specified.
- D. Provide identical products when products are required in quantity.
- E. Materials in Contact with Drinking Water
 - 1. All materials, equipment, or products that will be in contact with drinking water (potable water) shall be tested and certified as meeting the specifications of NSF/ANSI 61 Standard in accordance with California Code of Regulations, Title 22, Section 64591. Examples include, but are not limited to, valves, pumps, flow meters, protective materials (coatings, linings, liners), joining and sealing materials, pipes, tanks, pipe fittings, filters, cleaning chemicals and lubricants.
 - 2. All materials, equipment, or products that will be in contact with drinking water (potable water) or may contain lead shall be tested and certified as “lead-free” per California Health and Safety Code Section 116875.
- F. Related Sections:
 - 1. Section 01 33 00 – Submittal Procedures

1.2 APPROVAL OF MATERIALS

- A. The Contractor shall furnish without additional cost to the District such quantities of construction materials as may be required by the Engineer for test purposes. The Contractor shall place at the Engineer's disposal all available facilities for and cooperate with the Engineer in the sampling and testing of all materials and workmanship. The Contractor shall prepay all shipping charges on samples. No samples are to be submitted with the bids unless otherwise specified.
- B. Each sample submitted shall be labeled. A letter, in duplicate, submitting each shipment of samples shall be mailed to the Engineer by the Contractor. Both the label on the sample and the cover page shall indicate the material represented, its place of origin, the names of the producer and the Contractor, the Specification number and title, and a reference to the applicable drawings and specification paragraphs.
- C. Materials or equipment of which samples are required shall not be used on the work until approval has been given by the Engineer in writing. Approval of any sample shall be only for the characteristics or for the uses named in such approval and no other. No approval of a sample shall be taken in itself to change or modify any contract requirement.
- D. Failure of any material to pass the specified tests will be sufficient cause for refusal to consider under this contract any further sample of the same brand or make of that material.

1.3 SPECIAL TOOLS, HARDWARE, AND SOFTWARE

- A. Furnish any special tools necessary for normal operation, and/or maintenance of all equipment, systems, and devices furnished under this contract.
- B. Furnish all hardware devices and software necessary for operation, maintenance, calibration, setup, adjustment, testing, programming/reprogramming, and any other activity associated with the equipment or systems furnished under this Contract. This includes all hardware devices necessary to interface with standard PCs. Furnish a minimum of one copy of all software and include all licenses and a minimum of 1 year software service agreement (where applicable).
- C. The Contractor shall make all subcontractors, suppliers, and manufacturers furnishing products under this contract aware of these requirements.

1.4 HANDLING

- A. Deliver manufactured products in the manufacturers' original unbroken containers or packaging, with identifying labels intact and legible.
- B. Immediately on delivery, assure and document product compliance with requirements of Contract Documents and reviewed submittals, and verify that products are properly protected and undamaged.
- C. Handle products and packages in a manner to avoid soiling or damaging.
- D. Promptly remove damaged or defective products from the site, and replace at no cost to the District.

1.5 INSPECTION

- A. One copy of each of the Contractor's purchase orders for materials forming a portion of the work shall be furnished to the Engineer, if requested. Each such purchase order shall contain a statement that the materials included in the order are subject to inspection by the District. Materials purchased locally will be inspected at the point of manufacture or supply, and materials supplied from points outside the San Francisco Bay Area will be inspected upon arrival at the job, except when other inspection requirements are provided for specific materials in other sections of this Specification.

1.6 STORAGE

- A. Store manufactured products in accordance with the manufacturer's instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weathertight enclosures.
 - 2. Maintain temperature and humidity within the ranges specified by the manufacturers.

B. Exterior Storage

1. Store fabricated products above the ground, on blocking or skids, to prevent soiling and staining.
2. Cover products subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
3. Store loose granular material in a well-drained area on solid surfaces to prevent mixing with foreign matter.

C. Arrange storage to facilitate inspection.

D. Periodically inspect stored products to ensure that specified conditions are maintained and the products are free from damage or deterioration.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 01 81 02

SEISMIC DESIGN CRITERIA

PART 1 - GENERAL

1.1 REFERENCES:

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

1.2 RELATED SECTIONS:

- A. Section 01 43 11 – Seismic Qualification and Certification
- B. Section 05 50 00 – Metal Fabrications

1.2 SYSTEM DESCRIPTION

A. Design Requirements:

1. Architectural elements, mechanical and electrical components, equipment housings and their attachments, supporting structures, and anchorages shall comply with the requirements of ASCE 7, using the following values:
 - a. Design spectral acceleration at short periods, $S_{DS} = 1.4 g$
 - b. Seismic Design Category, D
 - c. Component importance Factor, $I_p = 1.50$
 - d. Component amplification factor, a_p : In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
 - e. Component response modification factor, R_p : In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
 - f. Overstrength Factor, Ω : In accordance with ASCE 7, Tables 13.5-1 and 13.6-1 for anchorage in concrete.
2. Do not use friction to resist sliding due to seismic forces.
3. Do not use more than 60 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
4. Do not use more than 60 percent of the weight of the tanks for resisting overturning due to seismic forces.

5. Resist seismic forces through direct bearing on anchors and fasteners. Do not design or provide connections that use friction to resist seismic loads.
6. Anchoring and fastening to concrete.
 - a. Use cast-in anchors (anchor bolts or welded studs) whenever possible for anchors at connections that resist seismic forces.
 - b. Do not use concrete anchors, flush shells, sleeve anchors, screw anchors, powder actuated fasteners, or other types of post-installed anchors unless indicated on the Drawings or accepted in writing by the Engineer.

1.3 SEISMIC QUALIFICATION AND CERTIFICATION

- A. The equipment and all components listed in this specification shall not undergo loss of their intended function after application of the Code prescribed seismic forces as specified in Section 01 43 11.

1.4 SUBMITTALS

- A. Shop drawings and calculations: Complete shop drawings and seismic calculations.
- B. Seismic Qualification and Certification shall be verified by an approved calculation that demonstrates the adequacy of the system for seismic forces. This calculation may be based on principles of structural analysis and engineering mechanics, or based on similarity to approved shake table tests as specified in Section 01 43 11.
- C. Contractor shall submit for review and approval test data or calculations signed and sealed by a Civil or Structural Engineer registered in the State of California to show compliance with the above requirements.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION

SECTION 05 05 24

SHOP AND FIELD WELDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Use this section for welding requirements of the related sections as described in 1.1.B and as listed in 1.1.C.
- B. Section includes:
 - 1. Shop and field welding of structural steel, pump barrels, metals fabrication, steel tank reservoir rehabilitations and appurtenances
 - 2. Third-party independent inspection and examination of welds
- C. Related Sections:
 - 1. Section 01 33 00 – Submittal Procedures
 - 2. Section 01 45 27 – Shop Inspection
 - 3. Section 05 50 00 – Metal Fabrications

1.2 APPLICABLE CODES AND STANDARDS

- A. ASME Boiler & Pressure Vessel Code, Section V, Nondestructive Examination, Latest Edition including addenda, supplements, and interpretations
- B. ASME Boiler & Pressure Vessel Code, Section VIII, Rules for Construction of Pressure Vessels, Latest Edition including addenda, supplements, and interpretations
- C. ASME Boiler & Pressure Vessel Code, Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators, Latest Edition including addenda, supplements, and interpretations
- D. AWWA D100 – Welded Carbon Steel Tanks for Water Storage, latest edition
- E. AWS D1.1 – Structural Welding Code – Steel, 2020 edition
- F. AWS D1.2 – Structural Welding Code – Aluminum, latest edition
- G. AWS D1.6 – Structural Welding Code – Stainless Steel, latest edition
- H. AWS 3.0 – Standard Welding Terms and Definitions, latest edition

- I. AWS A2.4 – Standard Symbols for Welding, Brazing and Nondestructive Examination, latest edition

1.3 TERMS AND DEFINITIONS

- A. Certified Welding Inspector (CWI) – A person certified as a welding inspector as given in AWS QC1- Latest Edition, Standard for AWS Certification of Welding Inspectors.
- B. 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.
- C. NDE Level II Technician/Operator (NDE Level II): An individual certified at Level II as defined in American Society for Nondestructive Testing (ASNT) Recommended Practice SNT-TC-1A specific to the NDE method used.
- D. 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.
- E. Welding Procedure Specification (WPS) – A document providing the required welding variables for a specific application to assure repeatability by qualified welders and welding operators. WPSs that are not prequalified by Code shall be supported with a PQR.
- F. Standard Welding Terms and Definitions: See AWS 3.0, Standard Welding Terms and Definitions.

1.4 SUBMITTALS

- A. Contractor's Field Welding Plan:(Not applicable for District Field Installation)
 - 1. Submit a Field Welding Plan listing each WPS to be used on the project and indexing that WPS to the drawing and weld. All joints requiring radiographic testing per this section shall be clearly identified in the Field Welding Plan, and radiographic testing activities shall be shown on the Contractor's three week look ahead schedule as required in Section 01 31 19 – Project Meetings.
 - 2. Following the scheduling of radiographic testing by the Contractor, a pre-testing meeting shall be scheduled by the Contractor. Attendees shall at a minimum include the third-party CWI, representatives from the company performing the radiographic testing including the actual technicians that will perform the testing, the Contractor's representative, and representatives from the District including the Plant Inspection Section. The meeting shall be scheduled via a Plant Inspection Request per Section 01 45 27 – Shop Inspection.
- B. Qualification of Welders and Welding Procedures:

1. For field welding for Section 05 50 00 – Metal Fabrications, submit records consistent with Paragraph 1.6, shop and field welding requirements.
- C. Qualification of Inspectors and NDE Examiners:
 1. Submit verifiable evidence of the current CWI certification of all third party CWIs.
 2. Submit verifiable evidence of the certification of all personnel performing NDE or interpreting the test results to ASNT-TC-1A Level II as a minimum.
- D. Submit complete fabrication and erection drawings for the Engineer's approval prior to cutting or fabrication. Shop drawings shall show the details of fabrication with weld symbols in accordance with AWS A2.4 for all joints to be welded.
- E. Provide all submittals to the Engineer consistent with the requirements of Section 01 33 00 with sufficient review time for approval prior to start of welding. Welding shall not proceed until the related submittals are approved by the Engineer.

1.5 QUALIFICATIONS AND INSPECTIONS

- A. Pipe-Welding Procedure Specifications:
 1. All welds shall be completed in accordance with a qualified WPS.
 - a. The Contractor may use a prequalified WPS conforming to the provisions of AWS D1.1 – Clause 5 or AWS D1.6 – Clause 5, Prequalification of WPSs.
 2. All WPSs that are not prequalified as given above shall be qualified in accordance with one of the following:
 - a. ASME Boiler & Pressure Vessel Code, Section IX
 - b. AWS D1.1 – Clause 6
 - c. AWS D1.6 – Clause 6
 3. A CWI shall review and stamp all WPSs and PQRs.
- B. Pipe Welding, Shop:
 1. Welders shall be qualified under ASME Boiler & Pressure Vessel Code, Section IX, Part QW, AWS D1.1 – Clause 6, or AWS D1.6 – Clause 6, for the welding processes, positions, and procedures to be used for this project.
 2. Welders shall have verifiable evidence they have maintained their qualifications in accordance with AWS D1.1 – Clause 6, AWS D1.6 – Clause 6, or ASME Boiler & Pressure Vessel Code, Section IX, Part QW-322.

3. Welder Qualification(s) shall be witnessed and stamped indicating acceptance by a CWI.

C. Pipe Welding, Field:

1. Prior to the start of welding on this project, each welder shall perform welder qualification testing specific to the welding on this project. Only welders that pass welder qualification testing for this project will be allowed to weld on this project. Prior welder qualification records will not be accepted. All welder qualification tests will be at the expense of the Contractor. Qualifications shall be in accordance with AWS D1.1-Clause 6 or AWS D1.6-Clause 6 for each process, position and procedure to be used on the project.
2. Welder qualification testing shall be witnessed by a third party AWS CWI provided by and at the Contractor's expense. Upon successful completion of testing, the AWS CWI shall stamp, sign and date the welder qualification form.
3. The Engineer reserves the right to witness all welder qualification tests and be present for all weld coupon testing. Advanced notification requirements are specified in Section 01 45 27.

D. Metal Fabrication Welding as specified in Section 05 50 00 – Metal Fabrications

1. Aluminum welding shall conform to ANSI/AWS D1.2 latest edition Structural Welding Code - Aluminum "Suggested Specifications for Structures of Aluminum Alloys 6061-T6" unless otherwise noted.
2. Stainless Steel welding shall conform to ANSI/AWS D1.6 latest edition – Structural Welding Code – Stainless Steel.
3. Carbon Steel welding shall conform to ANSI/AWS D1.1 latest edition – Structural Welding Code – Steel.
4. Certification of Welders:
 - a. Submit verifiable evidence of initial qualification for each welder.
 - b. Submit verifiable evidence each welder has maintained current qualification(s).
5. Submit WPSs with supporting PQRs for approval per 1.1.A above.

E. Testing and Inspection:

1. The Contractor shall provide independent inspection of all structural steel framing welds and nondestructive examination (NDE) as indicated on applicable Contract Drawings. The District will perform direct visual verification of these inspections and tests. Notify the District's Plant Inspection

Section at (510) 287-1132 for all field testing and shop inspections and tests. Advanced notification requirements are specified in Section 01 45 27.

2. Welding inspection personnel shall be certified in accordance with AWS QC1 at the level of Certified Welding Inspector.
3. NDE personnel shall be certified in accordance with ASNT-TC-1A Level II as a minimum.
4. Inspections and test results shall comply with AWS D1.1 Clause 8 for the related inspection and test method.
5. The costs of all inspections and tests, including retests after repair, shall be borne by the Contractor.

F. Tolerances:

1. Dimensional tolerances and allowances for fit shall be in accordance with applicable AWS Standards unless shown otherwise. Tolerances and allowances shall be shown on the Contractor's erection or working drawings.

1.6 RETESTING OF WELDERS BASED ON QUALITY OF WORK:

- A. When the quality of a welder's work appears to be below the requirements of this specification or referenced Codes, the Engineer may require that the welder demonstrate an ability to produce sound welds by requiring complete requalification in accordance with the latest edition of AWS D1.1, Clause 4; AWS D1.2, Clause 3; or, AWS D1.6, Clause 6. All re-qualifications will be at the Contractor's expense.

1.7 NONDESTRUCTIVE EXAMINATION-GENERAL

A. Types of NDE and Acceptance Criteria:

1. Radiographic Examination (RT) per Paragraph UW-51, Section VIII, ASME Boiler & Pressure Vessel Code
2. Liquid Penetrant (PT) per Section V, ASME Boiler & Pressure Vessel Code. Acceptance criteria shall be as given by AWS D1.1 – Clause 8, Part C
3. Magnetic Particle (MT) per Section V, ASME Boiler & Pressure Vessel Code. Acceptance criteria shall be as given by AWS D1.1 – Clause 8, Part C

B. Nondestructive Examination of Production Welds:

1. In addition to any NDE required by the Contract Documents, the Engineer may elect to perform additional NDE of in-process or completed shop or field welds to verify weld quality. Any additional NDE may be performed by District

personnel or the Engineer may request the Contractor perform or subcontract these examinations.

2. Cost of Examinations:

- a. The cost of NDE identified in the Contract Documents for specific welded connections shall be borne by the Contractor.
- b. 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.
- c. 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.

1.8 CLEANING AND PASSIVATING OF STAINLESS STEEL WELDMENTS

- a. Larger than 2-inch pipe joints and structural steel, including the entire heat-affected zone (HAZ), shall be:
 - 1) Cleaned in accordance with ASTM A380. The joints shall be visually inspected to be free of paint, oil, grease, welding flux, slag, heat-treating and hot-forming scale, dirt, trash, metal and abrasive particles and chips, and other gross contamination. Dust may be present on the exterior surfaces, but should not be on the interior surfaces.
 - 2) De-scaled (pickled) with citric acid per in accordance with ASTM A380 Table 2.1, Part III. Perform intermittent scrubbing as required to assure a completely cleaned surface. Do not use a steel wire brush.
 - 3) Passivated per ASTM A380 with final cleaning per ASTM A380 Table 2.1, Part II, and in accordance with ASTM A967. The finish shall be inspected to be free of contaminating iron particles, heat-tint oxides per AWWA C220, weld scale, and other impurities.
 - 4) Follow immediately with a thorough rinse and water-jet spray to remove excess acid to prevent attack of the base metal.
 - 5) Both the exterior and interior of the joint and HAZ shall be treated. Inaccessible interior joints, as approved by the Engineer, shall be omitted from this process.
- b. The weld and HAZ shall be tested per ASTM A967 to be free of contaminating iron particles and other impurities. The ASTM A967 test method used shall be approved by the Engineer.

- c. 2-inch and smaller pipe joints: Shop welded stainless steel pipe joints shall be treated as described above when called out on the drawings.
- d. At branch locations, if any of the joined pipes are larger than 2-inches, joints shall be treated as described above.

1.9 VERIFICATION

A. General Requirements:

- 1. All welds shall be visually inspected and accepted by the Contractor's Third Party CWI and the Engineer prior to performance of all NDE, including hydrostatic and air tests. Final visual inspection shall be performed after the weld has cooled to ambient temperature.
- 2. In-process and final inspections shall be documented on the attached "Field Welding Inspection Form" by the Contractor's Third Party CWI, and available for review by the Engineer. At a minimum, all applicable elements listed on the form are required.
- 3. All visual inspections and nondestructive examinations shall be completed and confirmed as acceptable by the Engineer prior to further processing that could interfere with access to the welded joint for repairs, inspection and NDE.

B. Required NDE, Field Welding, Pipe:

- 1. Unless otherwise shown in the tail of the weld symbol on the Drawings, NDE of the finished weld for carbon steel pipe shall be:
 - a. Interior pipe fillet welds, for pipe 24-inch and larger only: MT
 - b. Exterior pipe fillet welds: MT or PT
 - c. Complete penetration groove welds shall be radiographed as described in Subparagraph 1.9C.1 below.

C. Required NDE, Shop Welding, Pipe:

- 1. Unless otherwise shown in the tail of the weld symbol on the Drawings, NDE of the finished weld for steel pipe 24" and larger shall be:
 - a. Full-penetration groove welds on specials and fittings shall be radiographed for the complete length of each seam on each pipe. All weld seams shall be visually accepted and results documented by Fabricator's Quality Control prior to initial radiography.
 - 1) Film radiography shall comply with ASME (latest edition) Section V Article 2 Mandatory Appendix II utilizing hole-type IQI revealing 2T sensitivity per Table T-276 in addition to IQI

placement per Section T -277.1-C placed on weld. Each film shall be identified with unique numbering as a minimum with the EBMUD Spec Number, date, cylinder and/or mark number. Welds shall conform to ASME Section VIII Paragraph UW-51.b.1, 2, 3 and 4. Final determination of conformance to ASME Section V for film sensitivity and ASME Section VIII for weld acceptability is at the discretion of the Engineer.

- b. Results of radiographic examinations shall be reviewed by the Fabricator's ASNT TC-1A Level II or AWS certified radiographic interpreter. The Contractor's independent ASNT-TC-1A certified Level 2 or AWS certified radiographic interpreter and the Engineer will review radiographic film and inspection reports. Welds shall be verified as being acceptable based on ASME Section VIII criteria prior to further processing of the cylinder. Contractor shall pay for all film radiographic examinations.
- c. Final determination of conformance to ASME Section V for film sensitivity and ASME Section VIII for weld acceptability is at the discretion of the Engineer.
- d. Alternate NDE method for welds that cannot be radiographed due to weld configuration or pipe size shall be approved by the Engineer.

D. Radiograph Records:

- 1. All radiographs, including information only examinations, will become the property of the District.
 - a. The Fabricator shall provide to the District all hardware and software necessary to review the radiographs. The Fabricator shall provide one set of hardware and software to the District prior to the start of radiography for retention by the District.
 - b. The Contractor shall provide the District with one new film viewer as follows: LC NDT FV-2010-T-PLUS High Intensity Portable LCD Film Viewer with Built-in Densitometer and Electronic Masking, or equal as approved by the Engineer.

E. Shop Inspection, Pipe:

- 1. The Engineer will perform inspections and witness tests during all phases of pipe fabrication.
- 2. Provide notification for Engineer to be present for testing. See Section 01 45 27 for inspection advance notification requirements and District travel expenses.

3. 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.
4. The Contractor shall provide third party independent CWIs and NDE Examiners for all pipe fabrications. Third party inspectors and examiners shall be independent from work production and schedule responsibilities. Third party CWIs shall provide daily reports to the Engineer for all inspections performed. Welding inspections shall include as applicable: verification of welder and weld procedure specification; joint fit-up and tack; preheat; root or first pass inspection; verification of any required in-process NDE; interpass temperature; final visual inspection including weld quality and item dimensions, orientation and configuration. The reports shall provide a clear summary of the inspection activities performed, direct traceability to the work, and a determination of acceptability.
5. The Engineer will verify that the third party independent inspections and NDEs comply with these requirements, including referenced Codes and Standards, and will review and accept (or reject) the reports of the CWIs and Examiners. The Engineer may at any time verify by direct inspection or surveillance the acceptability of all phases of welding and third party independent inspection and NDE activities.

F. Field Inspection:

1. Responsibilities

- a. The Contractor shall provide third party CWIs and NDE Examiners. Third party inspectors and examiners shall be independent from work production and schedule responsibilities. Third party CWIs and NDE Examiners shall provide daily reports, documented on the attached "Field Welding Inspection Form" to the Engineer for all work performed. The reports shall be signed and stamped and provide a clear summary of the inspection or NDE activities performed, direct traceability to the work, and a determination of acceptability.
- b. The District will verify that the third party independent inspections and NDE comply with these requirements, including referenced Codes and Standards, and will review and accept (or reject) the reports of the CWIs and Examiners. The Engineer may at any time verify by direct inspection or surveillance the acceptability of all phases of welding and third party independent inspection and NDE activities.

1.10 CHARPY V-NOTCH (CVN) TESTING

- A. 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.

1. WPS for shop welding shall be qualified in accordance with ASME Boiler Pressure Vessel Code Section IX and shall include Supplementary Essential Variables.
2. WPS for field welding shall be qualified in accordance with AWS D1.1 – Clause 6, Part B.
3. 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 6, Part D, Requirements for CVN Testing.
4. The number of CVN test specimens shall be per AWS D1.1 – 6.27.2, Option 1 – 3 specimens.
5. As required to be specified by AWS D1.1 – 6.27.5, the CVN test temperature shall be 40-degF unless otherwise specifically called out on the drawings.

PART 2 - NOT USED

PART 3 - EXECUTION

3.1 GENERAL PROCEDURES

- A. Use Shielded Metal Arc Welding (SMAW), Flux Cored Arc Welding (FCAW), Gas Tungsten Arc Welding (GTAW), or Gas Metal Arc Welding (GMAW-Spray or Globular modes only), unless the Engineer approves another process prior to use.
 1. Gas Metal Arc Welding (Short-Circuit) is not allowed.
- B. All welds shall be made according to an approved WPS.
- C. Each step of the welding process will be inspected and approved before proceeding to the next step.
- D. Welding shall be performed in at least two layers. Passes shall not exceed 1/4 inch in throat dimension.
- E. Welds shall be thoroughly cleaned after each pass.
- F. Welds shall be fully fused with base metal, uniform in appearance, free from cracks and reasonably free from irregularities. Weld shall blend smoothly and gradually into the base material
- G. Restart in weld zone on clean and sound metal.
- H. Remove defective welds by chipping, grinding, flame gouging, or air-arc gouging and repair by re-welding.
- I. No undercut is allowed.

- J. Use procedures or welding sequences that will minimize eccentric stresses, shear or distortion in the weld.
- K. Butt welds, where authorized, shall have complete penetration and fusion.
- L. Finished weld bead shall be central to the seam.
- M. Artificial or forced cooling of welded joints is not permitted.
- N. Low hydrogen electrode storage shall be in accordance with AWS D1.1 – 5.3.2.1.
- O. See District Standard Drawings 323-EA, 324-EA, and 325-EA for welding of flanges.
- P. Joining Dissimilar Metals
 - 1. When joining carbon steel to various stainless steels, the following filler material shall be used unless otherwise called out on the drawings:
 - a. Carbon steel to stainless steel: 309L filler material
 - b. Carbon steel to type 316 or 316L stainless steel: 309L or 316L filler material

3.2 SUPPLEMENTS

- A. The following supplements follow END OF SECTION and are a part of this section:
 - 1. Field Welding Inspection Form

END OF SECTION

Spec. Number		Date	
General Contractor		Welding Subcontractor	
Inspection Co		CWI NAME & #	

WELDING INSPECTION RECORD

<i>LOCATION DESCRIPTION</i>	<i>STATION</i>	<i>PC MKS</i>	<i>DWG DETAIL REF.</i>	<i>WELDER ID</i>	<i>WPS</i>	<i>JOINT FIT-UP AND FIELD TOP</i>	<i>ROOT PASS (GROOVE) *FIRST PASS (FILLET)</i>	<i>BACK GOUGE VISUAL/NDT</i>	<i>FINAL VISUAL</i>

DESCRIBE ALL IN-PROCESS REWORK: _____

ALL WORK AS LISTED IS IN CONFORMANCE WITH THE CONTRACT DOCUMENTS

FINAL ACCEPTANCE : STAMP / DATE /SIGNATURE	
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Sketches:

SECTION 05 05 26

FLANGE BOLTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Furnish and install bolts, washers, and nuts for flanged connections and where shown on the drawings.
- B. All stainless steel fasteners are subject to additional material verification by the District at the District's expense. Nonconforming bolts shall be segregated, identified and replaced with conforming bolts. Nonconforming bolts may be subjected to additional independent laboratory analysis at the Contractor's expense.
- C. Related sections:
 - 1. 43 41 45 Fiberglass Reinforced Plastic Tanks

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI B1.1 – Unified Inch Screw Threads (UN and UNR Thread Form)
 - 2. ANSI B16.1 – Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250
 - 3. ANSI B18.2.1 – Square and Hex Bolts and Screws, Inch Series
 - 4. ANSI B18.2.2 – Square and Hex Nuts, Inch Series
 - 5. ANSI B18.22.1 – Plain Washers
- B. ASTM International (ASTM):
 - 1. ASTM A193 – Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
 - 2. ASTM A194 – Specification for Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
 - 3. ASTM A449 – Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
 - 4. ASTM A563 – Specification for Carbon and Alloy Steel Nuts

5. ASTM D2000 – Standard Classification System for Rubber Products in Automotive Applications
 6. ASTM F436 – Specification for Hardened Steel Washers
 7. ASTM F844 – Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
 8. ASTM F2329 – Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
- C. American Water Works Association (AWWA):
1. AWWA C207-13 – Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)
- D. SAE International (SAE):
1. SAE J429 – Mechanical and Materials Requirements for Externally Threaded Fasteners
 2. SAE J995 – Mechanical and Material Requirements for Steel Nuts

1.3 SUBMITTALS

- A. Submit manufacturer's literature and application schedule for all bolting to demonstrate conformance with these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Standard bolting:

Carbon Steel	Bolts:	Plain or Galvanized: ASTM A449 Type 1 Plain Only: ASTM A193 Grade B7 or SAE J429 Grade 5.	
	Nuts:	1/4" to 1":	Plain or Galvanized: ASTM A563 Grade B, standard hexagonal flat nuts Plain Only: A194 Grade 2H or SAE J995 Grade 5, standard hexagonal flat nuts
		1-1/8" to 1-1/2":	ASTM A563 Grade B, heavy hexagonal flat nuts
	Washers:	Diameter 1-1/2" and smaller:	ASTM F436 Type 1
	Coating:	Hot-Dip Galvanized	ASTM F2329 for A449 bolts, A563 nuts and F436 washers
Stainless Steel, Standard	Bolts:	ASTM A193 Class 1, B8 (Type 304) or B8M (Type 316)	
	Nuts:	ASTM A194, Grade 8 (Type 304) or Grade 8M (Type 316), Standard Hex	
	Washers:	Type 304 or 316 to match bolts and nuts	
Stainless Steel, High Strength	Bolts:	ASTM A193 Class 2, B8 (Type 304) or B8N (Type 304N), Carbide solution treated and strain hardened.	
	Nuts:	1/4" to 1-1/2"	ASTM A194, Grade 1 standard hex or Grade 8-S1 (Type 304) Heavy Hex and Strain Hardened
	Washers:	Type 304 or 316 to match bolts and nuts	
1. Refer to standard drawing 323-EA, 324-EA or 325-EA for the specific bolt grade that corresponds to the pipe pressure of the application. 2. Refer to section 40 20 20 for the Mechanical Bolting Application Schedule that calls out stainless or galvanized dependent upon the location of the application.			

2.2 CONSTRUCTION

Bolts	ANSI B18.2.1, standard hexagonal heads
Nuts	ANSI B18.2.2
Washers	ANSI B18.22.1 Type A, Narrow

2.3 BOLTING MATERIAL OTHER THAN STEEL

- A. Threading and dimensions shall conform to the requirements for steel heads and nuts.

B. Class 3 Fit ANSI B1.1

2.4 BOLT MARKING

A. Identification symbols shall be applied to each bolt head to identify the material and grade of each bolt. The bolt identification symbols shall be as follows:

1. Carbon Steel: Three radial lines, 120 degrees apart
2. Stainless Steel: B8 (type 304), B8M (type 316)

2.5 LENGTH OF BOLT

A. After assembly, the bolts shall extend a minimum distance of two threads beyond the nut. In addition, the bolt length shall be no longer than 1-inch beyond the nut and shall not interfere with any appurtenance or the operation of any device.

2.6 THREADS

A. Coarse thread series – Class 2 Fit ANSI B1.1

2.7 BOLT THREAD ANTI-SEIZE COMPOUND

A. Compound shall be food grade meeting NSF code H1 standards for incidental contact, and shall be designed to prevent rusting, seizure and galling of bolt threads.

B. Acceptable products:

1. Loctite Food Grade Anti-Seize
2. Saf-T-Eze, by Saf-T-Lok®
3. Or equal as approved by the Engineer

2.8 FLANGE GASKETS

A. Potable Water:

1. General Requirements: See Section 01 61 00, Article 1.1.E – Materials in Contact with Drinking Water. NSF-61 certified: required.
2. Potable Water Service Conditions: Suitable for chloraminated water and in accordance with Standard Drawings 323-EA – Steel Pipe Flanges, Low Pressure, 324-EA – Steel Pipe Flanges, High Pressure, and 325-EA – Steel Pipe Flanges, Extra-High Pressure.
3. Composition Gasket: PTFE with aluminosilicate or hollow glass microspheres, meeting the requirements of AWWA C207-13. Full-face type gaskets shall be used for flat-faced flange sets and ring-type gaskets that extend outward to the inside of the bolt hole circle shall be used for raised-face flange sets. Thickness as shown on the Standard Drawings listed above.

- a. At a minimum, gaskets shall be rated for 750 psig @ 0 deg F and 0 psig @ 400 deg F; shall meet ASTM F36 compressibility $\geq 25\%$ and recovery $\geq 25\%$; ASTM D1708 Tensile Stress ≥ 2000 psi; ASTM F38 creep relaxation $\leq 40\%$; and a ASTM F586 design “m” factor ≥ 2.0 , and a design “y” factor ≥ 1500 psi for 1/16” and 1/8” thick gaskets.
 - 1) Acceptable products:
 - a) Garlock 3505 EPIX
 - b) Garlock 3505
 - c) Teadit TF1572 SAN
 - d) Or equal as approved by the Engineer.
4. Rubber Gasket: Premium peroxide-cured EPDM rubber per ASTM D2000, Shore Type A 60 - 90 durometer, full-faced type. Rated for 175 psig and -40 – 275 deg F. Full-face type. Thickness as shown on the Standard Drawings listed above.
 - a. Acceptable products:
 - 1) Garlock 98206
 - 2) AmericanBiltrite AB-576
 - 3) American Toruseal
 - 4) Or equal as approved by the Engineer.
- B. Raw Water: Composition Gasket; Synthetic fibers with nitrile (Buna-N) binder 1/8-inch thick; suitable for water, hydrocarbons, oils, and gasoline; 400 deg F continuous operating temperature; 500 psi maximum pressure. NSF-61 certified. Full-face type gaskets shall be used for “low pressure” steel flat-faced flange sets and “high pressure” steel flanges mating to a valve or appurtenance with cast iron flanges, while ring-type gaskets, which extend outward from the ID to only the inside of the bolt circle, shall be used for raised-face flange sets and “high pressure” steel flange sets. “Low pressure” and “High pressure” are defined on drawings 323-EA - Steel Pipe Flanges, Low Pressure and 324-EA - Steel Pipe Flanges, High Pressure.
 1. Acceptable products:
 - a. Garlock “Multi-Swell” Style 3760-U
 - b. Or equal as approved by the Engineer

C. All Chemical Services: Low torque type, full face meeting ANSI B16.1 (Class 150), PTFE molded to EPDM body, with dual concentric convex sealing rings molded in PTFE between center hole and bolt circle.

1. Acceptable products:
 - a. Garlock Style 370
 - b. Proco 9013-ET
 - c. Harrington Plastics
 - d. Chemline, Asahi
 - e. Or equal as approved by the Engineer

2.9 FLANGE INSULATION SETS

- A. General Requirements: See Section 01 61 00 Article 1.1.E – Materials in Contact with Drinking Water.
- B. Insulating Gasket: NSF-61 certified, 1/8" full face NEMA grade G10 glass reinforced epoxy retainer with minimum 750 volts/mil dielectric strength and minimum 65,000 psi compressive strength, EPDM sealing element on the retainer, 200 deg F (minimum) at rated pressure, with NEMA grade G10 insulating sleeves and washers, and stainless steel backup washers.
- C. Acceptable products:
 1. Advance Products & Systems, Inc., APS Voltaccept™ Trojan G-10
 2. GPT LineBacker® 61
 3. Lamons Isoguard
 4. Or equal as approved by the Engineer

PART 3 - EXECUTION

3.1 FLANGE BOLTING PROCEDURES

- A. All flange bolt torque values shall be verified using a properly calibrated torque wrench. The Contractor shall provide the torque wrench certificate of calibration upon request. Refer to Drawings 323-EA, 324-EA, and 325-EA for torque procedure details. Install the appropriate gasket.
- B. Install washers under both bolt heads and nuts. Verify that the OD of the washers does not extend past the OD of the flange.
- C. Coat bolt threads with anti-seize compound.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Fabricate and install miscellaneous metal work as shown on the drawings and specified herein.
- B. Related sections:
 - 1. Section 01 33 00 – Submittal Procedures
 - 2. Section 01 45 27 – Shop Inspection
 - 3. Section 05 05 24 – Shop and Field Welding
 - 4. Section 05 26 00 – Flange Bolting

1.2 QUALITY ASSURANCE

- A. Design, fabrication, and erection of structural steel, steel assemblies and shop and field welding shall meet applicable requirements of the AISC Specifications.
- B. Application of zinc (hot-dip galvanized) coatings to metal fabrications shall conform to Section 05 05 14 – Hot-Dip Galvanizing.
- C. Carbon Steel welding shall conform to ANSI/AWS D1.1, 2020 Edition – Structural Welding Code – Steel.
- D. Aluminum welding shall conform to ANSI/AWS D1.2, latest edition – Structural Welding Code – Aluminum.
- E. Stainless Steel welding shall conform to ANSI/AWS D1.6, latest edition – Structural Welding Code – Stainless Steel.
- F. ASTM B308-2010, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles (Withdrawn with no replacement, January 2019)
- G. ASTM B632, latest edition, Standard Specification for Aluminum-Alloy Rolled Tread Plate

1.3 SUBMITTALS

- A. Submit complete fabrication and erection drawings for the Engineer's approval prior to cutting or fabrication. Shop drawings shall show the details of fabrication with weld symbols in accordance with AWS A2.4 for all joints to be welded.

- B. See Section 05 05 24 – Shop and Field Welding for welding requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Steel: All hot rolled steel plates, shapes, sheet piling, and bars shall be new steel conforming to ASTM A6.
 - 1. Standard rolled steel sections: ASTM A992, Grade 50
 - 2. Steel structural tubing: ASTM A500, Grade B
 - 3. Nonstructural steel bars, angles, rods, clips, brackets, supports, and similar items: ASTM A36
- B. Stainless steel plate: ASTM A240, Type 304L
- C. Stainless steel tubing: ASTM A269. Type 304L and 316L
- D. Aluminum: Rolled or extruded from 6061 T6 alloy, ASTM B632, except as shown on the Contract Drawings.
- E. Steel bolts:
 - 1. All except flanges and anchor bolts: ASTM A325, Type N
 - 2. Flanges: See Section 05 05 26 – Flange Bolting
 - 3. Anchor bolts and rods: As specified below
- F. Stainless steel bolts:
 - 1. All except flanges and anchor bolts: ASTM F593-S8, Type 304 or 316
 - 2. Flanges: See Section 05 05 26 – Flange Bolting
 - 3. Anchor bolts and rods: As specified below
- G. Steel Pipe: ASTM A53, Grade B
- H. Epoxy adhesive anchors:
 - 1. Anchor rods: Type 316 Stainless Steel per ASTM F593, Group 2.
 - 2. All epoxy adhesive anchors shall be designed and installed per the requirements of ACI 318 Chapter 17 as amended by ICC-ES AC308.
 - 3. Acceptable epoxy adhesive (Must have a current ICC-ES Evaluation Report):
 - a. HIT-HY 200 Fast Cure Hybrid Adhesive, Hilti Corp.

- b. SET-XP High-Strength Anchoring Adhesive, by Simpson Strong-Tie
 - c. Or equal as approved by the Engineer.
- I. Expansion type anchor bolts shall only be used for static loads and shall not be loaded by vibrating or rotating equipment. Thread length shall suit intended use.
 - 1. Acceptable products in concrete:
 - a. Strong-Bolt 2 by Simpson Anchor Systems
 - b. Kwik-Bolt TZ by Hilti Corp.
 - c. Or equal as approved by the Engineer
 - 2. Acceptable products in CMU:
 - a. Wedge-All by Simpson Anchor Systems
 - b. Kwik-Bolt TZ by Hilti Corp.
 - c. Or equal as approved by the Engineer
- J. High Strength Anchor Bolts:
 - 1. Bolts shall conform to ASTM F1554.
 - 2. Nuts shall conform to ASTM A563, and washers shall conform to ASTM F436.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Verify measurements at the job.
- B. Perform all cutting, drilling, punching, threading and tapping required for miscellaneous metal or adjacent work.
- C. Grind all sharp metal edges on items to be painted or coated. Edges shall be rounded.
- D. Welds:
 - 1. Welds shall comply with the applicable provisions of Section 05 05 24 – Shop and Field Welding.
 - 2. For welds that will be galvanized, welds shall have all sharp edges removed and be abrasive blasted. All slag and other weld irregularities such as overlap, undercut, and weld spatter shall be removed.

- E. Punch holes 1/16-inch larger than the nominal size of the bolts, unless otherwise indicated. Whenever needed, because of the thickness of the metal, holes shall be subpunched and reamed or shall be drilled. Correct unmatched holes with new material or new reaming at the Engineer's discretion. No drifting of bolts nor enlargement of holes shall be allowed to correct misalignment.
- F. Protect dissimilar metals from galvanic corrosion by means of pressure tapes, coatings, or isolators as approved. Protect aluminum in contact with concrete or grout with a heavy coat of mastic..
- G. Stainless steel parts, assemblies, and equipment shall be thoroughly cleaned, descaled and passivated in accordance with ASTM A380, Standard Practice for Cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment, and Systems. The method of passivation to be used shall be in accordance with ASTM A967, Standard Specifications for Chemical Passivation Treatments for Stainless Steel Parts and submitted to the Engineer for approval prior to passivation work.
- H. After installation, clean damaged surfaces of shop coated metals and touch up with the same material used for the shop coat. Clean damaged surfaces of galvanized metals and touch up with zinc-rich paint conforming to ASTM A780.

3.2 INSPECTION

- A. All materials and workmanship will be inspected for conformance to these specifications. Any work found deficient must be replaced and brought up to full compliance with these specifications.
- B. See Section 01 45 27 – Shop Inspection for inspection advance notification requirements and District travel expenses.

END OF SECTION

SECTION 43 41 45

FIBERGLASS REINFORCED PLASTIC TANKS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Fiberglass Reinforced Plastic (FRP) tanks specified under this Section shall be furnished by the Contractor from fabricators who are fully experienced, reputable, qualified and regularly engaged in the manufacture of the items to be furnished which have been used as required herein. The Contractor's tank fabricator shall show that the responsible production personnel, supervisors, foremen and quality control personnel have each had at least 5 years' experience in the manufacture of tanks of similar size and construction. The Contractor's tank fabricator shall show that he has adequate production machinery, equipment, and facilities to manufacture the tanks. For this RFQ, the Contractor may be the FRP tank fabricator.
- B. Supply all labor, materials, equipment, and incidentals required to furnish and deliver:
 - 1. A total of two (2) fiberglass reinforced plastic (FRP) vertical tanks (one scrubber tank and one bulk pressurized chemical storage tank), complete and operable in accordance with this Section and the applicable Contract Documents.
 - 2. The tank shall be fabricated complete with all required FRP components, 316 stainless steel anchors and lugs, and other appurtenances as specified herein and in the applicable Contract Documents.
 - 3. Fabrication is to be in accordance with this Section and the construction Details included, and any other documents provided by the Engineer. Refer to ASME RTP-1 for all other fabrication details not described in this specification and the Contract documents and submit proposal for Engineer's review and approval. Where conflicts arise, this specification section shall govern.
 - 4. The Contractor shall guarantee all equipment furnished under this contract against improper assembly, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.

5. Tank shall be fabricated and assembled in accordance with the best modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Tank shall not have been in service at any time prior to delivery, except as required by tests.
6. All components and materials of construction shall be suitable for the intended service.

C. Engineer will provide:

1. Inspection during fabrication, installation and testing. This inspection will in no way relieve the Contractor of responsibility for any aspect of the Quality Control of the equipment. The Engineer reserves the right to remove components or samples for the purpose of independent tests.
2. Field installation of the tanks.

1.2 SYSTEM DESCRIPTION

- A. Tanks specified herein are intended to be custom constructed tanks for the storage of the chemicals specified herein, while meeting the seismic design criteria for this project. All of the tanks shall comply with NSF 61 for surfaces in contact with the service chemicals.
- B. Tanks shall be provided for long-term storage of the chemicals specified in Table A. The 6,000 gallon FRP tank (239-NH-TNK-102) must also be compatible with liquid ammonium sulfate (LAS).
- C. Tank Schedule: Provide Fiberglass Reinforced Plastic Tanks per Table A and Contract Drawings.

Table A – Fiberglass Reinforced Plastic Tank Schedule

Tank No. & Description	Service	Purpose	Orientation	I.D. (ft.)	Height (ft.)	Nominal Capacity (Gal)	Pressure/ Vacuum	Specific Gravity	Process Temp.	Viscosity	Reference Contract Drawings
239-NH-TNK-102 (Pressurized Ammonia Tank)	Aqueous Ammonia or liquid ammonium sulfate (19% NH ₃) or Liquid	Bulk Storage	Vertical, Dome Top	10'-0"	11'-0"	6,000	+3.0 / -1.0 psig	0.93	50°-100°F	<5 cps	506.40-S-039 506.40-M-306 506.40-M-307.4
239-NH-TNK-105 (Ammonia Scrubber)	Aqueous Ammonia (<19% NH ₃)	Scrubber	Vertical, Dome Top	4'-0"	5'-0"	470	Atmospheric	0.93	50°-100°F	<5 cps	506.40-M-306 506.40-M-307.1

Note 1: Contractor shall coordinate exact tank dimensions with the Engineer.

Note 2: All instrumentation (Endress+Hauser FMR10, 2-wire level transmitter, Endress+Hauser FTL51 high level switch, and Rosemont 3051 C (3051CD3A02A1AH2BADWL4M5DO) pressure transmitter) shall be provided by the District.

1.3 GENERAL

- A. Like items of equipment specified herein shall be the end products of one tank fabricator in order to achieve standardization for appearance, operation, maintenance, spare parts, and tank fabricator's service.
- B. The use of a tank fabricator's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only.
- C. All equipment specified herein shall be factory fabricated and assembled to maximum extent possible requiring a minimum of field assembly. Field installation shall be limited to anchoring the tanks and making external piping and electrical connections. Contractor is not responsible for field installation.
- D. All tanks and appurtenances shall be suitable for the chemicals stored in them.
- E. Materials: Materials that are not indicated to be coated shall be fabricated from materials as indicated. Where materials are not indicated, the Contractor shall provide corrosion-resistant materials suitable for long-term service.
- F. All tanks and appurtenances shall be vertical fiberglass reinforced plastic storage tanks suitable for installation in an indoor area in a chemical environment. See applicable project Drawings.
- G. Design
 - 1. Unless indicated otherwise, tanks are designed for vertical installation, cylindrical with flat bottom and dome top as indicated. The tanks shall be made of fiberglass reinforced plastic (FRP) with integral structural steel anchor chairs and pipe/appurtenance supports. Capacities, dimensions and tank penetrations shall be as specified in the Drawings and herein. The manway and all flanges and other penetrations shall be integrally molded and assembled in accordance with the Details in this Section.
 - 2. Hydrostatic Pressure: The tanks shall be vented and will store the indicated chemicals at atmospheric pressure. All tanks are designed based on the liquid contents for the specific gravity as well as internal pressure or vacuum as listed in Table A above.
 - 3. Personnel access roof load shall be a minimum of 250 pounds exerted as a concentrated load.

H. Fabrication

1. Appurtenances: The tanks shall be equipped with the following items, as specified and required and as shown on the Drawings and this specification
 - a. Nozzles and manways as shown on the Drawings and this specification. All manways shall be provided with approved access covers or blind flanges. Manway openings shall be provided for side access in addition to top access where indicated.
 - b. Anchor chairs and bolts for anchoring tank to the concrete pad or slab.
 - c. Hardware: All necessary corrosion-resistant hardware for installation of the tanks and accessories shall be supplied. The hardware shall be made of type 316 stainless steel.
 - d. Lifting lugs.
 - e. Piping and instrumentation supports.
 - f. Gaskets: Gaskets shall be provided for all flanged openings. Gaskets shall be minimum 1/8" thick with Shore A durometer of 60±5; material to be EPDM and compatible with the chemical stored.
 - g. Combination air valve with a cracking pressure above -0.3 psi for vacuum and less than +1 psi for positive pressure.
2. Labels: The tanks shall be identified by bonded lettering and labels indicating the chemical being stored. An NFPA diamond-shaped hazard identification label shall be included on each tank. Lettering shall spell out the tank name, number, and chemical being stored. Identification lettering shall be a minimum of 6 inches high and plainly visible. Labels shall conform to the Fire Code and NFPA 704 for size and color. The NFPA hazardous material labels shall be a minimum of 15 inches by 15 inches. Hazardous material labels shall be as manufactured by Seton Name Plate Company, or equal.
3. Nameplate: The vendor shall furnish and mount three (3) feet from the bottom on the outside of the tank a 316 stainless steel nameplate with the following:
 - a. Name of fabricator
 - b. Date of manufacture
 - c. District's equipment ID number

- d. Estimated empty weight
- e. Estimated maximum operating weight
- f. Tank capacity (in gallons)
- g. Resin number and manufacturer
- h. Type of corrosion resistant liner
- i. Design pressure and temperature

I. Sight Gauges: Each of the tanks shall be provided with 3” flanges that will allow for mounting of an external level gauge.

1.4 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Related sections:

- 1. Section 01 33 00 – Submittal Procedures
- 2. Section 01 43 11 – Seismic Qualification and Certification
- 3. Section 01 75 17 – Field Testing and Startup
- 4. Section 01 45 27 – Shop Inspection
- 5. Section 01 81 02 – Seismic Design Criteria
- 6. Section 05 05 24 – Shop and Field Welding
- 7. Section 05 05 26 – Flange Bolting
- 8. Section 33 12 01 – Basic Mechanical Materials and Methods
- 9. Section 40 90 00 – Instrumentation and Control for Process Systems
- 10. Section 43 06 40.05 – Schedule of Liquid Chemical Properties

B. ASTM International (ASTM)

- 1. D883 - Definitions of Terms Relating to Plastics.
- 2. D2471 - Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins.
- 3. D2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

4. D2584 - Ignition Loss of Cured Reinforced Resins.

C. American Society of Mechanical Engineers:

1. RTP-1 - Reinforced Thermoset Plastic Corrosion Resistant Equipment.

D. American Welding Society (AWS):

1. D1.6 - Structural Welding Code.

E. Building Code

1. 2019 California Building Code (CBC)

- F. Where reference is made to one of the above standards, the revision in effect at the time of tank solicitation shall apply. When two or more of the above regulations are applicable, the more stringent requirement shall be met.

1.5 CONTRACTOR SUBMITTALS

A. Provide the following with the FRP tank proposal as part of the RFQ bid proposal:

1. Indicate conformance to this Section and the standards and drawings referenced herein. Specifically list any exceptions and describe completely.
2. Alternate proposals will be considered only when provided in addition to a proposal that complies with the specified requirements, such that costs and features can be compared and evaluated between the base bid and requested alternate. Alternate proposals must include adequate explanation of the reasons for and benefits of the deviation. Alternate configurations or designs must satisfy the intent of the original design, and the proposal must include sufficient basis to demonstrate adequacy and allow proper evaluation.
3. Minor variations may be proposed for filament winding laminate sequences and/or the addition of mat layers if necessary to accommodate particular production techniques. The alternate sequences must be specifically described, meet the specified minimum thickness, and contain equal amounts of hoop winding, unidirectional reinforcement and minimum glass contents as the specified laminates. Alternate sequences shall be reviewed for approval prior to construction.

4. Anchor lug attachment by filament winding as noted in Detail 12 is preferred. Provide a description of the tank knuckle and anchor lug attachment method in the proposal.
5. For alternate dome configurations, provide a complete description of the proposed configuration, including crown radius, knuckle radius, straight-side skirt length, and overall height.
6. Approximate shipping weight for each tank.
7. Case histories with current references for projects of similar scope which have been successfully completed using construction techniques similar to those specified.

B. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

C. Submit the following three weeks after contract award and prior to fabrication:

1. Detailed schedule including submittals, material order, shop fabrication, inspection milestones, and delivery of tanks.
2. Catalog cuts: Provide catalog cuts for all off-the-shelf items.
3. Orthographic drawings:
 - i) Orthographic drawings for the tanks shall be scale drawings showing the relative size, configuration, location, materials of construction, and details of all equipment and materials to be furnished including the tanks, nozzles, and tank hold down and support systems. Both plan and elevation views shall be provided. All necessary clearances required by applicable codes (California, Building Code, Fire Code, and Plumbing Codes) or for maintenance and operation shall be clearly indicated. All piping terminal points shall be clearly shown and fully dimensioned.
 - ii) Contractor shall submit for approval any shop drawings or procedures, fabrication information, design data or construction details needed to document alternates, clarifications or exceptions, to describe items not specified herein, or as required to satisfy the requirements of this specification. Review or approval of Contractor submittals by Engineer will in no way relieve the Contractor of responsibility for compliance with specification requirements.

- iii) All drawings shall be drafted by computer aided drafting method using either Bentley MicroStation or AutoCad and shall be in an 11"x17" format. After the drawings have been approved by the District, submit the CAD files of the approved drawings for District use as record drawings.
- 4. Detailed description and product data for construction of tank. The submittal shall include, but not be limited to:
 - i) Tank size, configuration, weights, and location of openings, nozzles, vents, brackets, hold downs, supports and picking points.
 - ii) Tank resin manufacturer and resin data sheet.
 - iii) Details of all equipment and accessories to be furnished with the tanks including nozzles, piping, manways, insulation, heat tracing, bolts, gaskets, brackets, platforms, ladder and their support systems. Indicate material of construction on drawings or provide information on catalog cut sheets.
 - 5. A Quality Control manual for approval prior to fabrication of any equipment. As a minimum, the QC manual shall include all procedures as required by section 4.1.
 - 6. Unloading and Handling Procedures: Provide written instructions and methods for unloading, storing, and handling.
 - 7. Test plan for hydrotesting and vacuum testing showing all equipment, procedures, and summary of data to be collected. See Article 4.1.H and 4.1.I for additional information. Submit test plans at least 15 business days ahead of scheduled testing.
 - 8. Installation instructions shall be complete, detailed, and sequenced instructions for original installation. Recommended methods for assembly and adjustment including all bolt torques shall be provided along with special precautions and the sequence of work. Rigging and lifting details shall also be included for all factory fabricated assemblies and individual components weighing over 100 pounds.

D. Submit the following one week prior to delivery or earlier:

- 1. QC documentation in accordance with section 4.1.
- 2. Factory Test Results: Provide a certified copy of all factory test results as required by section 4.1.

3. O&M Manuals: In addition to the requirements in Section 01 33 00, include final tank drawings, installation instructions, factory test reports, and provide a section for Fabricator's Certificate of Proper Installation and field test reports (to be inserted when available).
 4. Hydrotesting and vacuum testing results
- E. Submit the following prior to contract completion:
1. Record drawing CAD files in accordance with Section 01 33 00.
 2. Tank Fabricator's Certificate of Proper Installation.
- F. The Contractor shall provide on-site supervision of all aspects of delivery, handling, and installation.

1.6 CONTRACTOR'S FIELD SERVICES

- A. Contractor's fabrication representatives for the tanks and liners specified herein shall be present at the jobsite for the minimum person-days listed for the services below, travel time excluded:
1. One (1) person-day shown per tank for installation assistance, inspection, and certification of the installation
 2. One (1) person-day per tank for functional testing
- B. Contractor's fabrication representative for the storage tanks shall provide certificates of satisfactory installation stating that the tanks have been:
1. Installed in accordance with this specification and the Fabricator's recommendations and inspected by a Fabricator's authorized representative, and
 2. All applicable safety equipment has been properly installed, and
 3. The tanks are ready for start-up.

1.7 WARRANTY

- A. The Contractor shall provide a two-year warranty covering all defects in material and workmanship from the date of acceptance by the District but shall continue in full force and effect following notice from District of any warranty or guarantee issue, until such issue has been fully resolved to the satisfaction of District.

PART 2 - MATERIALS

2.1 FABRICATION DATA SUMMARY

- A. Bulk tank for 19% Aqueous Ammonia or Liquid Ammonium Sulfide (also known as ammonium hydroxide) and scrubber tank service:
 - 1. Corrosion Liner:
 - a. Two layers synthetic veil followed by three layers of 1-1/2 oz./sq.ft. chopped strand mat.
 - b. Sequence = NNMMM (see key in Laminate Sequence Tables at the end of this section).
 - c. Minimum thickness: 0.15 inch.
 - d. Resin: Derakane Signia 411-350 WSR, or AOC Vipel F013-H2O.
 - e. BPO/DMA catalyst system.
 - 2. Structural Laminates to be fabricated with the following:
 - a. Resin: Derakane Signia 411-350 WSR, or AOC Vipel F010-H2O, or AOC Vipel F013-H2O.
 - b. MEKP catalyst system.
 - 3. Postcure required, 4 hours at 180°.

2.2 RESIN

- A. Resin used throughout all laminates shall be premium grade bisphenol A epoxy-based vinyl ester as listed in the Fabrication Data Summary, or Engineer approved equal.
- B. Except as specified below, no fillers, additives, or pigments shall be used in the resin or resin putty.
 - 1. A thixotropic agent for viscosity control may be used in accordance with the resin manufacturer's recommendations.
 - 2. Thixotropic agent shall not be used in the corrosion liner or on surfaces that will be in contact with the corrosive environment.
 - 3. Resin putty shall be made with the same resin used in the laminates.

4. Resin putty shall contain a minimum 15 percent by weight of milled glass fibers. A fumed-silica additive may be added to increase the viscosity of the putty.

2.3 CATALYSTS/PROMOTERS

- A. Catalysts and cure system to be used in each service shall be as specified for the specific equipment in the Fabrication Data Summary, and shall conform to the requirements of the resin manufacturer.
- B. All catalyst, promoters and other additives shall be specifically as required by the resin manufacturer's Technical Data Sheet to comply with the requirement for NSF-61 certification.
- C. For BPO/DMA cure systems, the ratio of benzoyl peroxide to dimethylaniline must be in the range of 10 to 20 parts active BPO to one part DMA, (preferably 10-15:1). Ratios outside of this range may result in resin not gelling, gelling but not curing, or not curing to adequate hardness, regardless of the extent of posture.

2.4 REINFORCEMENT

A. General:

1. Fiber reinforcement shall have an epoxy compatible silane type surface finish and binder that is specifically recommended by the reinforcement manufacturer for the particular resin system to be used.

B. Surfacing Veils:

1. All surfacing veils shall be 10 mil nominal thickness.
2. Surfacing veil for inner surfaces shall be Type C-glass and synthetic surfacing veil, apertured such as Nexus 100-10, as specified in the Fabrication Data Summary and the Laminate Tables.
3. Surfacing veil for exterior surfaces shall be Type C-glass or A-glass.

C. Mat:

1. Mat shall be Type ECR glass with a weight of 3/4 or 1-1/2 ounce per square foot, as specified for the particular laminate.
2. Mat shall have a nominal fiber length of 1.25 inch, ± 0.75 inch

D. Roving:

1. Continuous glass roving used in chopper gun for spray-up shall be Type ECR chopper roving.
2. Woven roving shall be 24 oz./sq.yd. with a 5 x 4 plain weave, and be Type ECR glass.
3. Continuous glass roving used for filament winding shall be Type ECR glass with a yield of 200 yards or more per pound.
4. Unidirectional fabric shall be Type ECR glass. Weft style unidirectional fabric shall be approximately 16 ounce per square yard, made with glass strand of a yield greater than, (more yds/lb) that of the adjacent filament winding strand, and stitched in a manner that provides uniform strand density without bunching or gapping.

PART 3 - FABRICATION

3.1 FABRICATOR

A. Fiberglass tank fabricators:

1. Diamond Fiberglass, Victoria, TX
2. Plas-Tanks Industries, Inc., Hamilton, OH
3. Daniel Company, Upland, CA
4. Belco Manufacturing, Belton, TX
5. Augusta Fiberglass, Blackville, SC
6. Or equal as approved by the Engineer.

3.2 GENERAL

- A. Equipment shall be fabricated in accordance with the Details included in this Specification.
- B. Contractor shall provide any required fabrication details not covered in this specification. Proposed details must be approved by the Engineer prior to fabrication.
- C. Positive measurement control of catalysts, promoters, and resins shall be maintained.

3.3 AMBIENT CONSIDERATIONS

- A. Materials shall be stored in a dry area and within the temperature and humidity limits recommended by the material manufacturers.
- B. Temperature of materials and laminate surfaces during fabrication shall be maintained:
 - 1. Within a range of 60 degrees Fahrenheit to 95 degrees Fahrenheit.
 - 2. A minimum of 5 degrees Fahrenheit above dewpoint.
- C. Materials and laminate surfaces shall be protected from dust, fog, rain and other contaminants.
- D. If any of the above requirements are not met during final surface preparation or lamination, the affected plies shall be removed. The surface exposed due to the removal of the plies shall be abraded and prepared in accordance with this Specification before applying new plies.

3.4 MOLDS

- A. Molds shall be completely covered with mylar or other suitable material that produces a smooth and glossy internal surface.
- B. Mandrels shall be cylindrical and smoothly curved. Use of mandrels with a surface comprised of multiple flat segments is not allowed.

3.5 LAMINATES

- A. General:
 - 1. Laminate sequences shall conform to the Laminate Tables 1 through 5 at the end of this section, except as allowed by Article 3.6 of this section.
 - 2. Thicknesses shown are construction minimums. It is the responsibility of the Contractor to assure that minimum thickness is achieved using the specified sequence, or by adding layers of reinforcement if necessary.
 - 3. Reinforcement shall not be saturated on waxed paper or other contaminated material. Reinforcement may be saturated on clean paper or cardboard.
 - 4. Laminate surfaces that are not molded shall be coated with resin that contains sufficient wax to allow full cure of the surfaces.

5. For internal corrosion surfaces that are not molded, the resin/wax coat shall be applied within 24 hours of application of the laminate.
6. All external surfaces shall be covered with a surfacing veil and a natural translucent wax coat containing U.V. stabilizer. Type and amount of U.V. stabilizer shall conform to the recommendation of the resin manufacturer.
7. Chopped strand glass applied by chopper gun may be used in lieu of mat plies if:
 - a. The application is mechanically controlled in a manner that ensures uniform thickness and uniform glass-to-resin ratio.
 - b. The application procedure is approved by the Engineer prior to fabrication.

B. Corrosion Liner Laminate:

1. Inner surface of all laminates shall be resin rich and reinforced with 1 or 2 layers surfacing veil as specified in the Fabrication Data Summary and the Laminate Tables.
2. Interior layer of the corrosion liner shall consist of 2 or 3 layers of 1-1/2 ounce per square foot mat, as specified in the Fabrication Data Summary and the Laminate Tables.
3. Corrosion liner laminate shall contain not less than 20 percent nor more than 30 percent glass (by weight).
4. Interruptions in the application of the corrosion liner laminate are not allowed.
5. Minimum thickness of corrosion liner laminate shall be as required in the Fabrication Data Summary.
6. Edges of surfacing veils shall be lapped a minimum of 1 inch.

C. Hand Lay-up Structural Laminate:

1. Structural laminate reinforcement shall consist of alternating layers of mat and woven roving plies, as specified in the Laminate Tables.
2. Woven roving plies shall have a mat ply on each side.
3. Edges of woven roving layers shall be lapped a minimum of 2 inches. Lapped edges of adjacent plies shall be staggered.

4. Laminate that is made up primarily of 1 ½ ounce per square foot mat plies and woven roving plies shall contain not less than 35 percent or more than 45 percent glass (by weight).
5. Laminate that is made up primarily of ¾ ounce per square foot mat plies and woven roving plies shall contain not less than 45 percent or more than 55 percent glass (by weight).

D. Filament Wound Structural Laminate:

1. Structural laminate reinforcement shall consist of continuous strand hoop (approx. 90°) winding, unidirectional (axial) roving, and chopped strand glass, as described in the Laminate Tables.
2. Each cycle of filament winding shall completely cover the surface uniformly without bunching or gapping.
3. Each layer of hoop winding or unidirectional roving shall be separated by a layer of chopped strand glass, as shown in the Laminate Tables.
4. Adjustments in the winding laminate sequence may be proposed, but basic ratios of hoop, axial and random chopped glass must be maintained. Changes to the specified laminate sequence require Engineer approval.
5. Edges of unidirectional roving layers shall be lapped a minimum of 2 inches. Axial glass strands shall be oriented within $\pm 5^\circ$ of the axial centerline of the tank.
6. Filament wound structural laminate consisting of hoop winding, unidirectional roving and chopped strand glass shall contain a minimum of 53 percent glass by weight.
7. Layers of mat may be added as required:
 - i) To ensure proper bonding between the corrosion liner and the filament windings.
 - ii) Within the filament windings to accommodate the manufacturing method.
 - iii) To provide laminate of acceptable quality.
8. Additional layers of mat beyond those specified in the Laminate Tables are not considered as part of the specified wall thickness.

3.6 EXOTHERM DELAYS

- A. Delays in laminating sequence are suggested after exotherm plies (E or e) as shown in the Laminate Tables. If interruptions are needed other than as suggested:
1. They shall follow application of a mat (M or m) ply.
 2. Lamination shall not proceed until the exotherm has completed and the laminate has cooled to 95 degrees Fahrenheit or less.
 3. Laminate shall not be cooled by artificial means.
 4. When lamination is resumed, it shall begin with a mat (M or m) ply. This may require an additional ply beyond the number of plies specified.
- B. If application of filament winding is interrupted such that the outer surface gels:
1. Application shall be discontinued and the laminate shall be allowed to cure and exotherm.
 2. Ridges on the cured surface shall be ground smooth.
 3. After grinding, a layer of mat or chopped glass shall be applied, and application of the filament winding shall resume before this layer gels.
 4. Additional mat layer shall not be considered as part of the specified wall thickness.
- C. If interruptions in laminating exceed 24 hours or the laminate surface loses acetone sensitivity or is contaminated, the surface shall be abraded and prepared in accordance with this Specification before the laminating sequence resumes.

3.7 SECONDARY OVERLAYS

- A. General:
1. Secondary overlays used for joining or construction of components shall be in accordance with the Details at the end of this section.
 2. Use of additional joints or other joint designs is not allowed.
 3. If joint locations are required for construction of tank shells, Contractor shall propose number and location for approval of Engineer.
- B. Surface Abrasion:

1. Surfaces that will receive a secondary overlay shall be abraded prior to application of the overlay.
2. Abraded area shall extend a minimum of 1 inch beyond the edge of the secondary overlay.
3. If application of the secondary overlay does not begin within four hours of surface abrasion, the abrasion shall be repeated.
4. Abrasion shall remove all traces of glossy resin coat and shall expose the glass fiber over the entire abraded area.
5. Perimeter of the abraded area shall be smoothly contoured into the surrounding surface.
6. Abrasion shall be done by grinding. Grinding disks shall be new and not contaminated and shall have a grit size of 16 to 24.

C. Final Surface Preparation:

1. Dust shall be removed from the abraded area immediately prior to beginning application of the secondary overlay.
2. Dust shall be removed by vacuuming or brushing with clean non-metallic brushes or by wiping with clean dry rags.
3. Dust shall not be removed with solvent or with compressed air.
4. If abraded area shows any indication of contamination, it shall be cleaned with solvent, allowed to evaporate and abrasion of the area shall be repeated.

D. Application of Secondary Overlays:

1. Equipment components to be joined shall be restrained from movement until the secondary overlays are completed.
2. Cut edges of laminates shall be thoroughly coated with resin such that no glass fibers are exposed. Voids shall be filled with resin putty.
3. The puttied area shall be ground to a smooth contour and the surface shall be prepared in accordance with this specification.
4. Immediately resin coat the abraded area, using a brush to work the resin into the surface.

5. Resin coats shall be applied only to the portion of the abraded areas that will be covered immediately by secondary overlay.
6. Resin coats shall not contain any thixotropic material.
7. Unless otherwise specified, beginning ply width for joint overlays shall be 4". Successive plies shall uniformly increase in width until the minimum total joint width is achieved. Joint width specified is exclusive of the exterior surfacing veil layer.
8. Secondary overlays at joints shall extend equally within $\pm 1/2$ inch on each side of the joint.
9. Tolerance on width of secondary overlays shall be +1 inch, -0 inch.
10. Woven roving plies shall not exceed the width of the mat ply below them.
11. Abraded area that is not covered with the secondary overlay shall be surface coated after completion.

3.8 TANK ASSEMBLY

- A. Tolerances for fabrication of the tank shall conform to ASME RTP-1, Figure 4-1 and NM7-1, and the following. Where conflicts occur, the most stringent requirement shall apply.
 1. Laminate thicknesses as specified on the Details provided at the end of this section and in the Laminate Tables are considered to be construction minimums.
 2. Gaps at mating edges of equipment and misalignment of inside surfaces of equipment components shall be a maximum of $1/3$ of the wall thickness of the component with the thinner wall.
 3. The outside surface of tank flat bottoms after assembly shall be flat within 1% of the tank diameter. In addition, localized indentations or protrusions shall not exceed $\pm 1/4$ " within two feet.
- B. Mid-shell slip joints used for connecting short sections of tank shell by overwinding are not allowed.
- C. A non-skid surface shall be provided on the exterior surface of the domed cover. Silica grit may be applied in conjunction with the final resin coat, or other methods employed if approved by the Engineer.

3.9 NOZZLES/FLANGES

- A. Flanged nozzles shall conform to the Details provided at the end of this specification section.
- B. Nozzle neck and flange shall be made in one piece, with all layers of reinforcement in the nozzle neck and hub extending uninterrupted into the flange. Corrosion liner thickness shall extend completely across flange face. The “flange on pipe” method of nozzle fabrication shown in ASME RTP-1, Fig. 4-6(a) is not allowed.
- C. Additional thickness in the hub shall be obtained with alternating layers of 1 ½ ounce per square foot mat and 24 ounce per square yard woven roving.
- D. Additional thickness in the flange shall be obtained with layers of mat. These mat layers shall be uniformly distributed throughout the flange thickness.
- E. Flanges 3 in. diameter and smaller may be manufactured using a lighter weight roving or cloth in lieu of 24 oz./sq. yd woven roving specified in the Laminate Tables, provided the same total amount (by weight) of woven material is applied. Specific alternate materials and sequence shall be submitted to Engineer for approval prior to manufacture.
- F. Plies of 24 oz./sq.yd. woven roving shall have a mat ply on each side. When multiple plies of lighter weight woven material are used in lieu of a single ply of 24 oz./sq.yd woven roving, they may be applied back-to-back, but not to exceed the thickness of the 24 oz./sq.yd woven roving.
- G. Back of flanges shall be spotfaced at the bolt holes for proper bearing of the bolt heads and washers. Overall machining of the back of the flange is allowed if the fillet radius is maintained and the hub reinforcement is not undercut.
- H. Size of spotfacing shall accommodate SAE size washers. Spotfacing or backfacing shall not produce a flange thickness less than that specified.
- I. Tolerances for dimensions and flatness of flanged nozzles and manways shall conform to RTP-1 Fig. 4-5(a) and paragraph 4-700. .
- J. Unless otherwise specified, flanged nozzles shall be installed with the bolt holes straddling the vertical and the horizontal centerlines of the equipment.
- K. Potential warping of flanges shall be anticipated and corrected by machining if necessary to achieve the required flatness tolerance. Full required corrosion liner thickness shall be maintained and surfacing veils shall be restored after machining.
- L. Bolt holes shall be coated with resin such that no fibers are exposed.

3.10 POSTCURE

- A. If necessary to achieve a full cure, completed equipment shall be postcured in accordance with the resin manufacturer's recommendations.
- B. Tanks required to be certified for NSF-61 shall be postcured in all cases, in accordance with the resin manufacturer's minimum requirements.
- C. Equipment shall be inspected, all necessary repairs completed and approved by the Engineer prior to postcure.
- D. Postcuring shall be done in a manner that assures minimum temperature requirements are achieved in all parts of the vessel without overheating of any localized areas.
- E. Minimum Barcol hardness shall be 90 percent of the resin manufacturer's minimum recommended Barcol hardness.

PART 4 - INSPECTION AND TESTING

4.1 CONTRACTOR'S INSPECTION AND TESTING

- A. General:
 - 1. Contractor shall implement a quality control procedure which verifies and documents that materials, fabrication operations, and completed tank complies with this specification.
 - 2. Quality control shall include a final inspection by the Contractor and a written record of this final inspection. The objective of Contractor's quality control and inspection procedure is to have the tank comply with these Contract Documents at the time of the Engineer's first inspection, thus eliminating any need for rework by the Contractor or a second inspection by the Engineer.
 - 3. As a minimum, the Quality Control procedure shall include adequate inspection and/or testing to verify and document the following:
 - i) Allowable visual defects.
 - ii) Sequence and thickness of laminates.
 - iii) Glass content of laminates.
 - iv) Filament winding angle
 - v) Barcol hardness.

- vi) Lack of acetone sensitivity.
 - vii) Dimensional tolerances.
 - viii) Conformance to Details.
 - ix) Surface preparation prior to secondary overlays.
 - x) Ambient conditions during fabrication.
 - xi) Postcure procedures.
- 4. The Contractor's quality control manual and all documentation shall be made available for the Engineer's review at all times during the fabrication.

B. Resin Testing:

- 1. Contractor shall test resin to establish cure characteristics and verify that it meets the acceptance standards of the resin manufacturer.
- 2. Resin testing shall be performed in accordance with ASTM D2471. Gel time, time to peak exotherm, and peak exotherm temperature shall be recorded.
- 3. If resin is used in the form it is received, one test shall be performed for each manufacturer's batch number.
- 4. If resin is altered with additives, one test shall be performed for each drum of resin, or portion thereof, that is mixed with additives.
- 5. Documentation shall be provided for each test that includes resin type, manufacturer, batch and lot number, drum number, listing and amount of additives, description and manufacturer of additives, catalyst type and amount.

C. Inspection of Glass Reinforcement:

- 1. Glass reinforcement shall be inspected prior to using it in the fabrication.
- 2. Glass that does not meet the acceptance standards of the glass manufacturer shall not be used.
- 3. Glass reinforcement that is wet or has been wet shall not be used.

4. Documentation shall be provided for each type of glass and lot number that includes product description, manufacturer, binder type, product code, and production date.

D. Sampling and Inspection of Laminates:

1. Nozzle cutouts and other excess laminates shall be retained for use as samples.
2. Samples shall be clearly marked to indicate the location from which they were taken.
3. At the Engineer's request, sample plugs shall be taken at locations not otherwise sampled. Subsequent holes shall be repaired with a procedure approved by the Engineer.
4. Laminate samples shall become the property of the Engineer at the Engineer's option.
5. Available samples from at least two representative areas of each major equipment component shall be tested and documented as follows:
 - i) Measure and record total thickness, corrosion liner thickness and structural laminate thickness.
 - ii) Separate the corrosion liner from the structural laminate and determine glass content for each per ASTM D2584.
 - iii) Record the sequence and orientation of individual reinforcement plies from the remains of the ignition test.

E. Visual Inspection:

1. Contractor shall take care to minimize the amount of defects in all laminates. In no case shall visual defects in any area of the equipment exceed the maximum allowable levels of visual defects set forth in ASME RTP-1, Table 6-1, Level 2. Allowable defects apply to small localized areas and shall not be averaged over larger areas.
2. Air entrapment limits, (gaseous bubbles or blisters), that are required to supplement ASME RTP-1 Table 6-1, shall be as follows. Dimensions refer to the largest measured dimension for any specific defect. Defects at the interfaces between layers are subject to the most stringent requirement.
 - i) Inner Surface: 2 per sq. in. up to max. size of 1/16 inch, except < 1/64 inch is unlimited.

- ii) Interior Layer: 2 per sq. in. up to max. size of 1/8 inch, except < 1/32 inch is unlimited.
 - iii) Structural Layer: 2 per sq. in. up to max. size of 3/16 inch, except < 1/16 inch is unlimited.
3. Presence of visual defects in excess of the allowable levels shall be grounds for rejection of the equipment.

F. Non-Conformances and Repairs:

- 1. A component will be considered to be a non-conformance when it is found to deviate from the specifications, project drawings or other approved documents.
- 2. All non-conformances shall be documented and brought to the attention of the Engineer.
- 3. Damaged material and material not conforming to the specifications and drawings may be rejected by the Engineer at any time.
- 4. The Contractor shall correct or replace any components in non-conformance as directed by the Engineer.
- 5. Any repairs recommended by the Contractor shall be described in detail and submitted to the Engineer for approval prior to implementation.

G. Documentation:

- 1. Contractor shall provide copies of all records produced from the inspection and testing of the equipment, and during fabrication when requested.
- 2. The report shall also include a record of as-built dimensions and other data, to document any changes made and accepted during the fabrication.

H. Shop Hydrotesting:

- 1. Each tank shall be hydrostatically tested for leaks at the factory by filling with water. Each FRP tank shall be checked for leaks after it has been filled for at least 2 hours. The Contractor shall run this test prior to shipment of the tanks. No leakage will be allowed.

2. Hydrotesting shall be performed after completion of the fabrication, after all laminates are fully cured, and after inspection and approval by the Engineer.
3. Hydrotesting shall be performed at the design pressure (as measured at the top of the vessel) stated in Table A. Temporarily anchor tank prior to testing. No deformation of the tank or its anchor lugs is allowed during and after testing.
4. The District shall witness all hydrotesting.

I. Shop Vacuum Testing

1. Contractor shall evacuate the tank to vacuum pressure stated in Table A for a minimum of 2 hours. Temporarily anchor tank prior to testing. No deformation of the tank or its anchor lugs is allowed during and after testing. Some seepage is allowed provided that the vacuum test pressure is held for the minimum specified time.
2. The District shall witness all vacuum testing.

4.2 INSPECTION AND TESTING

A. General:

1. Contractor shall comply with requirements described in Section 01 45 27 – Shop Inspection
2. The Engineer will inspect fabrication on an intermittent and up to a full-time basis. The Contractor shall provide cooperation, scheduling information, and complete access to the Engineer during such inspection.
3. The Engineer shall be given access to the equipment and all quality control records during fabrication and upon completion for the purpose of verifying compliance to this specification.
4. Contractor shall give the Engineer advance notice of occurrence of the following milestones per Section 01 45 27 – Shop Inspection:
 - i) Beginning of shop fabrication of components.
 - ii) Welding of structural components
 - iii) Beginning of application of corrosion liner for each tank shell or section.

- iv) Beginning of nozzle installation for each tank.
- v) Beginning of each shell joint.
- vi) Tank completion.
- vii) Hydrotesting
- 5. Inspection by the Engineer does not relieve any responsibility of the Contractor to meet the requirements of this specification.
- 6. The Engineer retains the right to employ any of the following techniques as a part of the inspection, including but not limited to:
 - a. Photography.
 - b. Magnification or other special viewing techniques.
 - c. Ultrasonic, magnetic or other special non-destructive measurement techniques.
 - d. Barcol hardness testing.
 - e. Acetone sensitivity testing.

B. Final Inspection:

- 1. The Engineer will carry out a final inspection of the equipment prior to shipment. Contractor shall give the Engineer advance notice of completion per Section 01 45 27 – Shop Inspection.
- 2. Prior to final inspection by the Engineer:
 - i) Equipment shall be cleaned of all foreign material.
 - ii) Obstructions to the inspection shall be removed.
 - iii) Tank shall be in a position that allows easy access and viewing.
- 3. If requested during final inspection, the tanks shall be moved as required to allow viewing of all parts.

C. Testing:

- 1. The Engineer retains the right to employ testing on equipment samples for the purpose of verifying physical properties, glass

content, laminate sequence, or other parameters which are specified or which form the design basis of the equipment.

2. Testing will be performed by an independent party in accordance with applicable ASTM standards and at no cost to the Contractor.

4.3 REPAIR OF EQUIPMENT

- A. At the Engineer's option, equipment may be repaired in order to meet the requirements of this specification.
- B. Repair procedures shall be submitted for approval to the Engineer prior to their implementation.

PART 5 - HANDLING AND SHIPPING

5.1 HANDLING

- A. Loads imposed on the FRP tanks or shell sections during handling, storage, and erection shall be considered and precautions taken to assure that damage does not occur. Conditions such as ovaling and localized stresses at lifting/anchor points and temporary support points are of particular importance.
- B. Equipment shall not be rolled, slid, dropped, allowed to swing into other objects, or forced out of shape.
- C. Care shall be exercised to prevent tools, scaffolding, or other objects from striking or being dropped on or inside the equipment.
- D. Personnel entering the equipment shall wear soft-soled shoes.
- E. Equipment shall be lifted/positioned using proper rigging and hoisting practices.
- F. Unless otherwise specified, a crane shall be used to lift/position the equipment.
- G. Lifting slings that will be in direct contact with the equipment shall be made from woven nylon or canvas and shall be a minimum of 3 inches wide.
- H. Care shall be exercised to prevent shackles, eyes, hooks, etc. from coming into contact with the equipment.
- I. Lifting slings shall not be attached to, or allowed to come in contact with, nozzles, flanges, gussets, or other fittings.

5.2 SHIPPING

- A. The Contractor shall be responsible for shipping, handling, and delivery of the tank and accessories so as to prevent transit and handling damage to the tanks and coatings.
- B. The Contractor and the Engineer shall coordinate the delivery schedule.
- C. Contractor shall provide instructions for unloading, storage and installation of all tank and accessories.
- D. Contractor shall be responsible for packing and loading equipment and associated materials in a manner that precludes damage during shipping.
- E. Support saddles used to ship tank in a horizontal position shall be padded and support a minimum of 90° of the circumference.
- F. Smaller tanks shall be mounted on skids or protective framework so constructed as to provide for easy handling by fork truck or similar device, and shall also be provided with lifting lugs, cleats, etc. to permit handling by crane.
- G. Blocking that is used to prevent shifting of equipment shall be padded.
- H. Equipment shall be mounted on the shipping vehicle such that there is a minimum clearance of 2 inches between equipment projections, such as nozzles, and the bed of the shipping vehicle.
- I. If two or more pieces of equipment are shipped together there shall be sufficient clearance between them to prevent contact in transit.
- J. Flange faces shall be protected from damage. All openings are to be covered with securely bolted PVC blind flanges to prevent entrance of dirt, water and debris.
- K. Loose parts, such as fasteners, gaskets, and accessory fittings, shall be securely packed to allow storage in the field. No components or other pieces shall be shipped loose inside of the tanks.
- L. Each shipping crate shall be clearly marked with its contents.
- M. Additional requirements are per ASME RTP-1, NM-8.

PART 6 - INSTALLATION

6.1 RECEIVING

- A. The Engineer will inspect tanks upon receipt and prior to off-loading to identify any damage that may have occurred during transit. The Engineer will inspect the exterior surfaces for cracks, scuffs, abraded areas, unusual distortion or other evidence of contact by straps, shipping dunnage or other external sources.

- B. If evidence of external contact is identified, the Engineer will inspect the interior of the tanks, especially at the location of the external contact. What can appear as minor scuffs or abrasion on the external surface can be the cause of more serious internal star fractures in the corrosion liner.
- C. Any damage identified will be evaluated by the Engineer for a determination of whether the tank can be repaired onsite, returned to the tank manufacturer for repair, or rejected if not repairable.

6.2 GENERAL

- A. Installation, handling, and storage of the tanks shall be in strict accordance with this Section and the tank Contractor's printed instructions. Tanks shall be inspected for proper installation. The tank supplier shall coordinate and supervise all aspects of delivery, handling, and installation.
- B. The District shall be responsible for all off-loading, storage, placement and installation of the tanks, as well as connection and integration of the tanks and appurtenances with the chemical pumps and piping.
- C. The tanks shall be set on a cushioning pad of several layers of 30 lb roofing felt, or equivalent, to minimize stresses and compensate for concrete slab irregularities in accordance with tank fabricator recommendations.
- D. All connecting of piping, accessories and other hardware, and fastening down of the tanks, shall be performed prior to final testing. Final location of fittings and valves will be made by the Engineer during submittal review.
- E. The tank Contractor shall inspect the installed tanks and complete a Tank Fabricator's Certificate of Proper Installation.

6.3 FOUNDATION

- A. The District is responsible for providing foundations for the tanks. Foundations shall be assumed to be existing concrete pads as shown in the Drawings.
- B. The tank foundation shall be flat, level and provide full non-elastic support to the flat bottom.
- C. Where tank foundations are recessed to accommodate bottom drains, the recessed area shall be filled after tank installation is complete with grout or other material which will provide localized support. Grout filling shall be flush with the original surface of the tank pad, and shall not result in any deformation of the tank bottom.
- D. Preliminary bolt circle can be determined from the fabrication details herein; however, final bolt circle depends on fabrication methods and typical over-thickness and a larger bolt circle is very likely. Anchor bolts shall be located after tank fabrication and installation.

- E. Prior to tightening anchor bolts, hard shims or grout shall be installed under all anchor lugs, in a manner that prevents distortion of the lug or tank shell when tightened.
- F. Additional requirements are per ASME RTP-1, NM-9.

6.4 PIPING

- A. All piping, valves or other equipment bolted to FRP flanged nozzles shall be independently supported, to minimize loads on the tank nozzles. Potential load due to thermal expansion of piping shall be considered and isolated if necessary.
- B. Do not force piping into alignment or close gaps by tightening bolts to make the connection. Mating piping flanges shall be brought into alignment without gaps or the use of excessive force, prior to insertion and tightening of bolts. This may require adjustment and field joining of the piping after the tank connection is made.
- C. FRP full faced flanged nozzles shall be only bolted up to flat faced connecting equipment or piping. Do not mate FRP full faced flanges to raised face flanges or ring gaskets.
- D. Only full faced gaskets shall be used for installation.
- E. Tighten bolts in a uniform and criss-cross pattern per the sequence shown in ASME RTP-1 Fig. NM9-3, using three equal increments to achieve the final torque. The recommended bolt torques listed below are the estimated minimum that is required to seal the flange during operation. Recommended torque may be increased by 50% safely if required.

Flange Diameter	Bolt Diameter	Bolt Torque (ft-lb)	
		Recommended	50% Increase
2"	5/8"	12.0	18.0
3"	5/8"	15.0	22.5
4"	5/8"	15.0	22.5
6"	3/4"	17.0	25.5
30" top manway (Pressurized Ammonia Tank)	3/4"	25.0	37.5

- F. In addition to these requirements, also satisfy all installation requirements of ASME RTP-1 and recommendations provided by the FRP tank fabricator.

6.5 FIELD QUALITY CONTROL

- A. Field Tests:

1. Hydrostatic Test: The tanks shall be filled with water after all connections, except for vent/overflow line, have been made. There shall be no leakage, no signs of weeping, and no signs of capillary action over a period of 48 hours.
2. Should any defects become evident during inspection, testing, or within the guarantee period, the Contractor shall repair or replace the defective tank or fitting as approved by the Engineer.
3. The District shall furnish all labor, materials and equipment required for tests.
4. The Contractor shall have a quality control procedure adequate to ensure that all installation procedures comply with this specification and the fabricator's installation requirements. Quality control shall include a final inspection by the Contractor and a written record of this final inspection.
5. After testing, the tanks shall be thoroughly cleaned and dried.

Notes:

1. Key for Tables 1 through 5:

N = 10 mil synthetic surfacing veil (0.010")
 C = 'C'-glass surfacing veil ('A' glass acceptable on exterior) (0.010")
 M = 1 1/2 oz./sq.ft. mat (0.043")
 E = 1 1/2 oz./sq.ft. mat, exotherm ply (0.043")
 m = 3/4 oz./sq.ft. mat (0.022")
 e = 3/4 oz./sq.ft. mat, exotherm ply (0.022")
 R = 24 oz./sq.yd. woven roving, 5x4 plain weave (0.033")
 H = Hoop (approx. 90°) filament winding (0.025")
 U = 16 oz./sq.yd. unidirectional roving (0.021")
 c = 1/2 oz./sq.ft. chopped strand mat (0.014")

TABLE 1	FILAMENT WOUND LAMINATE CONSTRUCTION							
Total Thk.	Min. Glass %	Structural Thk.	C/N	M/E	H	U	c	Sequence of Plies
0.66"	53%	0.50"	3	3	10	3	13	NNMME 2(cHcUcHcH) cHcHcUcHcH C

TABLE 2	HAND LAYUP LAMINATE CONSTRUCTION			
Thk.	C/N	M/E	R	Sequence of Plies
0.32"	3	6	1	NNMME MRMM C
0.34"	4	8	-	NNMME MM MMMNN
0.35"	3	6	2	NNMME MRMRM C
0.43"	3	7	3	NNMME MRMRMRM C
0.57"	4	10	3	NNMME MRMRMRE MMMNN
0.59"	3	10	4	NNMME MMRMRE MRMRM C
0.86"	3	14	7	NNMME MRMRMRE MRMRE MRMRMMC
0.96"	3	15	9	NNMME MRMRMRE MRMRMRE MRMRMMC

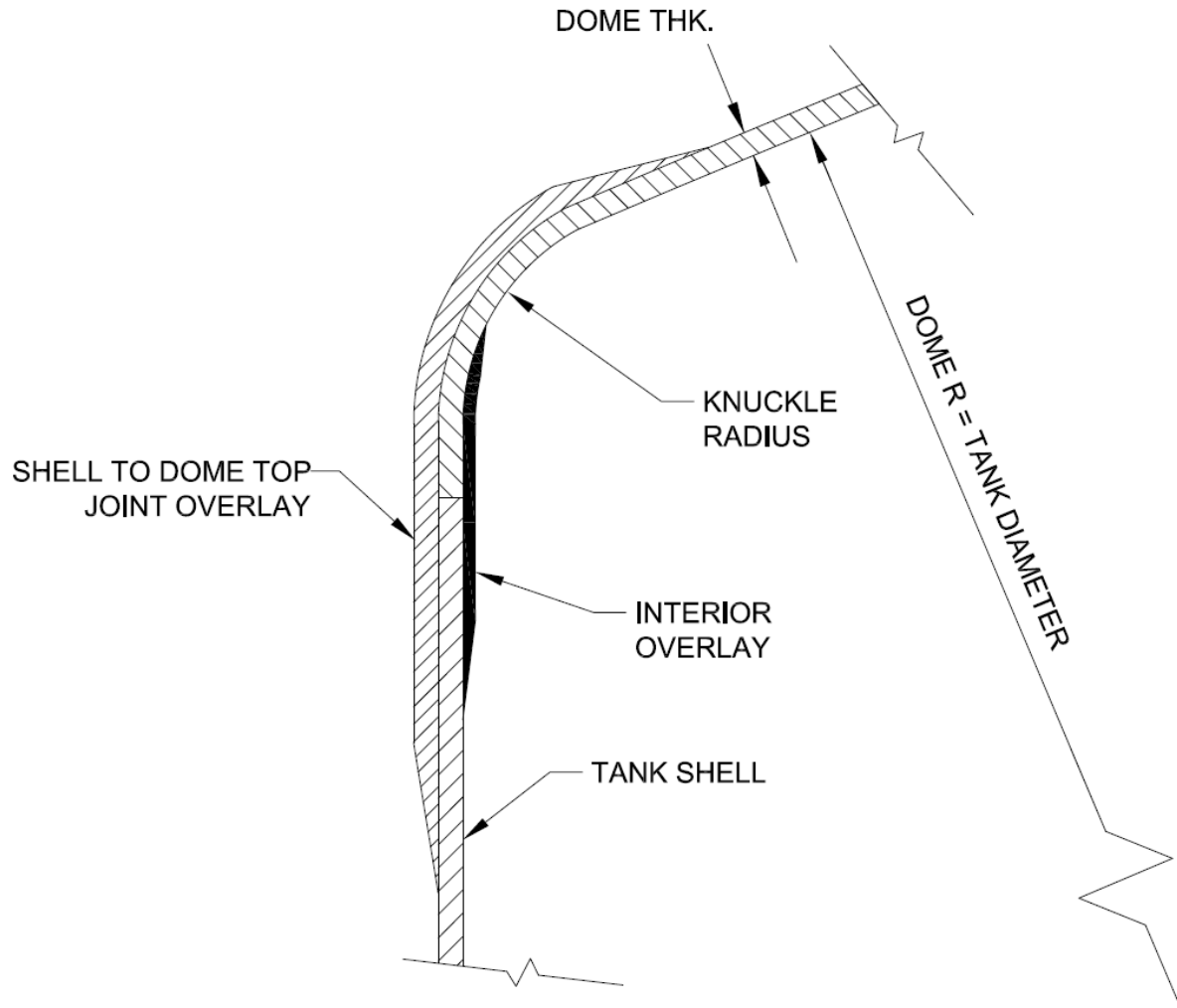
Laminate Sequence Tables 1 & 2

TABLE 3	EXTERIOR JOINING LAMINATE CONSTRUCTION			
Thk.	C/N	M/E	R	Sequence of Plies
0.14"	1	3	-	MMM C
0.17"	1	3	1	MMRM C
0.25"	1	4	2	MMRM C
0.31"	2	6	1	MMMRMMNN
0.32"	1	5	3	MMRM C
0.38"	2	6	3	CMMRM C
0.44"	1	7	4	MMRMRE MRM C
0.80"	1	12	8	2(MRMRE) MRM C

TABLE 4	INTERIOR JOINING LAMINATE CONSTRUCTION			
Thk.	C/N	M/E	R	Sequence of Plies
0.16"	2	3	-	MM NN
0.26"	3	6	-	NMM MMNN
0.31"	2	6	1	MMMRMMNN

TABLE 5	HIGH STRENGTH LAMINATE CONSTRUCTION			
Thk.	C/N	m/e	R	Sequence of Plies
0.91"	1	19	15	3(mRmRmRm) mRmRm C

Laminate Sequence Tables 3, 4 & 5

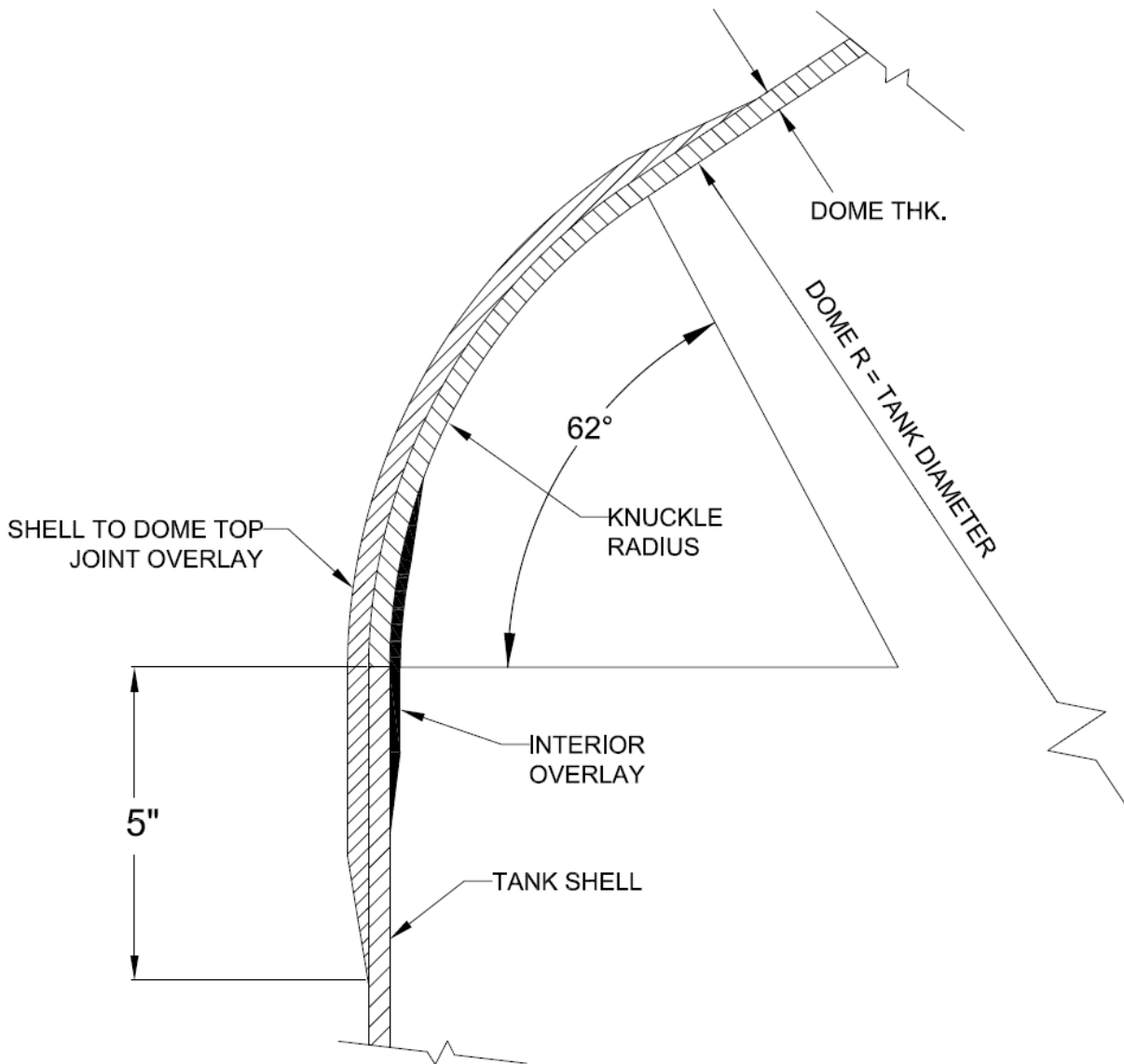


TANK	DOME THK (TABLE 2)	EXTERIOR OVERLAY (TABLE 3)	INTERIOR OVERLAY (TABLE 4)
4 ft. dia. Ammonia Scrubber	0.32"	0.25" by 8" wide	0.16" by 6" wide

Notes:

1. Minimum knuckle radius = 1.5".

Detail 1 – Dome Knuckle and Shell Joint
(Ammonia Scrubber)

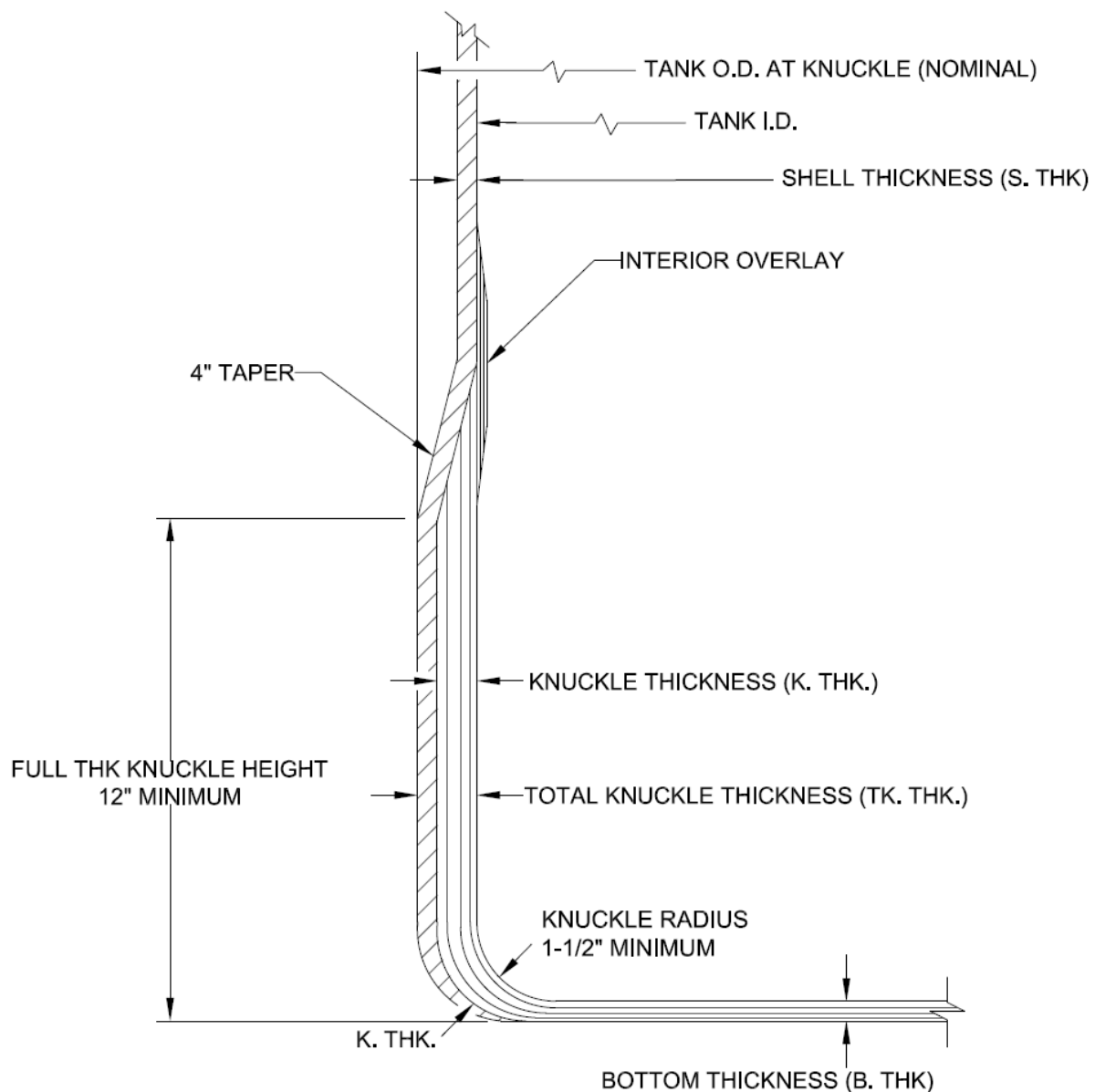


TANK	DOME THK (TABLE 2)	EXTERIOR OVERLAY (TABLE 3)	INTERIOR OVERLAY (TABLE 4)
10 ft. dia. Ammonia	0.59"	0.44"	0.16" by 6" wide

Notes:

1. Minimum knuckle radius to be 6% of dome radius.
2. Exterior overlay width as shown

Detail 2 – Dome Knuckle and Shell Joint
(Pressurized Ammonia Tanks)

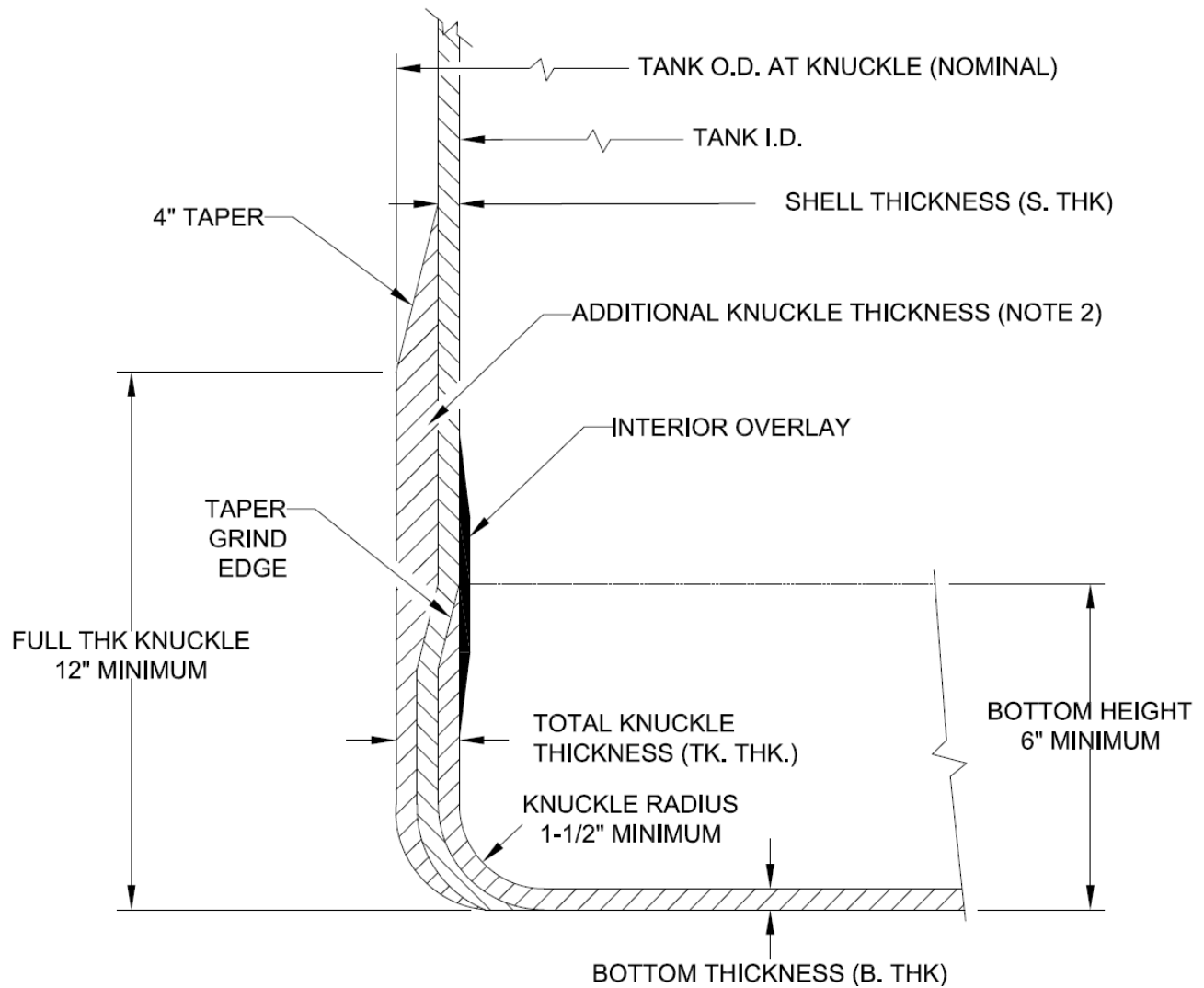


TANK	S.THK (TABLE 1)	B.THK (TABLE 2)	K.THK (TABLE 2)	TK.THK	INTERIOR OVERLAY (TABLE 4)
10 ft. dia. Ammonia	0.66"	0.86"	0.96"	1.46"	0.16" by 6" wide

Notes:

1. Flat bottom and knuckle to be laid-up on mandrel and overwound with the filament wound shell. All reinforcement layers to extend through radius to tangent point of flat bottom.
2. Total Knuckle Thickness includes structural portion of filament wound shell.
3. Outer surface in knuckle area to be uniform and vertically flat to accommodate anchor lugs.
4. Increase Full Thk Knuckle Height as required to accommodate anchor lugs.

Detail 3A –Integral Bottom and Knuckle

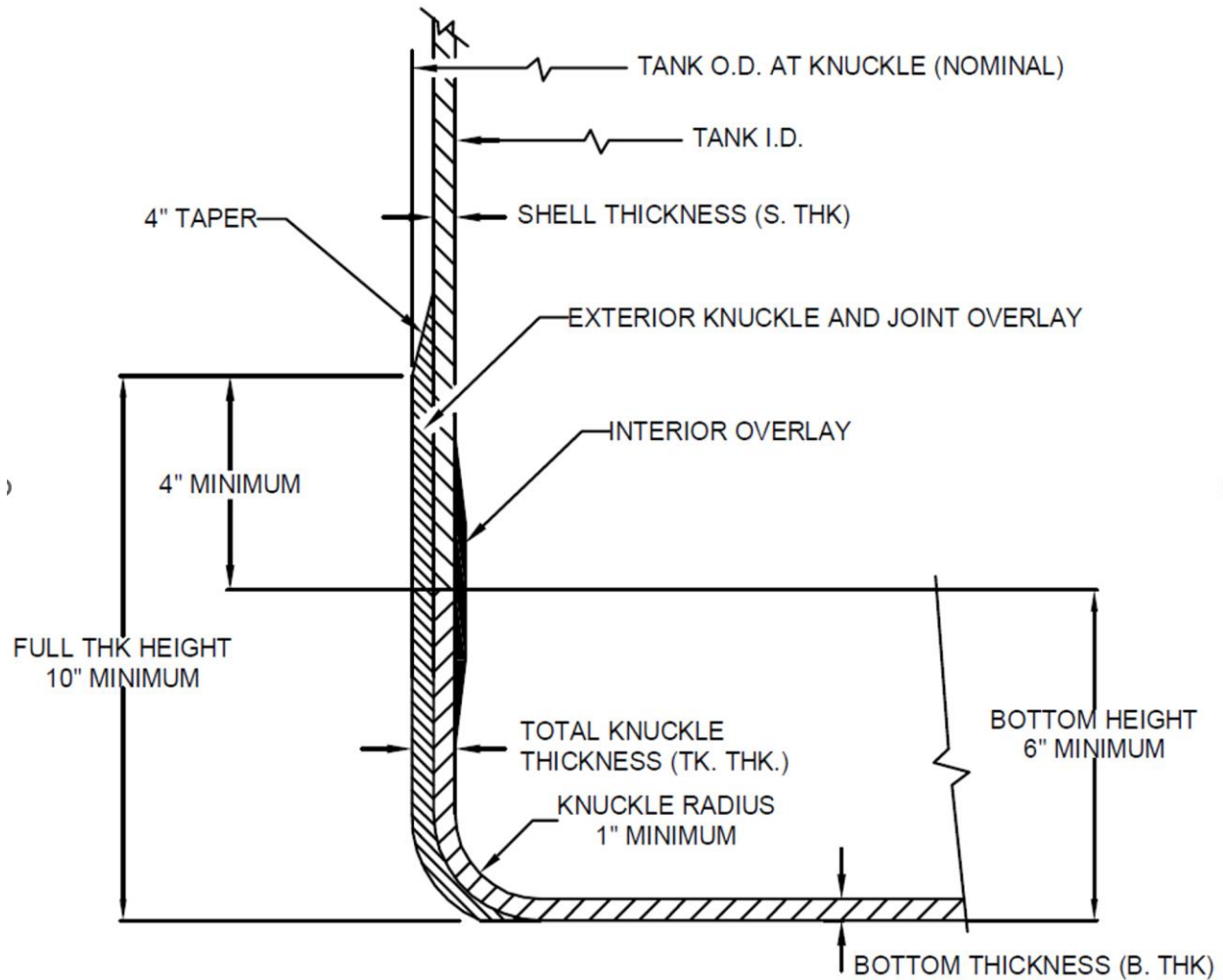


TANK	S.THK (TABLE 1)	B.THK (TABLE 2)	AK.THK (TABLE 3)	TK.THK	INTERIOR OVERLAY (TABLE 4)
10 ft. dia. Ammonia	0.66"	0.86"	0.80"	1.46"	0.16" by 6" wide

Notes:

1. Filament wound shell to overwind molded bottom, with all layers of unidirectional roving extending within 1" of bottom.
2. Additional knuckle thickness to be a minimum of AK.THK (Table 3) above the joint line. Increase this thickness, or reduce this thickness below the joint line as necessary to achieve vertical flatness and total knuckle thickness TK.THK. All reinforcement layers to extend through radius to tangent point of flat bottom.
3. Outer surface of knuckle build-up to be uniform and vertically flat to accommodate anchor lugs.
4. Increase Full Thk Knuckle Height as required to accommodate anchor lugs.

Detail 3B – Alternate Bottom Knuckle

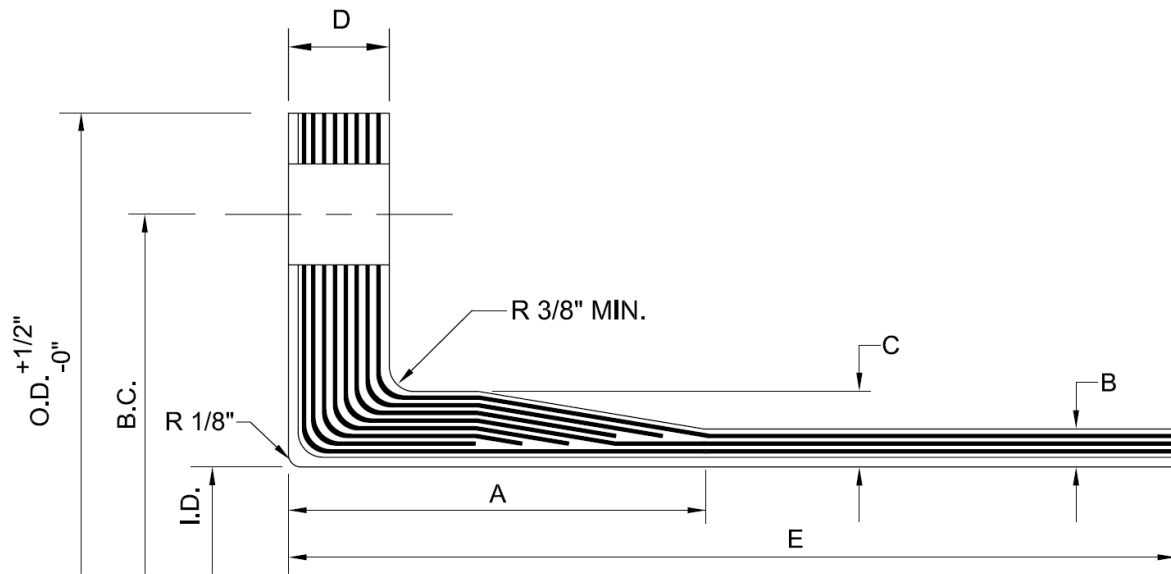


TANK	S.THK (TABLE 2)	B.THK (TABLE 2)	EXTERIOR OVERLAY (TABLE 3)	TK.THK	INTERIOR OVERLAY (TABLE 4)
4 ft. dia. Ammonia Scrubber	0.35"	0.35"	0.44"	0.79"	0.16" by 6" wide

Notes:

1. Exterior joint and knuckle overlay are combined and are to extend through radius to tangent point of flat bottom.
2. Increase Full Thk Knuckle Height as required to accommodate anchor lugs.
3. Tank O.D. is nominal and preliminary, based on design thicknesses and knuckle build-up. Total thickness in this area is typically greater than specified minimums.

Detail 4 – Bottom Knuckle and Shell Joint

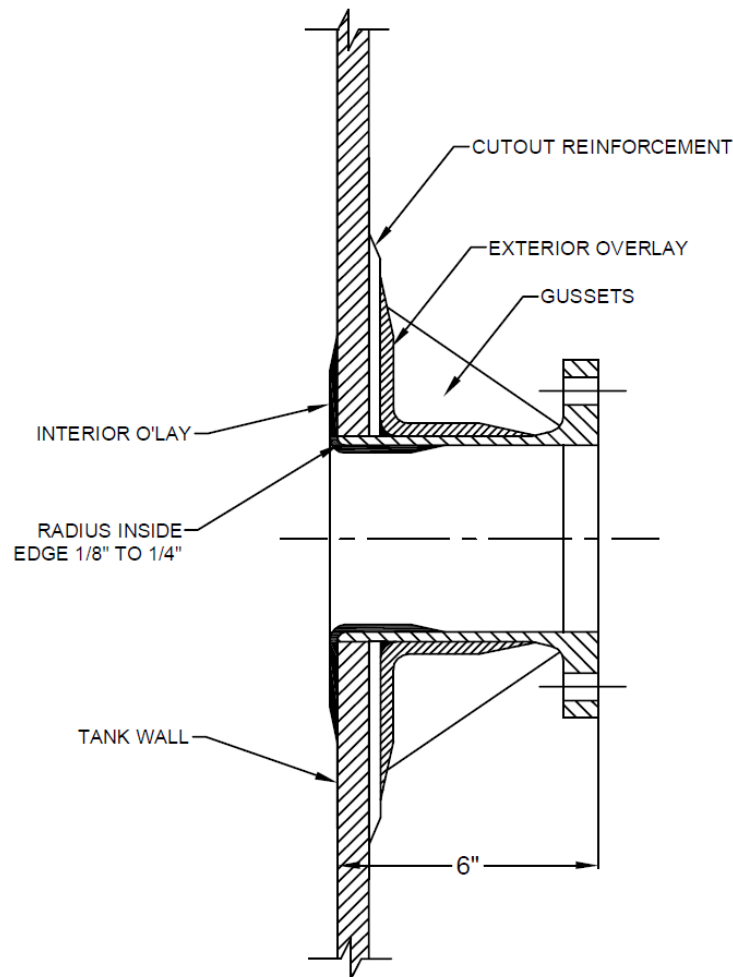


FLANGED NOZZLE								
NOZZLE I.D.	O.D.	B.C.	BOLTHOLE		A	B (TABLE 2)	C	D
			No.	DIA.				
2"	6"	4-3/4"	4	3/4"	3"	0.35"	5/8"	3/4"
3"	7 1/2"	6"	4	3/4"	3"	0.35"	5/8"	3/4"
4"	9"	7 1/2"	8	3/4"	3 1/4"	0.35"	5/8"	3/4"
6"	11"	9 1/2"	8	7/8"	3 3/4"	0.35"	5/8"	3/4"
30" Top Manway (Pressurized Ammonia Tank)	38-3/4"	36"	28	3/4"	6"	0.43"	1 1/8"	1 1/2"

Notes:

1. Dimension 'E' as required.
2. Provide manway cover in accordance with Detail 8.

Detail 5 – Flanged Nozzle Construction

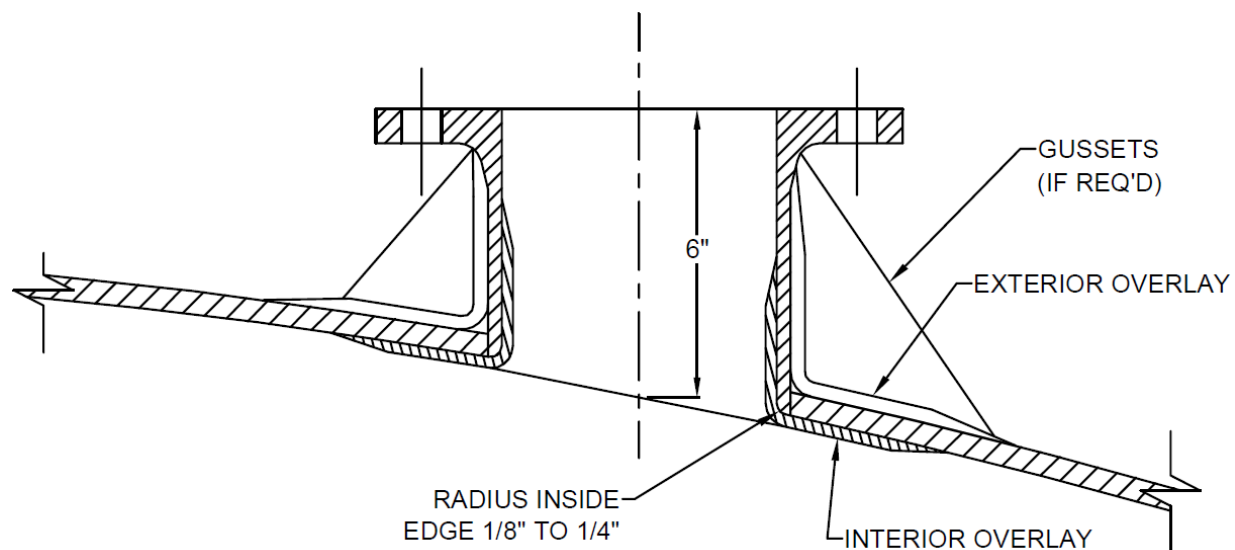


NOZZLE I.D.	EXTERIOR OVERLAY (TABLE 3)	CUT-OUT REINFORCEMENT.	
		DIA.	THK (TABLE 3)
2"	0.32" by 6" wide	8"	0.17"
3"	0.32" by 6" wide	9"	0.17"
4"	0.32" by 6" wide	10"	0.25"
6"	0.32" by 8" wide	12"	0.32"

Notes:

1. Flanged nozzle construction per Detail 5.
2. Cut-out reinforcement required only for nozzles in the lower half of the tanks.
3. Install 4 ea. plate gussets on nozzles 6" dia. and less. Overlay 1/8" plate on both sides with 0.14" thick overlay, (Table 3).
4. Interior overlay to be 0.16" thick (Table 4) by 6" wide.

Detail 6 – Side Nozzle Installation

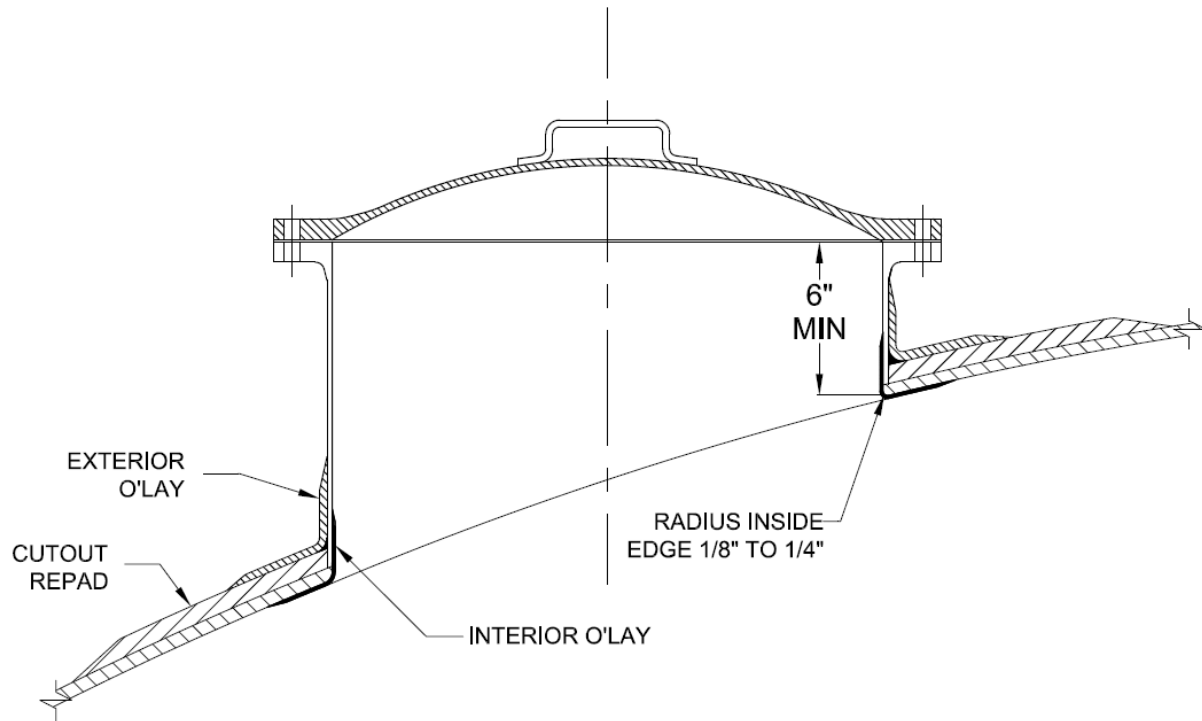


NOZZLE I.D.	EXTERIOR OVERLAY (TABLE 3)
2"	0.32" by 6" wide
3"	0.32" by 6" wide
4"	0.32" by 6" wide
6"	0.32" by 6" wide

Notes:

1. Flanged nozzle and manway construction per Detail 5.
2. Install 4 ea. plate gussets on nozzles 6" dia. and less. Overlay 1/8" plate on both sides with 0.14" thick overlay, (Table 3).
3. Interior overlay to be 0.16" thick (Table 4) by 6" wide.

Detail 7 – Dome Nozzle Installation

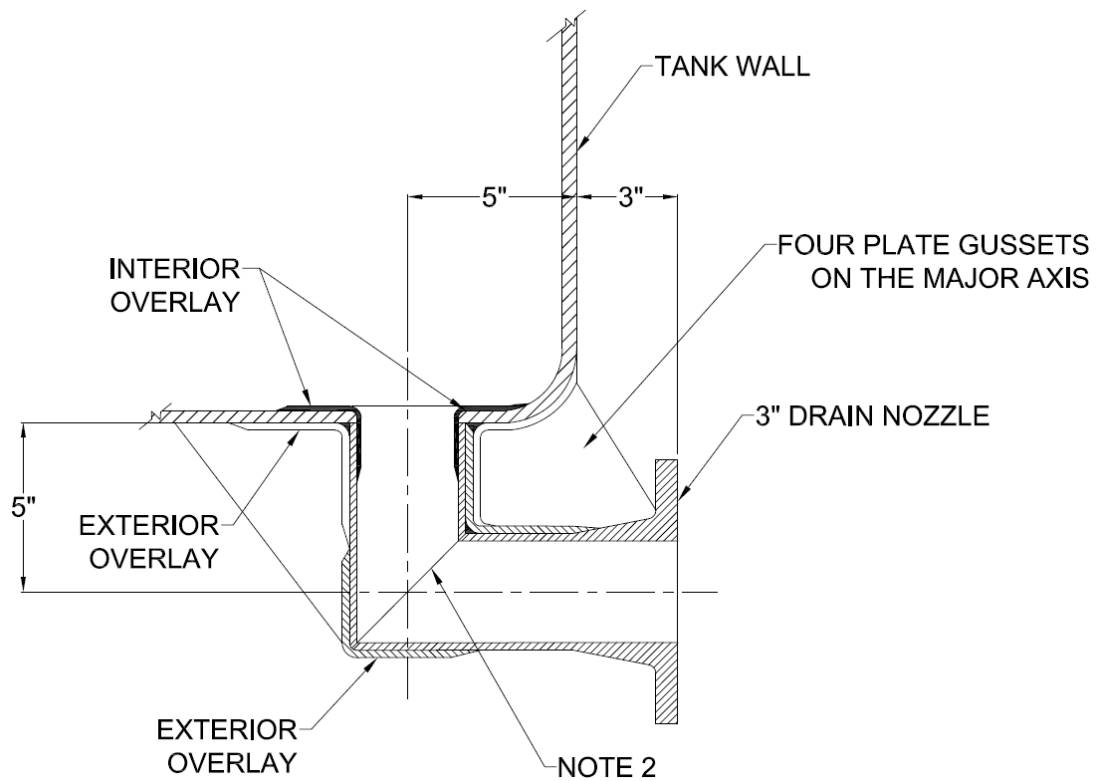


Notes:

1. Flanged construction per Detail 5.
2. Flange thickness, hub thickness and hub length for cover to match to dimensions 'A', 'C' and 'D' shown in Detail 5. Cover thickness to match manway neck thickness 'B' in Detail 5.
3. Cut-out reinforcement to be 60" diameter by 0.25" thick (Table 3). Taper cut-out reinforcement overlay beyond the required diameter.
4. Exterior overlay to be 0.44" (Table 3) by 10" wide.
5. Interior overlay to be 0.16" thick (Table 4) by 6" wide.
6. Provide manway cover with two handles.

Detail 8 – Top Manway Installation

(Pressurized Ammonia Tank)

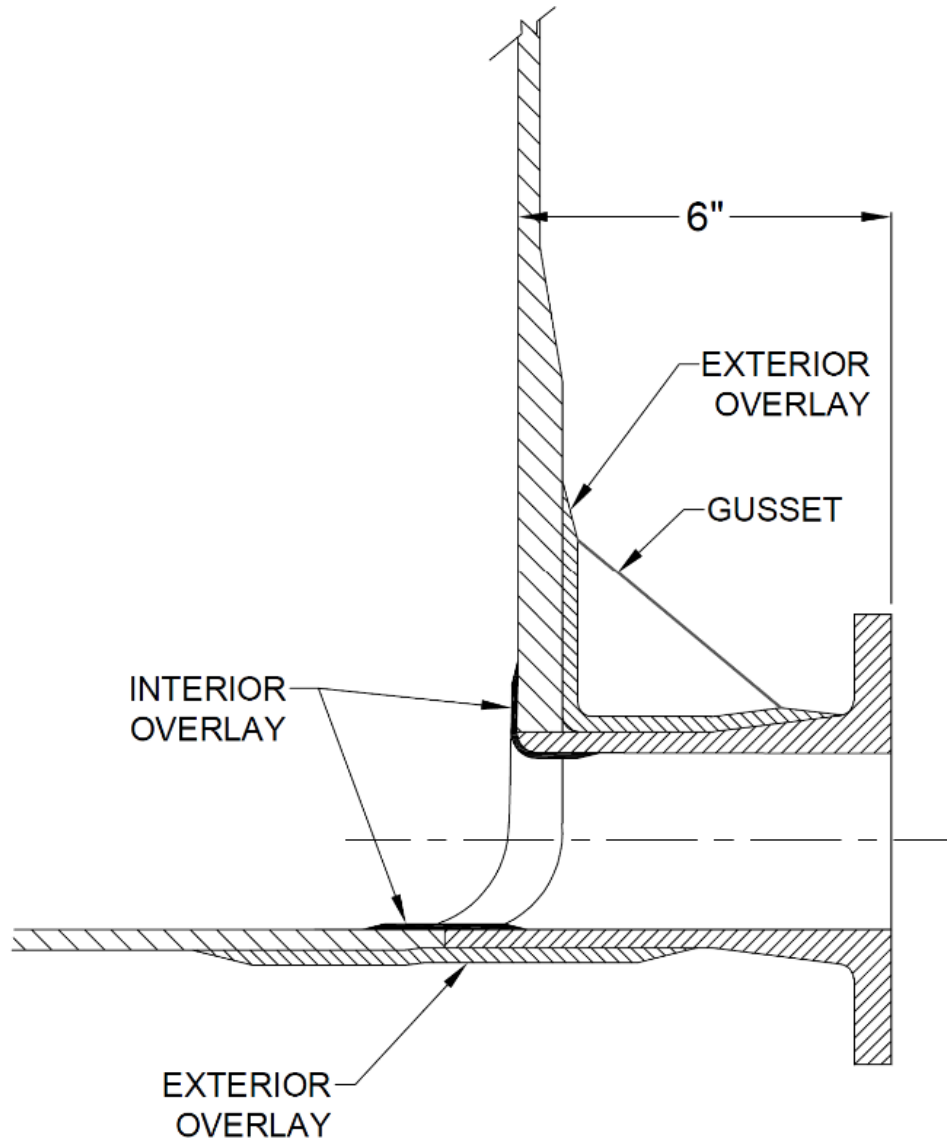


Notes:

1. Flanged nozzle construction per Detail 5, for 3" diameter.
2. Round the cut edges and cap with MNN (see Key for Laminate Sequence Tables) before assembly. Lap a minimum of 1/2" onto inside and outside surfaces.
3. Exterior overlays to be 0.32" thick (Table 3), extending a minimum of 4" onto nozzle neck and tank shell all around.
4. Interior overlay to be 0.16" thick (Table 4) by 6" wide.
5. Install plate gussets at sides, top center and rear center of nozzle. Overlay 1/8" plate on both sides with 0.14" thick overlay, (Table 3).

Detail 9 – Full Bottom Drain

(Pressurized Ammonia Tank)

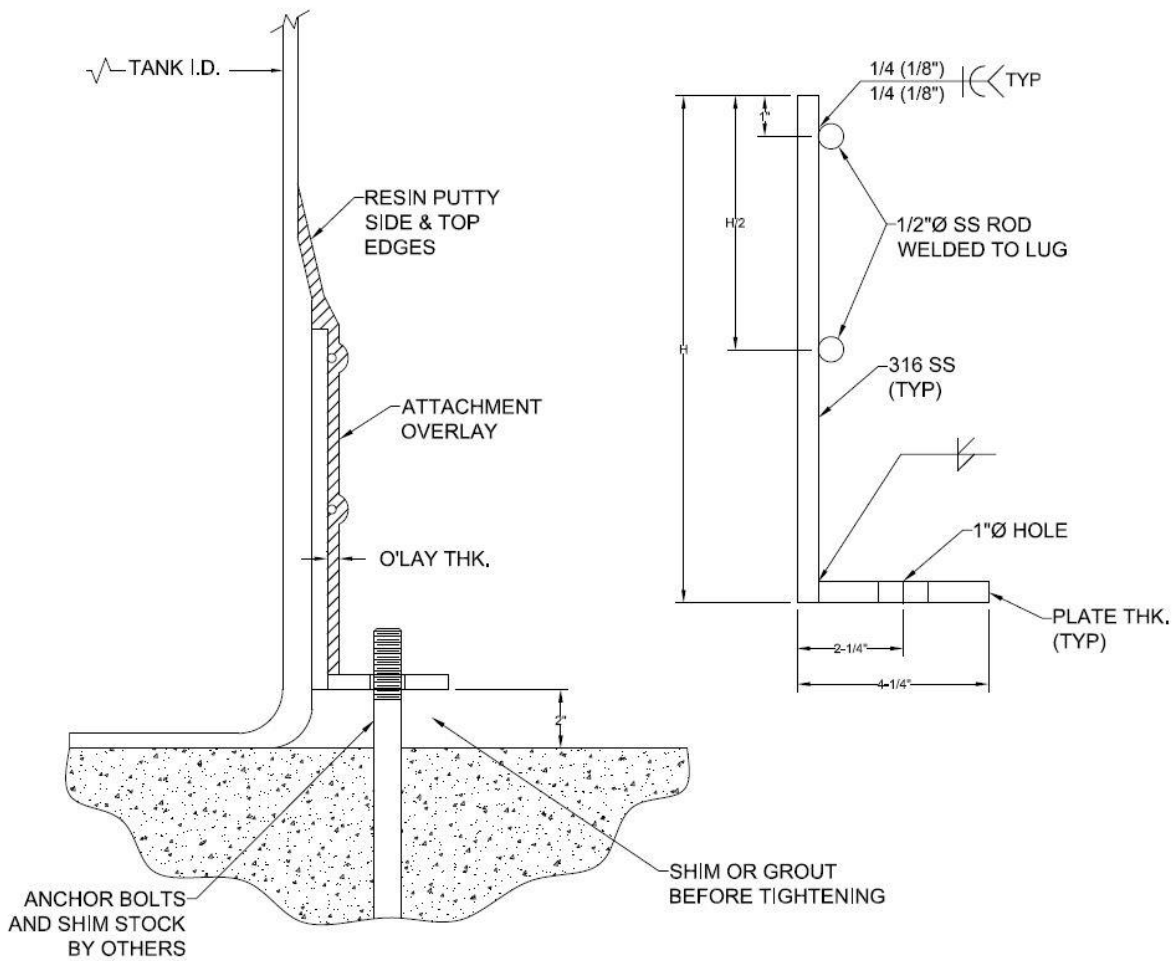


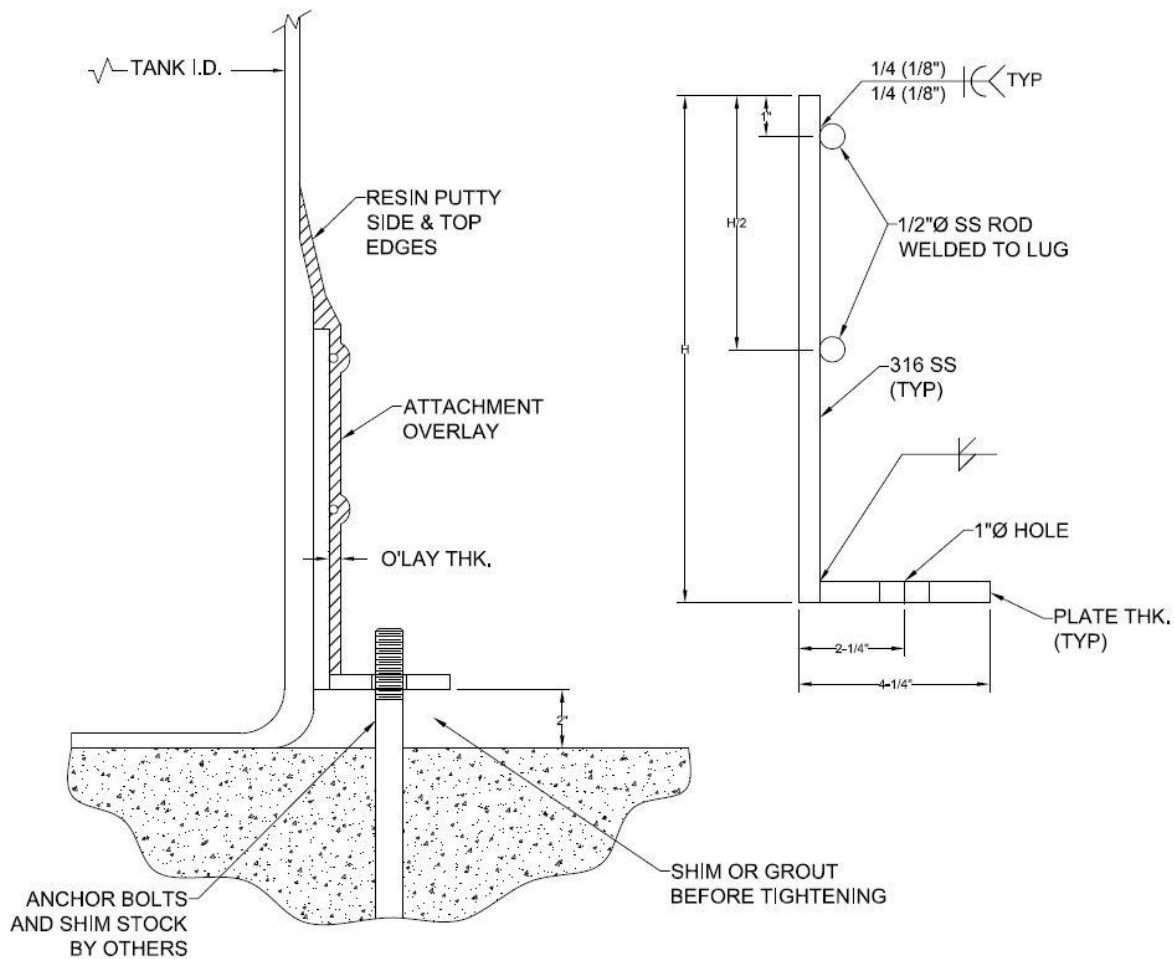
Notes:

1. Flanged nozzle construction per Detail 5; 2" diameter.
2. Exterior overlay to be 0.32" thick (Table 3), extending a minimum of 4" onto nozzle neck and tank shell all around.
3. Interior overlay to be 0.16" thick (Table 4) by 6" wide for the Ammonia scrubber.
4. Install plate gussets at sides and top center of nozzle. Overlay 1/8" plate on both sides with 0.14" thick overlay, (Table 3).

Detail 10 – Bottom Drain

(Ammonia Scrubber)



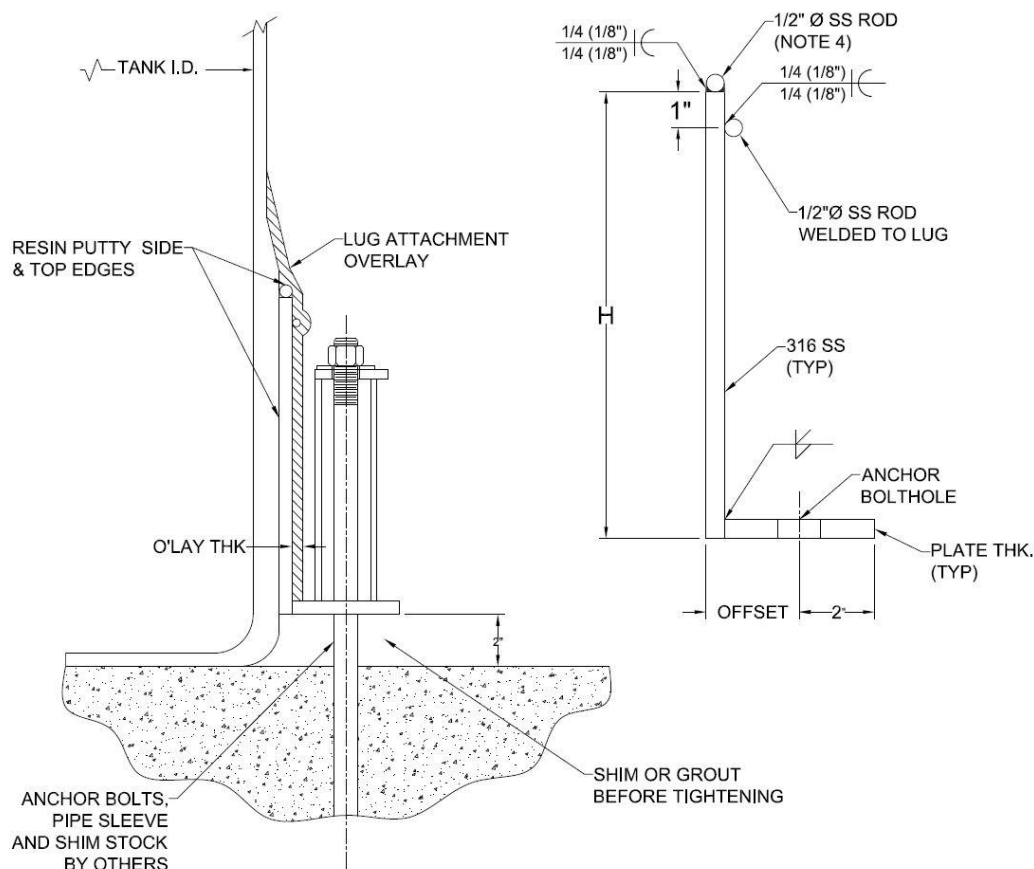


TANK	QTY. PER TANK	H	W	PLATE THK.	OVERLAY THK. (NOTE 5)
4 ft. dia. Ammonia Scrubber	4	8"	4"	1/2"	0.44" (Table 3)

Notes:

1. Anchor lug width "W" is shown only in the table, where "W" represents the dimension in the circumferential direction.
2. Anchor lugs to be equally spaced around tank perimeter.
3. Anchor lugs to be fabricated from 316 SS.
4. Provide putty ramp at 45° around edges of lug back plate.
5. Anchor lug attachment laminate to extend full thickness a minimum distance of 6" plus a 4:1 taper beyond the SS plate and putty ramp on all three sides. Do not exceed Overlay Thk by more than 1/8".
6. Anchor bolt and lug locations shall be coordinated with in-field measurements to avoid damage to existing slab reinforcement.
7. Tighten anchor bolts only after shim stock is in place.
8. Welding to be in accordance with Section 05 05 24 and AWS D 1.6.

Detail 11 – Anchor Lugs
(Ammonia Scrubber)

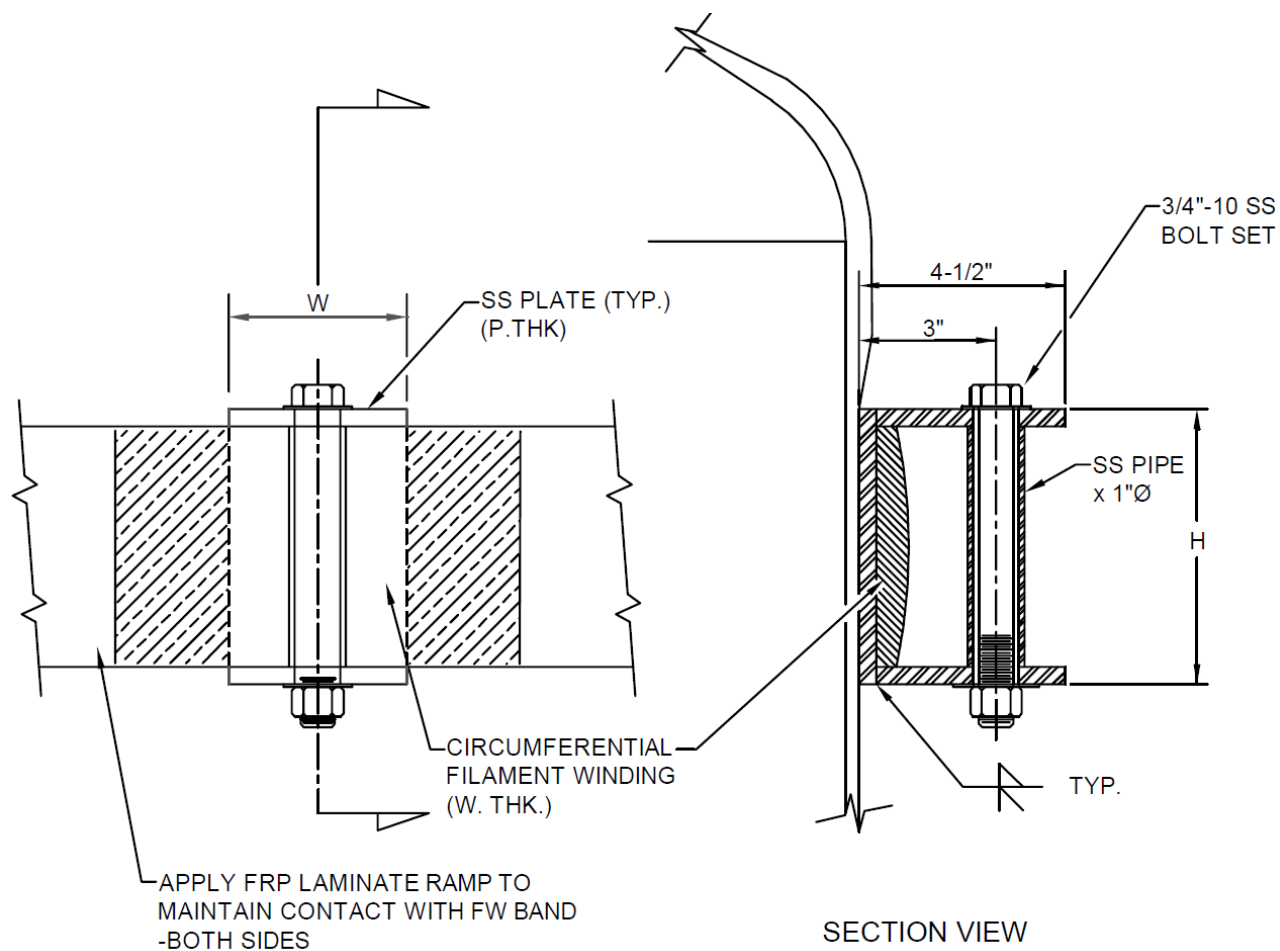


TANK	QTY. PER TANK	H	W	PLATE THK.	L (NOTE 4)	ANCHOR BOLTHOLE DIA.	ANCHOR BOLTHOLE OFFSET	OVERLAY THK. (TABLE 5)
10 ft. dia. Ammonia	12	12"	8"	7/8"	5"	1-1/8"	2-3/4"	0.91"

Notes:

1. Anchor lug width "W" is shown only in the table, where "W" represents the dimension in the circumferential direction.
2. Anchor lugs to be equally spaced around tank perimeter.
3. Anchor lugs to be fabricated from 316 SS.
4. Provide rod with length to extend "L" beyond edge of lug on both sides.
5. Provide putty ramp at 45° around edges of lug back plate.
6. Anchor lug attachment laminate to extend full thickness a minimum of 6" beyond the SS plate and putty ramp, plus a 4:1 taper on all three sides. Do not exceed Overlay Thk by more than 1/8".
7. Alternately, attach anchor lugs with 0.38" thick filament wound band over full height of lug. In this case, the rod extension in Note 4 is not required. Apply FRP ramp adjacent to lug on both sides to maintain full contact of FW band to tank shell.
8. Anchor lugs are designed for anchor bolt hole of 1-1/8" maximum. If anchor bolt design indicates a larger size is needed, coordinate with Engineer to verify or revise the anchor lug design.
9. Anchor bolts to be located after tank fabrication and installation.
10. Tighten anchor bolts only after shim stock is in place.
11. Welding to be in accordance with Section 05 05 24 and AWS D 1.6.
12. See structural Contract Drawings for anchor bolt and pipe sleeve detail.

Detail 12 – Anchor Lugs
(Pressurized Ammonia Tank)

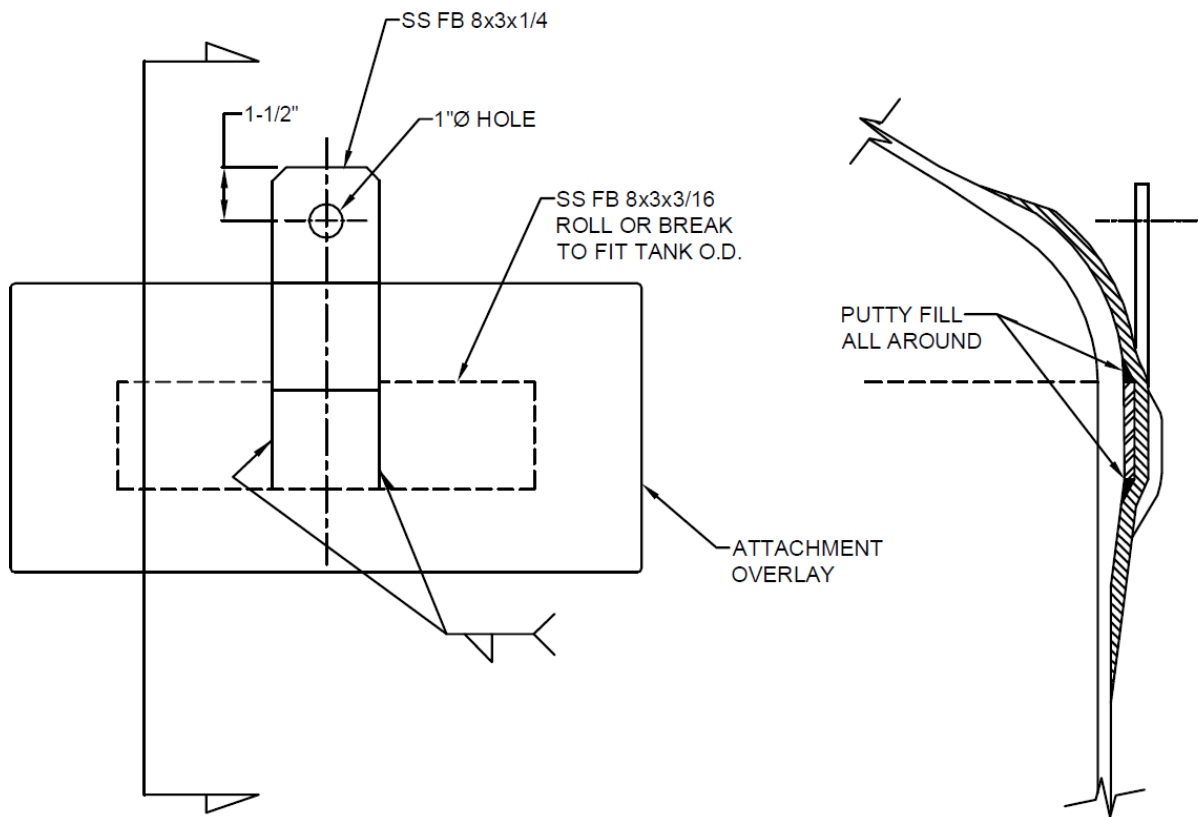


TANK	H	W	P.THK	W.THK
10 ft. dia. Ammonia	6"	4"	1/2"	0.60"

Notes:

1. Provide 4 ea. lifting lugs per tank, equally spaced around tank perimeter.
2. Lifting lugs and other components to be 316 SS.
3. Welding to be in accordance with Section 05 05 24 and AWS D 1.6.

Detail 13 – Lifting Lug
(10 ft. dia. Tanks)

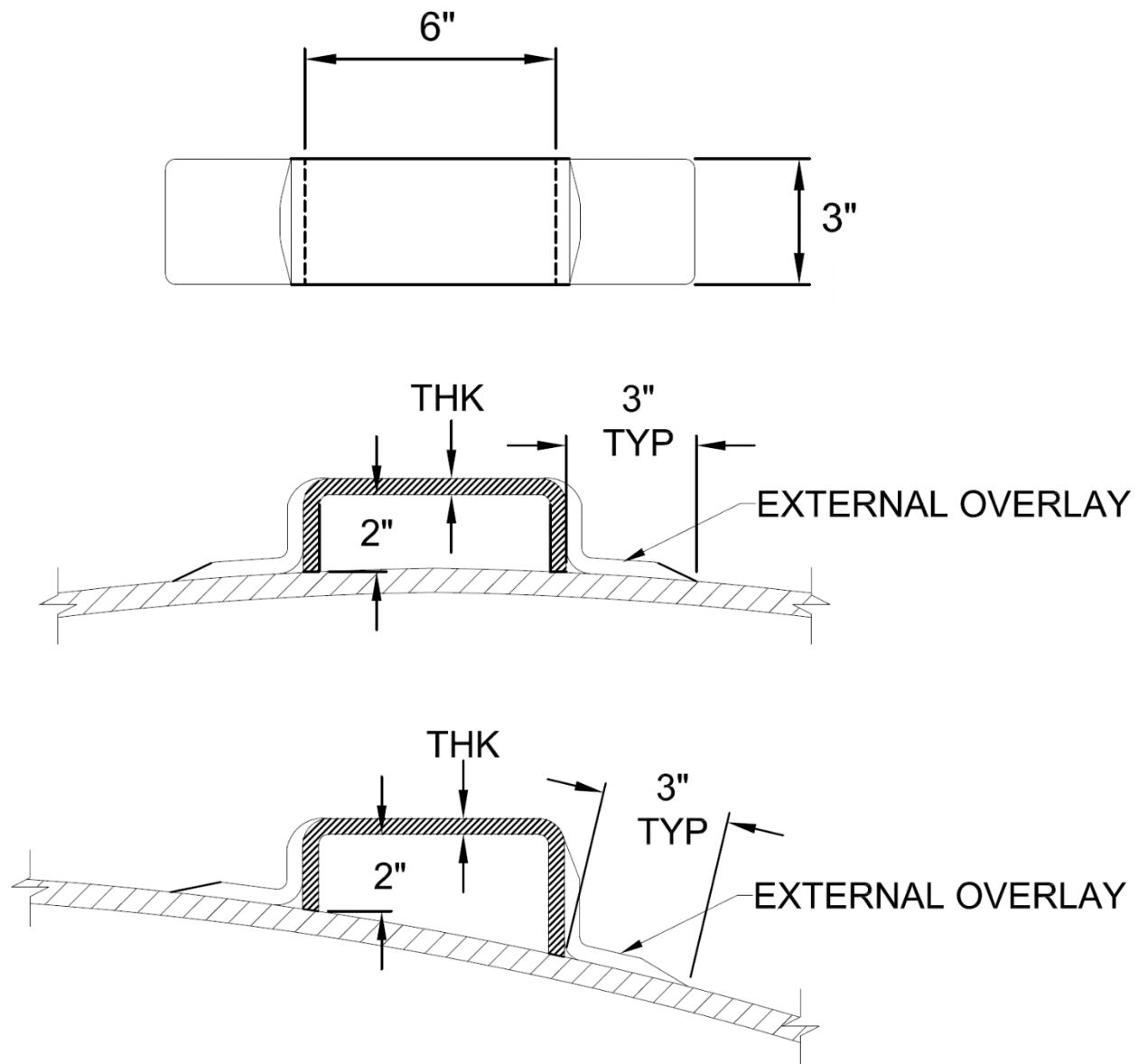


SECTION VIEW

Notes:

1. Provide 2 ea. lifting lugs per tank.
2. Lifting lugs to be fabricated from 316 SS.
3. Lifting lug attachment laminate to be 0.32" thick (Table 3), with full thickness extending a minimum of 4" plus 1 1/2" taper beyond SS plate on all sides.
4. Welding to be in accordance with Section 05 05 24 and AWS D 1.6.

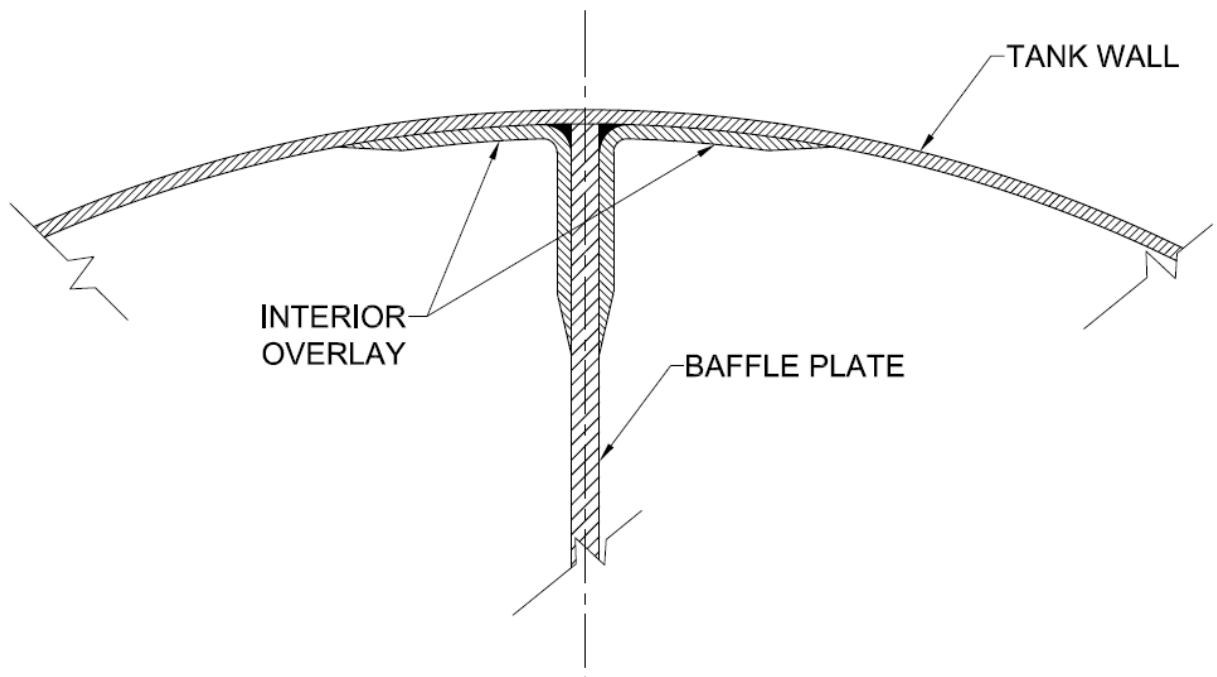
Detail 14 – Lifting Lug
(Ammonia Scrubber)



Notes: _

1. Views show face of support clip, installation on the side of the tank and installation on the dome, respectively.
2. Support clip thickness (THK) to be 0.38" (Table 3).
3. External overlay thickness to be 0.32" (Table 3)'
4. Provide support clips in quantity and as located on the drawings.
5. Brackets connecting support clips to adjacent piping by others.
6. Field drill for bolting.

Detail 15 – Pipe Support Clip

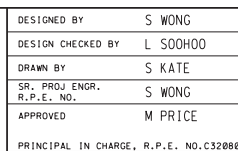
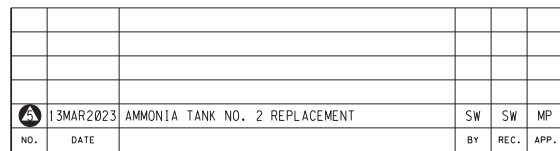


Notes:

1. Where indicated on the scrubber drawings, install the baffle plate to bisect the Ammonia Scrubber to the height indicated.
2. Baffle Plate to be 0.57" thick (Table 2).
3. Cap top edge of baffle plate with 0.16" thick (Table 4) overlay extending a minimum of 1" down on each side.
4. Attachment overlays to be 0.31" thick (Table 4) by 6" wide, applied to both sides and bottom of the baffle plate.

Detail 16 –Baffle Plate
(Ammonia Scrubber)

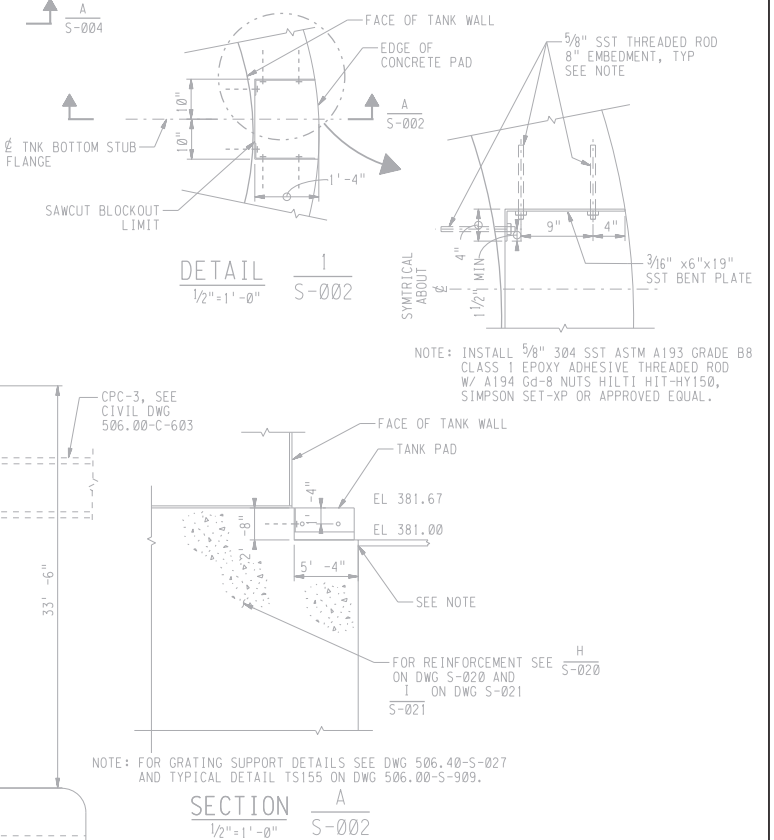
END OF SECTION

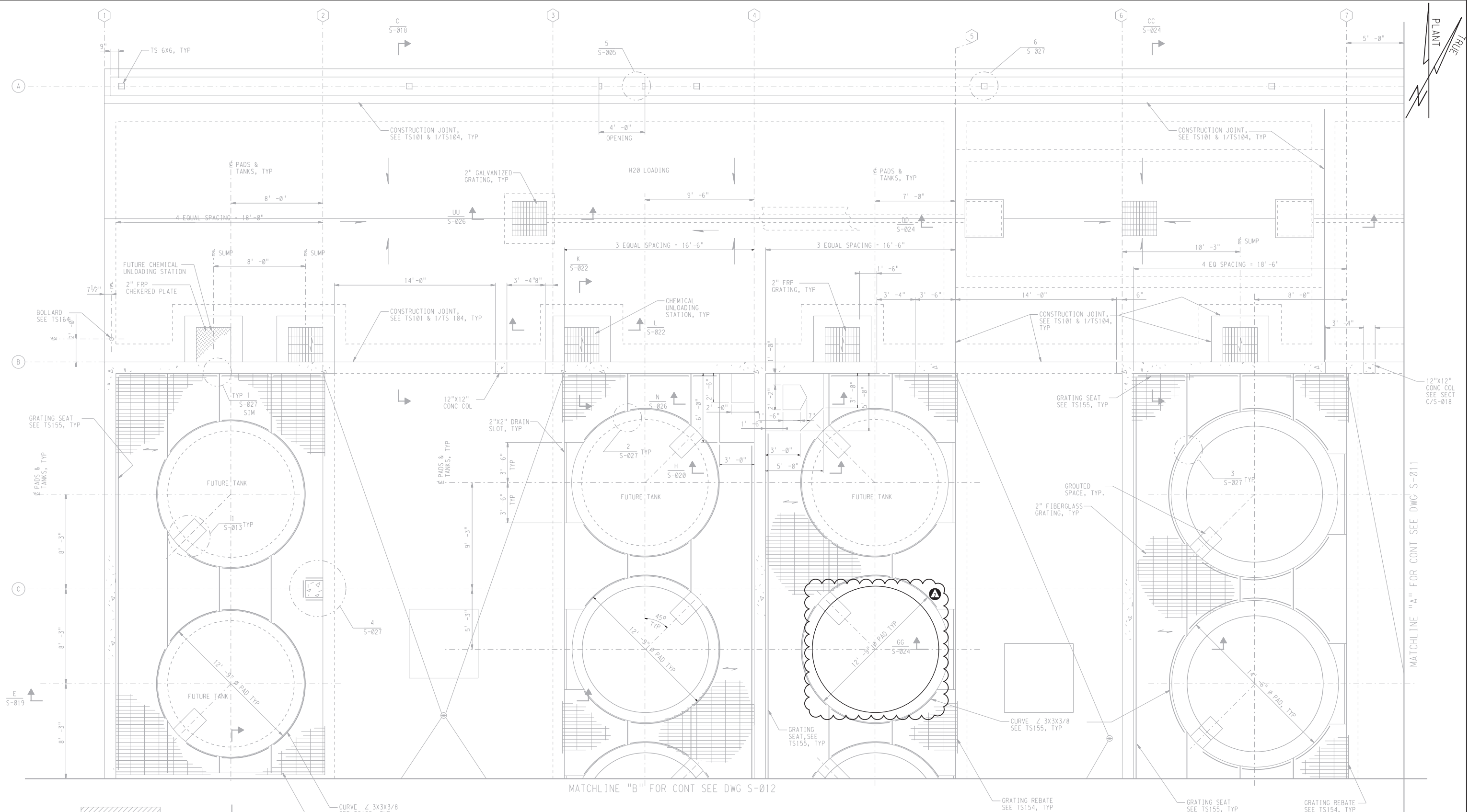


EMUD REVIEW	PROJECT MANAGER: R.P.E. NO. C89573	<i>Chloe Ched</i> CHLOE CHEDI
	RECOMMENDED: SENIOR CIVIL ENGR. R.P.E. NO. C74981	<i>[Signature]</i> MICHAEL J. HARTLAUB
	ACTING MGR OF DESIGN R.P.E. NO. C38146	<i>Paul Franceschi</i> PAUL M. FRANCESCHI

PROJ NO.	506.40-S-002	5
SCALE AS SHOWN		
DATE 07SEP2001	STRUCT. DISC. NUMBER	REV.

1. LIVE LOAD:
INSIDE BUILDING CONCRETE SLAB = 250 PSF OR H10 TRUCK LOAD.
INSIDE BUILDING TRENCH COVER = 100 PSF OR H10 TRUCK LOAD
(WHERE APPLICABLE), OR 250 LBS. CONCENTRATED.
INSIDE GRATING = 100 PSF OR 300 LBS. CONCENTRATED LOAD.
CHEMICAL DELIVERY AREA = 250 PSF OR H20 TRUCK LOAD.
2. REFER TO MECHANICAL AND ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS
AND OPENINGS NOT SHOWN.
3. CONTRACTOR SHALL VERIFY AND COORDINATE THE LOCATIONS AND SIZE OF ALL
OPENINGS, PIPINGS DUCTWORK AND CONDUITS. PRIOR TO CONSTRUCTION.
4. FOR LOCATION OF PIPE SUPPORTS, SEE MECHANICAL DWGS.
5. FLOOR ELEVATION AT HIGH POINT EL 381.00. FLOOR DRAINS AT LOW
POINT EL 380.75.
6. TANK TIE DOWN BY TANK MANUFACTURER.
7. ALL TANK PADS EL 381.67.
8. IF BLOCKOUT AT PAD INTERFERE WITH BEAM ANCHORAGE, CONTRACTOR MAY MOVE
THE BEAM AS CLOSE AS POSSIBLE AND AS REQUIRED FOR ANCHOR BOLTS OF BEAM
SUPPORTS.
9. ALL STEELS AND ANCHOR BOLTS AT CONTAINMENT AREA SHALL BE FUSION BONDED
EPOXY COATING.
10. INSTALL SLOPED GROUT TOPPING IN CHEMICAL METERING AREAS, 1/8"/FT MINIMUM
SLOPE.
11. INSTALL SKID-RESISTANT EPOXY PAINT IN CHEMICAL METERING AREAS AS SHOWN
12. INSTALL NEW 12,000-GALLON TANK SH-TK-106.
13. INSTALL NEW PUMP PAD AND EXPAND SECONDARY CONTAINMENT.





FLOOR PARTIAL PLAN - A
1/4"=1'-0"

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	DESCRIPTION	BY	REC.	APP.
13MAR2023		AMMONIA TANK NO. 2 REPLACEMENT	SW	SW	MP



DESIGNED BY	S. WONG
DESIGN CHECKED BY	L. SOOHOO
DRAWN BY	S. KATE
SR. PROJ. ENGR.	S. WONG
APPROVED	M. PRICE
PRINCIPAL IN CHARGE, R.P.E. NO. C32080	

PROJECT MANAGER:	R.P.E. NO. C89573
RECOMMENDED:	SENIOR CIVIL ENGR. R.P.E. NO. C74901
ACTING MGR OF DESIGN	R.P.E. NO. C38146

EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
WALNUT CREEK WATER TREATMENT PLANT CHEMICAL BUILDING STRUCTURAL FLOOR PARTIAL PLAN - A			
SHEET 1 OF 4			
PROJ. NO.	SCALE	AS SHOWN	506.40-S-010
DATE	07SEP2001	STRUCT.	DISC.
NUMBER		REV.	



KEY PLAN

* VERIFY DIMENSIONS W/ MECH & EQUIP MFR'S

FLOOR PARTIAL PLAN - C

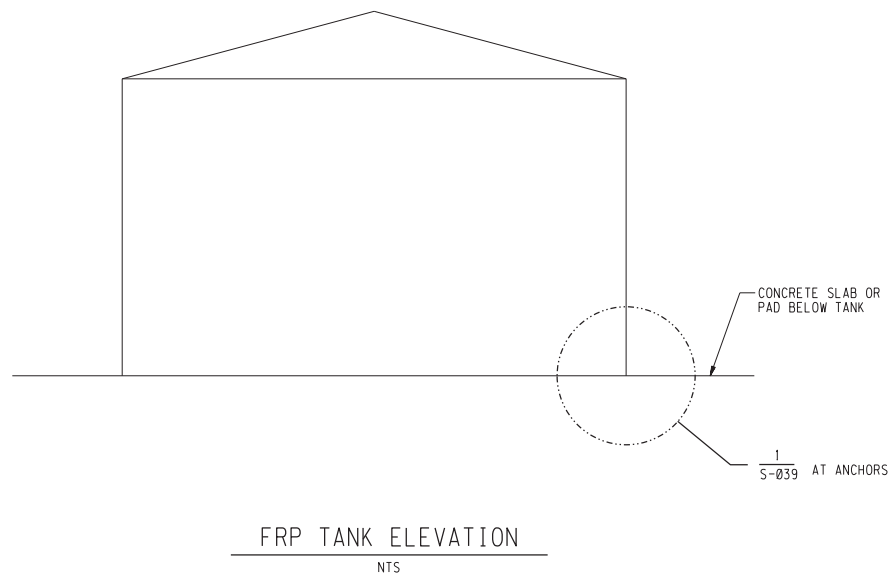
$$\frac{1}{4}'' = 1' - 0''$$


A	13MAR2023	AMMONIA TANK NO. 2 REPLACEMENT	SW	SW	MP
NO.	DATE		BY	REC.	APP.

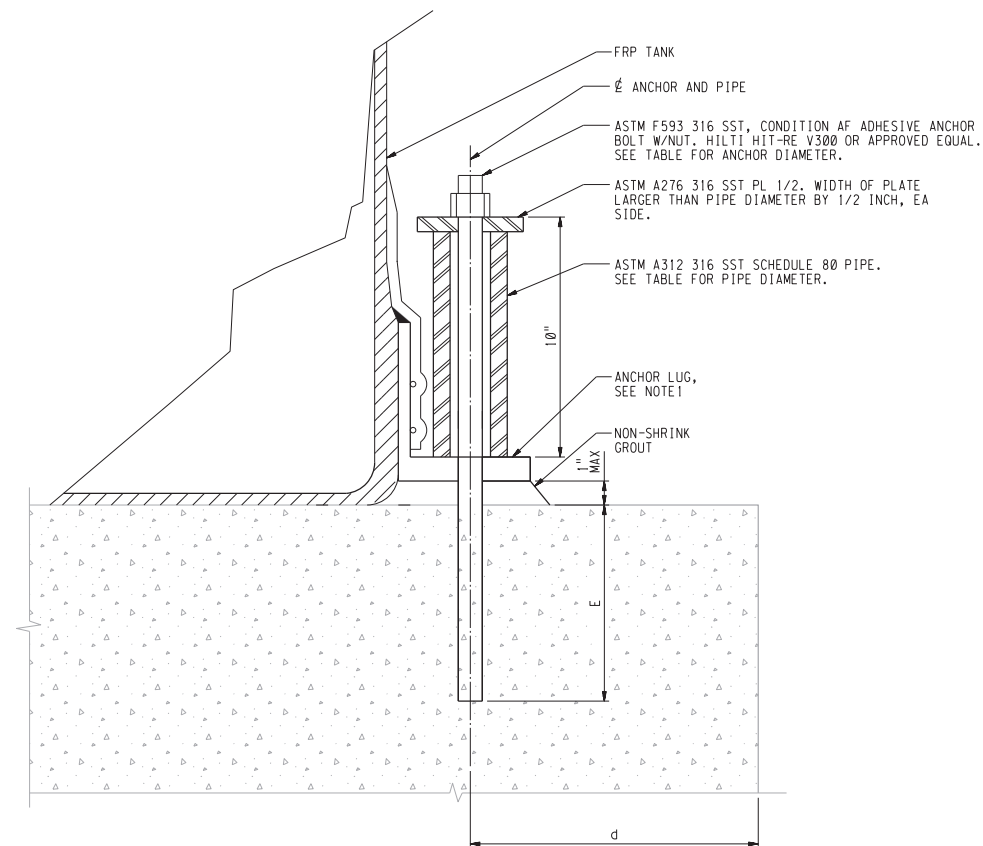
DESIGNED BY	S WONG
DESIGN CHECKED BY	L SOOHOO
DRAWN BY	S KATE
SR. PROJ ENGR. R.P.E. NO.	S WONG
APPROVED	M PRICE
PRINCIPAL IN CHARGE, R.P.E. NO.C32086	

EBUILD REVIEW	PROJECT MANAGER: R.P.E. NO. C89573	<i>Chloe Chedoke</i> CHLOE CHEDOKO
	RECOMMENDED: SENIOR CIVIL ENGR. R.P.E. NO. C74981	<i>[Signature]</i> MICHAEL J. HARTLAUB
	ACTING MGR OF DESIGN R.P.E. NO. C38146	<i>Paul M. Franceschi</i> PAUL M. FRANCESCHI

EAST BAY MUNICIPAL UTILITY DISTRICT			
OAKLAND, CALIFORNIA			
WALNUT CREEK WATER TREATMENT PLANT			
CHEMICAL BUILDING			
STRUCTURAL			
FLOOR PARTIAL PLAN - C			
SHEET 3 OF 4			
PROJ. NO.	506.40-S-012		4
SCALE	AS SHOWN		
DATE	07SEP2001	STRUCT.	DISC.
		NUMBER	REV.



CHEMICAL AND TANK TYPE	TANK SIZE (GAL)	TANK DIAMETER D	TANK WALL HEIGHT H	ANCHOR DIAMETER D _a	PIPE DIAMETER D _p	MIN ANCHOR EDGE DISTANCE d	ANCHOR EMBEDMENT E
AMMONIA (BULK)	6000	10'-0"	11'-0"	1"	1 1/4"	1'-0"	1'-10"
AMMONIA (SCRUBBER)	470	4'-0"	5'-0"	1"	N/A	0'-6"	0'-8"



DETAIL $\frac{1}{S-039}$
3"=1'-0"

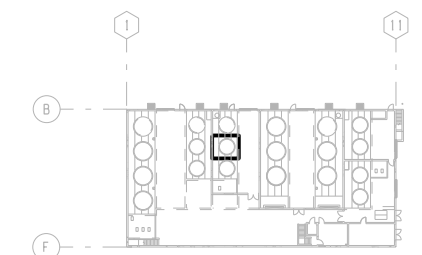
1. SEE SPECIFICATIONS 43 41 45 FOR NUMBER AND SIZE OF ANCHOR LUGS.
SEE PROCESS MECHANICAL DRAWINGS FOR ANCHOR LUG LOCATIONS.



DESIGNED BY	S WONG
DESIGN CHECKED BY	L SOOHOO
DRAWN BY	S KATE
SR. PROJ ENGR. R.P.E. NO.57109	S WONG
APPROVED	M PRICE
PRINCIPAL IN CHARGE, R.P.E. NO.C32080	

EM/UD REVIEW	PROJECT MANAGER: R.P.E. NO. C89573	<i>Chloe Chelone</i> CHLOE CHELONE
	RECOMMENDED: SENIOR CIVIL ENGR. R.P.E. NO. C74901	<i>[Signature]</i> MICHAEL J. HARTLAUB
	ACTING MGR OF DESIGN R.P.E. NO. C38146	<i>Paul Maneschi</i> PAUL MANESCHI

EAST BAY MUNICIPAL UTILITY DISTRICT				
OAKLAND, CALIFORNIA				
WALNUT CREEK WATER TREATMENT PLANT				
CHEMICAL BUILDING				
STRUCTURAL				
FRP TANK DETAILS				
PROJ. NO.		506.40-S-039		0
SCALE	AS SHOWN			
DATE	31MAR2023	STRUCT.	DISC.	NUMBER
				REV.



NOTES

1. SEE M-307.1 FOR MATERIAL LIST AND NOTES THAT APPLY TO THIS SHEET.
2. SEE M-307.1 FOR AMMONIA SCRUBBER (NK-TNK-105) DETAIL.
3. SEE M-307.4 FOR AMMONIA BULK TANK (NK-TNK-102) DETAIL.
4. PROVIDE TRANSVERSE AND LONGITUDINAL BRACING SIMILAR TM165, SECTION A FOR VENT PIPE. ATTACH SUPPORTS WITH HEAVY DUTY BEAM CLAMPS. NO ALTERATION OF EXISTING STRUCTURAL BEAMS IS ALLOWED.
5. SUPPORT PIPE EVERY 10 FEET OR NEAR ELBOWS AND LINE EQUIPMENT.

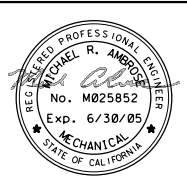


3" ON ORIGINAL DOCUMENT

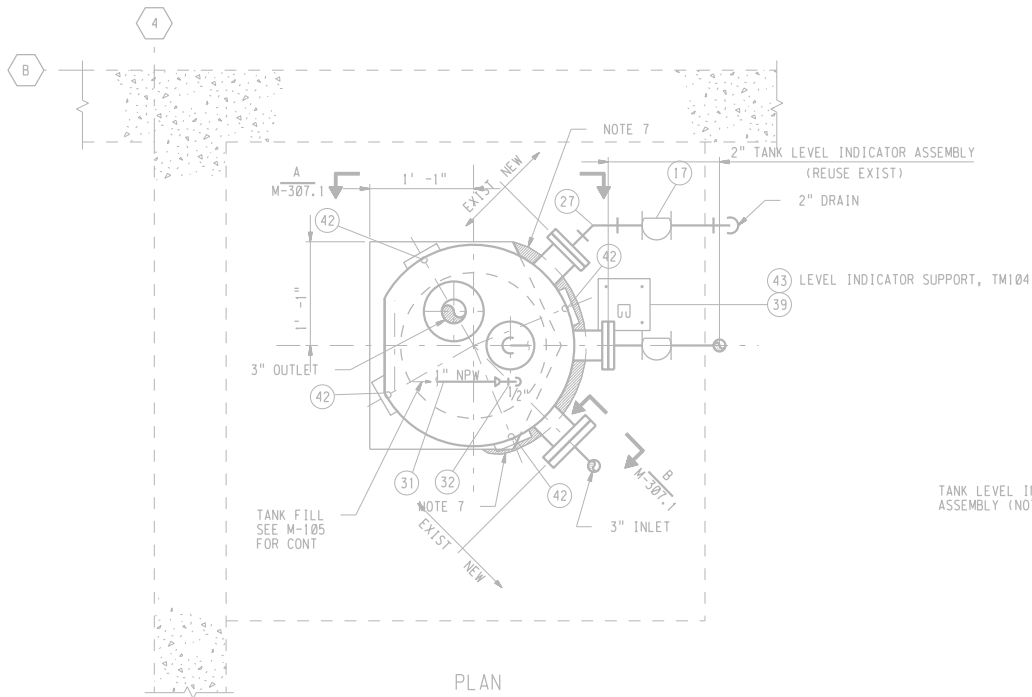
0 1 2 3

DESIGN	DESIGNED BY	_____	EAST BAY MUNICIPAL UTILITY DISTRICT			
	DESIGN CHECKED BY	_____	OAKLAND, CALIFORNIA			
	DRAWN BY	_____	WALNUT CREEK WTP IMPROVEMENTS PROJECT			
A COPY OF THE ORIGINAL DRAWING WITH ORIGINAL SIGNATURES CAN BE FOUND IN ENGINEERING RECORDS.			SITE			
			MECHANICAL			
			AMMONIA, STORAGE AREA PLAN & SECTIONS			
RECOMMENDED:	_____	STRUCTURE OR ZONE	506.40-M-306		3	
	_____	SCALE 1/4" = 1' - 0"				
APPROVED:	_____	DATE 07SEP2001	STRUCT.	DISC.	NUMBER	
	_____		REV.			

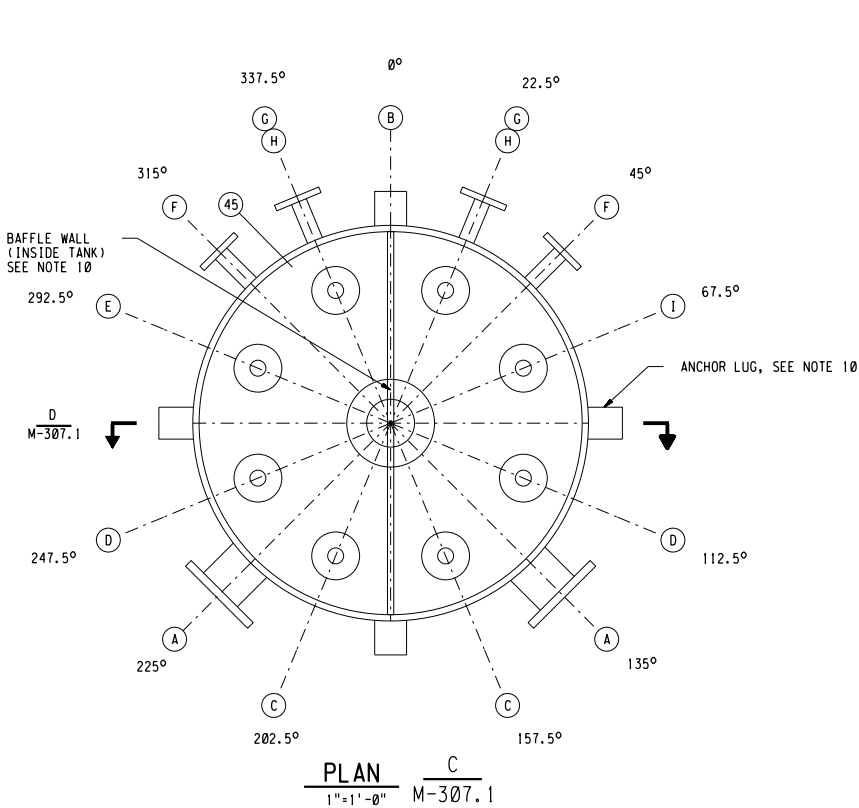
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SPEC NO.

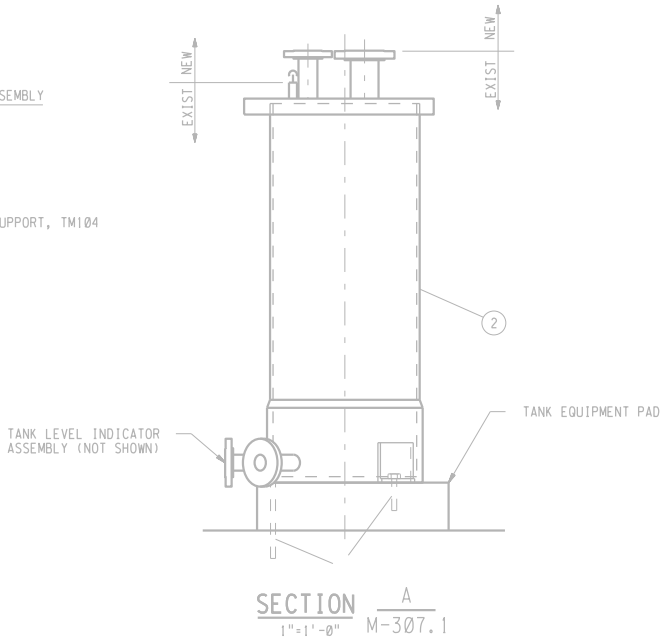


NH SCRUBBER TANK DETAIL (NOTE 6)
1"=1'-0"

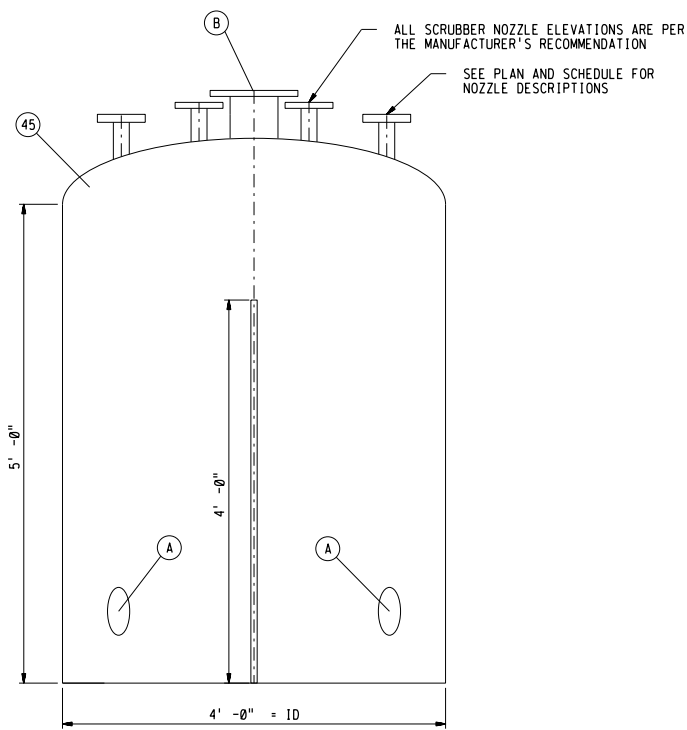


AMMONIA SCRUBBER (NH-TNK-105) TANK SCHEDULE								
KEY	SIZE	SERVICE	TYPE	RATING	PROJECTION	ORIENTATION (CW)	ELEVATION	RADIAL DIMENSION
A	6"	VENT INLET	FLANGED	150LB	6"	135° & 225°	0'-6"	ON TANK WALL
B	6"	VENT OUTLET	FLANGED	150LB	6"	0°	TOP OF TANK	0'-0"
C	2"	NPW FILL LINE	FLANGED	150LB	6"	157.5° & 202.5°	TOP OF TANK	1'-6"
D	2"	SPARE	FLANGED	150LB	6"	112.5° & 247.5	TOP OF TANK	1'-6"
E	2"	OVERFLOW	FLANGED	150LB	6"	292.5°	TOP OF TANK	1'-6"
F	2"	DRAIN	FLANGED	150LB	6"	45° & 315°	0'-1"	ON TANK WALL
G	2"	SIGHT GAUGE (BOTTOM)	FLANGED	150LB	6"	22.5° & 337.5°	0'-6"	ON TANK WALL
H	2"	SIGHT GAUGE (TOP)	FLANGED	150LB	6"	22.5° & 337.5°	TOP OF TANK	1'-6"
I	2"	PRESSURE TRANSMITTER	FLANGED	150LB	6"	67.5°	TOP OF TANK	1'-6"

NOMINAL TANK HEIGHT = 5.0 FT
INTERNAL DIAMETER = 4 FT
SEE NOTE 10

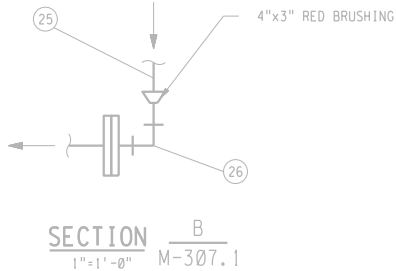


SECTION A
1"=1'-0" M-307.1



SECTION D
NTS M-307.1

3" ON ORIGINAL DOCUMENT
0 1 2 3



SECTION B
1"=1'-0" M-307.1

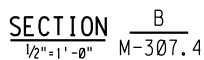
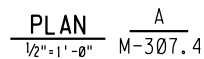


MATERIAL LIST			
ITEM	QTY	DESCRIPTION	REMARKS
1	2	TANK, 6000 GAL, LINEAR POLYETHYLENE W/ PLATFORM ASSEMBLY	SECTION 13207
2	1	TANK, 50 GAL, FRP W/ LEVEL INDICATOR	NOTE 6
3	1	TRANSFER PUMP, END-SUC CENT, MAG DRIVE, POLYPRO WETTED PARTS	NOTE 3
4	2	ULTRASONIC LEVEL TRANSMITTER, 24VDC, 3" FLANGED END	
5	2	LEVEL SWITCH, 24VDC, TEFLON PROBE, FLANGED END	
6			
7			
8	3	PRESSURE GAUGE ASSEMBLY	TM014
9			
10			
11	1	BASKET STRAINER, 2" PVC, 1/16" PVC SCREEN, EPDM SEALS, SOCKET	
12	1	DUPLEX BASKET STRAINER, 2" PVC, 1/16" PERF PVC BASKET, UNION ENDS	
13	1	Y-STRAINER, 2" CLEAR PVC W/ 1/16" PVC SCREEN, SOCKET ENDS	
14			
15			
16	2	DIAPHRAGM VALVE, 3" PVC, EPDM SEALS, ANSI 150LB FLANGE ENDS	
17	9	DIAPHRAGM VALVE, 2" PVC, EPDM SEALS, UNION ENDS	
18			
19	2	DIAPHRAGM VALVE, 1" PVC, EPDM SEALS, UNION ENDS	
20			
21	2	BALL CHECK VALVE, 2" PVC, EPDM SEALS, UNION ENDS	
22	1	PIPE SLEEVE AND BIRD SCREEN PER TM626	
23	4	SAMPLE/FLUSHING ASSEMBLY, 3/4" CAM LOCK CONN	TM013
24	1	DRAIN ASSEMBLY, 2" VALVE & CAM LOCK CONN	TM013, SIM
25	Ø70'	PIPE, 4", PVC SCH 40 W/ FITTINGS	
26	Ø60'	PIPE, 3", PVC SCH 80 W/ FITTINGS	
27	AS-REQD	PIPE, 2", PVC SCH 80 W/ FITTINGS	
28	AS-REQD	HEAVY DUTY PIPE HANGER WITH BRACING PER TM165 AND 168	40 20 20
29	AS-REQD	PIPE, 1", PVC SCH 80 W/ FITTINGS	
30	AS-REQD	FLUSH MOUNTED PIPE SUPPORT PER TM100	40 20 20
31	AS-REQD	BRASS PIPE, 1", NPT, W/ BRASS FITTINGS	
32	AS-REQD	BRASS PIPE, 1"/2", NPT, W/ BRASS FITTINGS	
33	AS-REQD	VERTICAL PIPE SWAY BRACE PER TM128	40 20 20
34	1	PIPE CAP, 4", PVC	
35	1	PIPE CAP, 3", PVC	
36	3	PIPE CAP, 2", PVC	
37	AS-REQD	MODULAR MECHANICAL SEAL, (SIZE AS REQD)	TM100
38	2	MECHANICAL SEAL PER TM030	40 20 20
39	AS-REQD	CHANNEL SUPPORTS, 1-5/8" SST SQR, W/ SST FASTENERS & BASE	TM04, SIM
40	AS-REQD	CLEVIS HANGER W/ THEATER ROD, DRAIN SW (SIZES AS REQD)	TM117
41	2	PRESSURE & VACUUM RELIEF VALVE (SHAND & JURS 94050)	
42	4	ANCHOR BOLT, 5/8", SST, DRILL-IN, 3-1/2" MIN EMBEDMENT	NOTE 7
43	AS-REQD	ANCHOR BOLT, 1/2", SST, DRILL-IN, 3-1/2" MIN EMBEDMENT	
44	1	TANK, 6,000 GAL, FRP FOR AMMONIA (AMMONIUM HYDROXIDE, 19%) SERVICE	43 41 45
45	1	TANK, 470 GAL, FRP FOR AMMONIA SCRUBBER	43 41 45
46	2	BUTTERFLY VALVE, 6" PVC WAFER-STYLE	33 12 16.05
47	Ø100'	PIPE, 2", 3", 4", AND 6", PVC SCH 80 W/ FITTINGS AND SUPPORT	40 20 20
48	1	PRESSURE TRANSMITTER WITH DIAPHRAGM SEAL (PLASTOMATIC GGTS)	33 09 11
49	AS-REQD	BLIND FLANGE, 2", 3", 4", AND 6" SCH 80	323-EA

NOTES

- NOTES AND MATERIAL LIST APPLY TO DRAWINGS 506.40-M-306, AND M-307.1. SEE NOTES ON M-301 FOR ADDITIONAL REQUIREMENTS.
- PROVIDE EQUIPMENT ID TAGS FOR ALL NUMBERED EQUIPMENT AND DEVICES IN ACCORDANCE WITH 506.00-J-023, J-024.1, AND J-024.2.
- TRANSFER PUMP RATINGS: (NH-PMP-225) 70 GPM @ 23'
- THIS MATERIAL LIST IS NOT COMPLETE. FITTINGS SUCH AS ELLS, UNIONS, REDUCERS, FLANGES, TEES, NIPPLES, ETC. MAY NOT BE LISTED, HOWEVER ALL ITEMS NECESSARY TO COMPLETE THE INSTALLATION SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
- PIPE INSTALLATIONS SHALL MAINTAIN A MINIMUM 3' WALKWAY CLEARANCE AROUND TANKS, INCLUDING BETWEEN TANKS AND WALLS.
- RELOCATE EXISTING NH SCRUBBER TANK FROM AMMONIA ROOM (SEE 506-M-300 FOR EXISTING LOCATION OF AMMONIA SCRUBBER TANK). REUSE EXISTING TANK LEVEL INDICATOR ASSEMBLY WITH VALVE. ALL OTHER MATERIALS SHALL BE NEW. GRIND HOLD DOWN CLIPS TO WHITE METAL AND COAT WITH HIGH-BUILD EPOXY IN ACCORDANCE WITH SECTION 09963 PRIOR TO TANK INSTALLATION.
- ANCHOR BOLTS FOR THE TWO TANK HOLD DOWN CLIPS NEAREST THE BOTTOM TANK NOZZLES SHALL EXTEND A MINIMUM OF 3-1/2" BEYOND THE TANK EQUIPMENT PAD. DRY PACK UNDER THE SCRUBBER TANK HOLD DOWN CLIPS AND AROUND THE ANCHOR BOLTS TO FORM A CONTINUOUS CONCRETE PAD UNDER THE TANK. PROVIDE A 2" MINIMUM CLEARANCE BETWEEN BOTTOM NOZZLE FLANGES AND DRY PACK (CLEARANCE FOR FLANGE BOLTING).
- PROVIDE LATERAL BRACING (NOT SHOWN) FOR ALL PIPING SUPPORTED BY CLEVIS HANGERS.
- VENT PIPE CENTERLINE SHALL BE NO GREATER THAN 2'-6" ABOVE THE TANK.
- SEE SPECIFICATION SECTION 43 41 45 FOR FABRICATION DETAILS FOR NH-TNK-102 AND NH-TNK-105. CONFIRM NOZZLE AND ANCHOR LUG ORIENTATION PRIOR TO FABRICATION. SEE S-039 FOR ANCHOR DETAIL.

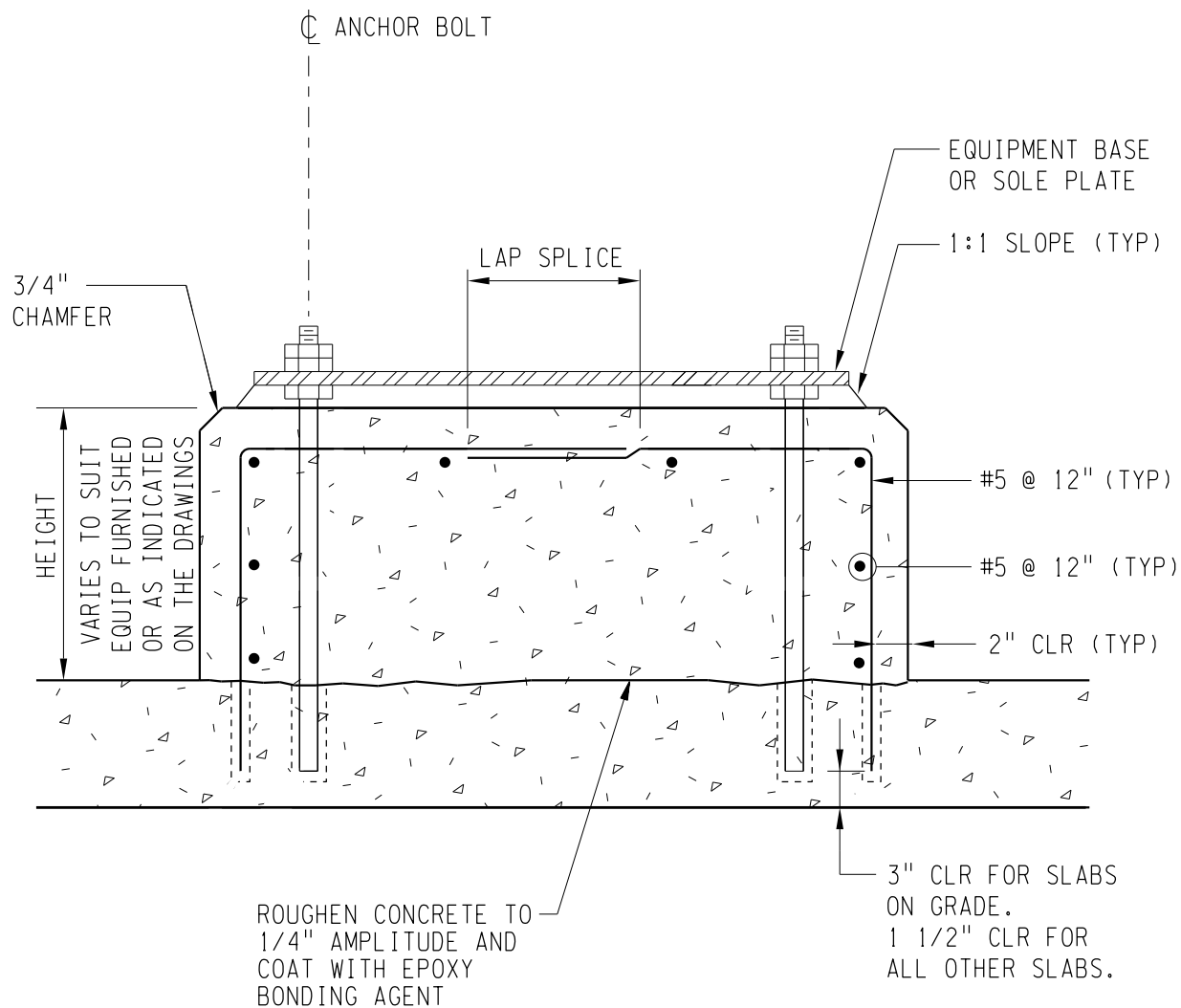
DESIGN DESIGNED BY DESIGN CHECKED BY DRAWN BY	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
	WALNUT CREEK WTP IMPROVEMENTS PROJECT CHEMICAL BUILDING MECHANICAL			
	AMMONIA, STORAGE AREA SECTIONS, DETAILS, MATERIAL LIST & NOTES			
A COPY OF THE ORIGINAL DRAWING WITH ORIGINAL SIGNATURES CAN BE FOUND IN ENGINEERING RECORDS.		STRUCTURE OR ZONE		
RECOMMENDED:		SCALE AS SHOWN		506.40-M-307.1
APPROVED:		DATE 07SEP2001		2
NO.	DATE	REVISION	BY	REC. APP.



NOMINAL TANK HEIGHT = 11.0 FT
INTERNAL DIAMETER = 10 FT
SEE NOTE 1

1. SEE THE END OF SPECIFICATION SECTION 43 41 45 FOR FABRICATION DETAIL DRAWINGS.
2. SEE M-307.1 FOR ADDITIONAL NOTES.
3. CONFIRM ORIENTATION OF ANCHOR LUGS AND NOZZLES WITH ENGINEER PRIOR TO FABRICATION.
SEE S-039 FOR ANCHOR DETAIL.

DESIGN	DESIGNED BY	<i>Chloe Chok</i> CHLOE CHOK	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
	DESIGN CHECKED BY	M.PRICE	WALNUT CREEK WTP IMPROVEMENTS PROJECT CHEMICAL BUILDING MECHANICAL			
REVIEW	DRAWN BY	FACILITY DRAFTING				
	PROJECT ENGINEER R.P.E. NO. C 89573	<i>Chloe Chok</i> CHLOE CHOK				
REVIEW	RECOMMENDED BY	<i>[Signature]</i> MICHAEL J. HARTLUB	PROJ. NO.	506.40-M-307.4		0
	SENIOR CIVIL ENGR. R.P.E. NO. C74901		SCALE AS SHOWN			
REVIEW	APPROVED:	<i>Paul Tranter</i>	DATE 03APR2023	STRUCT.	DISC.	NUMBER
	ACTING MGR. OF DESIGN R.P.E. NO. C38146					REV.



NOTES

1. ADHESIVE REBAR DOWELS ARE TO BE LOCATED TO AVOID CONFLICT WITH EXISTING REBAR.

EQUIPMENT BASE ON EXISTING
CONCRETE SLAB

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 AND WELDING NECK TYPE OR B16.47, SERIES A, CLASS 150 FLANGES ARE ACCEPTABLE ALTERNATIVES. USE TYPE AS CALLED OUT ON REFERRING DRAWING.
 - 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.
 - D. NOTE THAT ASME FLANGES WERE PREVIOUSLY REFERRED TO AS ANSI FLANGES.
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 0.75°.
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 0.06 IN OR LARGER RADIUS. THE RESULTING SURFACE SHALL HAVE A 125 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 WITH RUBBER GASKETS: THE BOLTS SHALL BE ASTM A193, CLASS 1, B8 (TYPE 304) OR B8M (TYPE 316). NUTS SHALL BE ASTM A194, GRADE 8 (TYPE 304) OR GRADE 8M (TYPE 316) STANDARD HEX. WASHERS SHALL MATCH.
 - C. STAINLESS STEEL WITH FIBER GASKETS: THE BOLTS SHALL BE ASTM A193, CLASS 2, B8 (TYPE 304) OR N8N (TYPE 304N), CARBIDE SOLUTION TREATED AND STRAIN HARDENED. NUTS SHALL BE ASTM A194, GRADE 1 STD HEX OR GRADE 8-S1 HEAVY HEX AND STRAIN HARDENED. WASHERS SHALL MATCH.

ANTI-SEIZE COMPOUND

10. THREAD ANTI-SEIZE COMPOUND SHALL BE USED ON ALL BOLT THREADS. SEE SECTION 05 05 26 FOR ACCEPTABLE PRODUCTS. FAILURE TO LUBRICATE THE BOLTING THREADS WITH ANTI-SEIZE COMPOUND PRIOR TO NUT INSTALLATION 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. FIBER GASKETS SHALL BE USED WITH HIGH STRENGTH STAINLESS STEEL BOLTING.
13. RUBBER GASKETS SHALL BE FULL-FACED PEROXIDE CURED EPDM WITH A THICKNESS OF 1/16" OR 1/8".
14. NON-ASBESTOS FIBER GASKETS SHALL MEET THE REQUIREMENTS OF AWWA C207. FACES SHALL BE LUBRICATED ON BOTH SIDES WITH FOOD GRADE ANTI-SEIZE COMPOUND.
15. FLANGES 24" AND SMALLER SHALL USE FULL FACED GASKETS. FLANGES OVER 24" SHALL USE RING GASKETS.

DIMENSIONS

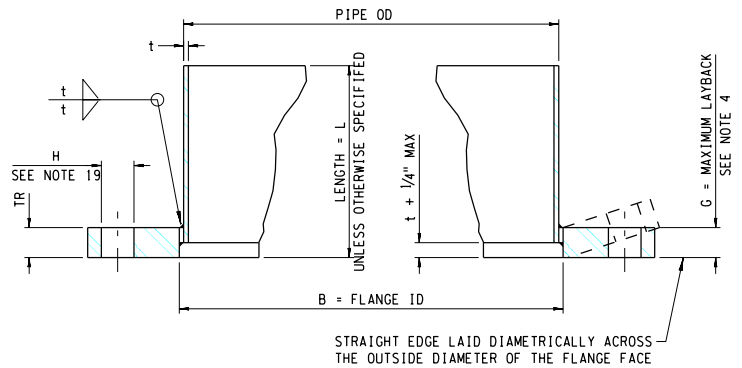
16. THE FLANGE ID "B" SHALL BE 1/8" LARGER THAN THE PIPE OUTSIDE DIAMETER FOR PIPES UP TO 16" AND 3/16" LARGER FOR PIPES 20" AND LARGER. NOTE THAT DISTRICT STANDARD PIPELINE PIPE DIAMETERS ARE DIFFERENT FROM ASME B36.10 AND B36.19 PIPE. VERIFY ACTUAL PIPE DIAMETER BEFORE FABRICATING FLANGES. SEE APPLICABLE 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 18" FOR FLANGES 24" AND LARGER.
19. THE BOLT HOLE DIAMETER "H" SHALL BE 1/8" LARGER THAN THE BOLT DIAMETER.

BOLTING PROCEDURES

20. INITIAL BOLTING: HAND TIGHTEN EACH, THEN "SNUG" EACH TO 10% OF FINAL TORQUE AND CHECK GAP AROUND CIRCUMFERENCE FOR UNIFORMITY. SELECTIVELY TIGHTEN WHERE GAP IS LARGER.
21. FLANGE BOLTS FOR RUBBER GASKETS SHALL BE TIGHTENED TO FINAL TORQUE WITH MINIMUM PASSES AS FOLLOWS:

PASS	PERCENT OF FINAL TORQUE	PATTERN
1	20 TO 30	CROSS
2	50 TO 70	CROSS
3	100	CROSS
4	100	CIRCULAR CLOCKWISE

 AFTER HYDROTESTING, REPEAT PASSES 3 & 4.



LP FLANGE & PIPE SECTION ASSEMBLY

PIPE SIZE	MIN. FLANGE THICKNESS TR		BOLTS		BOLT TORQUE		MAXIMUM FLANGE LAYBACK G
	RING	HUB	#	DIAM	RUBBER	FIBER	
4	0.625	0.500	8	5/8	35	120	0.029
6	0.688	0.562	8	3/4	56	200	0.028
8	0.688	0.562	8	3/4	70	220	0.031
10	0.688	0.688	12	7/8	87	300	0.034
12	0.812	0.688	12	7/8	104	350	0.040
16	1.000	0.750	16	1	119	450	0.048
20	1.125	0.750	20	1 1/8	137	600	0.048
24	1.250	1.000	20	1 1/4	205	700	0.051
30	1.375	1.000	28	1 1/4	207	800	0.056
36	1.625	1.125	32	1 1/2	304	1000	0.064
42	1.750	1.25	36	1 1/2	359	1000	0.071
48	1.875	1.375	44	1 1/2	362	1000	0.074
54	2.125	1.375	44	1 3/4	516	1500	0.079
60	2.250	1.500	52	1 3/4	526	1500	0.084
66	2.500	1.500	52	1 3/4	625	1500	0.090
72	2.625	1.500	60	1 3/4	625	1500	0.094
78	2.750	1.750	64	2	761	2000	0.097
84	2.875	1.750	64	2	877	2000	0.102
90	3.000	2.000	68	2 1/4	1036	3000	0.107
96	3.250	2.000	68	2 1/4	1252	3000	0.112
102	3.250	-	72	2 1/2	1458	4000	0.117
108	3.375	-	72	2 1/2	1820	4000	0.121

TABLE DIMENSIONS ARE IN INCHES, TORQUE IS FT-LBS

22. FLANGE BOLTS FOR NON-ASBESTOS COMPOSITION GASKETS SHALL BE TIGHTENED WITH MINIMUM PASSES AS FOLLOWS:

PASS	PERCENT OF FINAL TORQUE	PATTERN
1	20 TO 30	CROSS
2	50 TO 70	CROSS
3	100	CROSS
4	100	CIRCULAR CLOCKWISE
ALLOW MINIMUM 4 HR FOR GASKET TO UNDERGO RELAXATION, THEN:		
5	100	CROSS
6	100	CIRCULAR CLOCKWISE

23. BOLTS SHALL IN ALL PASSES BE TIGHTENED IN DIAMETRICAL PAIRS AND IN A CROSS PATTERN AS RECOMMENDED BY THE GASKET MANUFACTURER OR ASME PCC-1, TABLES 4 OR 4.1.

24. A CALIBRATED TORQUE WRENCH SHALL BE USED ON ALL PASSES TO ENSURE UNIFORM BOLTING. TORQUE MULTIPLIERS ARE REQUIRED FOR HIGHER TORQUE VALUES.

REVISED AND REDRAWN 14 JAN 99 DLH

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

NO.	DATE	REVISION	BY	REC.	APP.	DESIGN	REVIEW	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA		STRUCTURE OR ZONE DESIGNATION	SCALE	DATE	0323-EA
7	10-15-20	REVISED NOTE	JC	MR	CAV	DESIGNED BY EBMUD		STANDARD DRAWING		WITH ATTACHED PIPE SECTION	NONE	IFEB 81	
6	03-10-20	REVISED VALUES	DSB	DSB	CAV	DESIGN CHECKED BY HUBERT LAI							
5	02-01-17	REVISED NOTES	MR	DSB	CAV	DRAWN BY dlh		STEEL PIPE FLANGES LOW PRESSURE					
4	06-30-08	REVISED NOTES	JH	ST	AST								
						CORROSION CHECK BY K. CHAPMAN		WITH ATTACHED PIPE SECTION					
						SR. CIVIL ENG. R.P.E. NO. C 27714 W. BODE							
						RECOMMENDED MGR. OF DESIGN R.P.E. NO. C 16814 J. M. HILLIARD/W. BODE		APPROVED, DIRECTOR OF ENGINEERING, R.P.E. NO. C 31966 D. M. DIEMER					