Ver.: 10/05/22-ce

INVITATION FOR BIDS
AND
CONSTRUCTION DOCUMENTS
FOR

JOB NO. 02-06
WKK-15, CONSTRUCT KĪLAUEA 466' TANK, 1.0 MG, KĪLAUEA
KAUA'I, HAWAI'I

February 2026

DEPARTMENT OF WATER
COUNTY OF KAUA'I
LĪHU'E, KAUA'I, HAWAI'I

APPROVED:

Chief Procurement Officer

02/06/26

Date

1 ADMINISTRATION

1.1 INVITATION FOR BIDS.

DEPARTMENT OF WATER, COUNTY OF KAUA'I
02-06 WKK-15, CONSTRUCT KĪLAUEA 466' TANK, 1.0 MG, KĪLAUEA
KAUA'I, HAWAI'I

Pursuant to Chapter 103D, HRS, SEALED TENDERS will be received up to and opened at 2:00 p.m., Hawaiian Standard Time (HST) on **Wednesday, April 22, 2026**, in the Administration Office of the Department of Water at 4398 Pua Loke Street, Līhu'e, Kaua'i, Hawai'i ("DOW Admin. Office"). Bids received after the date and time specified above shall be rejected. Facsimile offers will not be accepted or considered.

The schedule set out below represents the Department's best estimate of the schedule that will be followed for this competitive sealed bidding procurement process. If an activity in the schedule is delayed, the dates following the delayed activity may be adjusted by the same number of days. All prospective Offerors will be advised by addendum of any changes to the Procurement Schedule.

Activity	Scheduled Date
Invitation For Bids Issued	February 9, 2026
Pre-Bid Conference	February 27, 2026 at 9:00am HST
Deadline: Receipt of Questions / Comments / Material Substitutions	March 20, 2026
Deadline: Notice of Intent	N/A
Department's Responses to Questions / Comments / Material Substitutions	April 1, 2026
Bid Opening	April 22, 2026 at 2:00pm HST
Selection / Award Notification	May 1, 2026
Contract Execution Period	August 2026 to January 2028
Contract Tentative Notice to Proceed Date	August 1, 2026

The Manager and Chief Engineer also reserves the right to reject any or all bids, in whole or in part, if deemed to be in the best interest of the Department of Water.

Bids must be signed in ink by the person or persons duly authorized to sign bids in the space provided for signature on the Offer form. **Bidders shall submit their offer and all related documents as required in this solicitation through Public Purchase at www.publicpurchase.com** .

BIDDERS ARE HEREBY NOTIFIED THAT EVIDENCE OF THE AUTHORITY OF THE PERSON(S) SIGNING THE BID DOCUMENT IS REQUIRED TO BE INCLUDED WITH THE BID DOCUMENTS. FAILURE TO COMPLY WITH THIS REQUIREMENT WILL BE CAUSE FOR REJECTION OF THE BID AS BEING NON-RESPONSIVE.

SCOPE OF WORK: This contract consists of furnishing all materials, labor, tools, and equipment for the installation of the Project, as indicated in the contract drawings and specifications.

The Project includes, but is not limited to, the demolition of an existing 0.1 million gallon (MG) concrete water storage tank, the construction of a new 1.0 MG concrete water storage tank, water and drain line improvements, electrical improvements and a variety of other site improvements. The Project shall be in-place and complete in accordance with the contract drawings and specifications. The project is located off of Wailapa Road in Kīlauea, Kauaʻi, Hawaiʻi.

The construction plans and specifications provide two alternative structural tank designs: REINFORCED CONCRETE RESERVOIR and WOUND RESERVOIR FOUNDATION. Bidders shall provide a TOTAL price on OFFER sheet ITEM NO. 34 for only one of the alternative designs. The Bidder shall indicate on OFFER sheet ITEM NO. 34, DESCRIPTION field, which of the alternative designs is proposed.

PLANS AND SPECIFICATIONS: The contract documents are to be downloaded electronically. Please email the Department of Water Contracts Officer, Christine Erorita at cerorita@kauaiwater.org for instructions. Those who download documents electronically shall be responsible for any and all costs related to printing or reproducing the items as required for offer submission. For inquires on obtaining plans and specifications and all other inquires call the project engineer at (808) 245-5411.

The contract documents may be examined at the following locations:

DOW Admin. Office, Līhu`e, Kaua`i, Hawai`i

Published in: ☐ Garden Island Newspaper
☒ Bid Service Weekly
☒ General Contractors' Association
☒ State Procurement Internet website at: https://hands.ehawaii.gov/hands/welcome
☒ DOW website at: www.kauaiwater.org
☒ DOW electronic procurement system at: www.publicpurchase.com

CONTRACTORS LICENSE: All prospective Bidders must be currently licensed by the State of Hawaiʻi, Department of Commerce and Consumer Affairs, Division of Professional and Vocational Licensing.

"A" general engineering contractors and "B" general building contractors are reminded that due to the Hawaiʻi Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al, 97 Haw. 450 (2002), they are prohibited from undertaking any work, solely or as part of a larger project, which would require the general contractor to act as a specialty contractor in any area where the general contractor has no license. Although the "A" and "B" contractor may still bid on and act as the "prime" contractor on an "A" or "B" project (See, HRS § 444-7 for the definitions of an "A" or "B" project), respectively, the "A" and "B" contractor may only perform work in the areas in which they have the appropriate contractor's license (An "A" or "B" contractor obtains "C" specialty contractor's licenses either on its own or automatically under HAR § 16-77-32.). The remaining work must be performed by appropriately licensed entities. It is the sole responsibility of the contractor to review the requirements of this Project and determine the appropriate licenses that are required to complete the Project.

PRE-BID CONFERENCE: The estimated contract value is more than $500,000 and, thus, a Pre-Bid Conference shall be held. If a Pre-Bid Conference is held, all potential interested offerors, subcontractors, and union representatives are invited to attend on the date specified in the Procurement Schedule in Section 1.1 at the DOW Admin. Office. A visit to the site will be conducted following the meeting. The site inspection is not mandatory; however, submission of an offer shall be evidence that the Offeror understands the scope of the project and shall comply with the specifications herein, if awarded the contract and has thoroughly familiarize itself with the existing conditions, rules and regulations, and the extent and nature of work to be performed. No additional compensation, subsequent to bid opening, shall be allowed by reason of any misunderstanding or error regarding site conditions or work to be performed. All prospective Bidders must make their own transportation arrangements to and from the site. Those interested in attending the pre-bid conference should contact the Procurement Officer. Offerors are advised that anything discussed at the pre-bid conference does not change any part of this solicitation. All changes and/or clarifications to this solicitation shall be done in the form of written addenda.

NOTICE OF INTENTION TO BID: Bidders are not required to submit a Notice of Intent to Bid.

CHIEF PROCUREMENT OFFICER
DEPARTMENT OF WATER
COUNTY OF KAUA‘I

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1.2 DEFINITIONS.

This section shall incorporate the definitions not listed below and contained in Hawai‘i Revised Statutes (HRS) 103D; the Hawai‘i Administrative Rules (HAR), Title 3, Department of Accounting & General Services, Subtitle 11, Procurement Policy Board, Chapters 120 through 131; and the General Provisions for Construction Contracts of the Department of Water, dated April 25, 2016. Terms as used in this solicitation, unless the context requires otherwise, shall have the following meaning:

“Award” means the notification of the Department’s acceptance of a bid or the presentation of a contract to the selected offeror.

“Bid sample” means a sample to be furnished by a bidder to show the characteristics of the item offered in the bid.

“Board” or “Board of Water Supply” shall mean the “Department of Water, County of Kaua‘i”, as provided for in the County Charter which became effective January 2, 1969.

“Contract Administrator” means the person designated to manage the various facets of the Contract to ensure the Contractor’s total performance is in accordance with the contractual commitments and obligations to the Department are fulfilled.

“Department” or “DOW” means the Department of Water, County of Kaua‘i, contracting on behalf of the Board of Water Supply. Wherever the terms “Engineer” or “Owner” are used in any document which forms a part of the Contract, the terms shall mean the Department of Water, County of Kaua‘i and its authorized agents.

“Offer” means the bid, proposal, or quotation.

“Offeror” means any individual, partnership, firm, corporation, joint venture, or other legal entity submitting, directly or through a duly authorized representative or agent, an offer for the good, service, or construction contemplated.

“Opening” means the date set for opening of bids, receipt of unpriced technical offers in multistep sealed bidding, or receipt of proposals in competitive sealed proposals.

“Procurement officer” means any person with delegated authority to enter into and administer contracts and make written determination with respect thereto. The term includes an authorized representative acting within the limits of authority. The delegated authority is received from the chief procurement officer directly or through the head of a purchasing agency or designee to the procurement officer.

“Project” means work to be performed as set forth in the Contract, including furnishing all services, labor, goods, materials, supplies, equipment and other incidentals reasonably necessary for the successful completion of work contemplated under the Contract.

"Quotation" means a statement of price, terms of sale, and description of goods, services, or construction offered by a prospective seller to a prospective purchaser, usually for purchases pursuant to section 103D-305, HRS.

"Special Provisions" means the terms and conditions pertaining to the specific solicitation in which they are incorporated; including but not limited to terms and conditions describing the preparation of solicitations, evaluation of offers, determination of award, plus those applicable to performance by the Contractor.

> Additions or revisions to the General Provisions, which shall be considered a part of the General Provisions, setting forth conditions or requirements applicable to the particular project or contract under consideration shall be included in the Special Provisions. Should any Special Provisions conflict with these General Provisions, said Special Provisions shall govern.

"Specifications" mean any description of the physical or functional characteristics, or of the nature of a good, service, or construction item. The term includes descriptions or any requirement for inspecting, testing, or preparing a good, service, or construction item for delivery.

"Standard commercial product" means a product or material, in the normal course of business, is customarily maintained in stock or readily available by a manufacturer, distributor, or dealer for the marketing of the product.

"Successful bidder" means the individual, partnership, firm, corporation, joint venture, or other legal entity that submitted a bid for the Project and was determined to be a responsible, responsive bidder and selected for award of the contract.

1.3 INSTRUCTIONS TO BIDDERS.

THESE INSTRUCTIONS TO BIDDERS SHALL BE CONSIDERED TO BE INCORPORATED INTO THE SPECIAL PROVISIONS.

1.3.1 Submission of Bids: Bidders shall read and examine the Special Provisions, Specifications, General Provisions and all other bid documents attached hereto and by reference made a part hereof. Submission of bids shall be deemed a verification of such reading and examination and shall be deemed acknowledgement and agreement to be bound by the terms and conditions, and specifications of such documents. All Bidders shall complete and submit with its bid, the Offer form found in Appendix C via www.publicpurchase.com .

All bids for the construction of this project shall be and marked "**Job 02-06 WKK-15, CONSTRUCT KĪLAUEA 466' TANK, 1.0 MG, KĪLAUEA.**"

Bidders shall submit their offer and all related documents as required in this solicitation through Public Purchase at www.publicpurchase.com .

1.3.2 Bidding Instructions: In addition to these Instructions to Bidders, Bidders are directed to SECTION 2 - BIDDING / PROPOSAL INSTRUCTIONS of the "GENERAL PROVISIONS FOR CONSTRUCTION CONTRACTS OF THE DEPARTMENT OF WATER", dated April 25, 2016 (hereafter "GENERAL PROVISIONS"), and the General Provisions in its entirety.

1.3.3 Offer Form: The attached form of the OFFER is furnished only for the guidance of bidders and is not to be used for actual bidding. An official copy of the Offer on which the bid shall be made will be furnished to the prospective bidder when plans and specifications are obtained.

1.3.4 Omission or Erasures; Conditioned Offers: Any Offer which contains any omission or erasure or alteration not properly initialed or any attempt by a bidder to condition the bid or other irregularity, and bid samples or descriptive literature, unless expressly requested, will not be examined or tested, and will not be deemed to vary any of the provisions of this solicitation and are submitted at the Bidder's risk and may be rejected. Offerors shall not submit their organization's terms and conditions, standard contracts, or other similar agreements or forms. General reference to such items or attempts to substitute such items for the Department's **shall** result in the disqualification of the Offeror's bid as conditioned.

1.3.5 Solicitation Review; Submission of Questions and Requests For Clarification:

1.3.5.1 Submission of Questions and Requests for Clarification: Offerors are encouraged to submit written questions pertaining to this solicitation. Questions and requests for clarification must be submitted in writing via e-mail or received by post mail to the Procurement Officer not later

than the date specified in the Procurement Schedule in Section 1.1 in order to generate an official answer. All written questions will receive an official written response from the Department and become an addenda to this solicitation. The only official position of the Department is that which is stated in writing and issued in this solicitation as an addenda thereto. All other means of communication, whether oral or written, shall not be formal or official responses/statements and may not be relied upon. **Any addendum issued must be acknowledged by downloading from Public Purchase, signed, and included with offer.**

1.3.5.2 Solicitation Review: Offerors should carefully review this solicitation for defects and/or ambiguities. Comments concerning defects and questionable or objectionable matter must be made in writing either via e-mail or post mailed and should be received by the Procurement Officer not later than the date specified in the Procurement Schedule in Section 1.1. This will allow issuance of any necessary amendments to this solicitation. It will also assist in preventing the opening of offers upon which award may not be made due to a defective solicitation package.

1.3.6 Standard Questionnaire and Financial Statement: When the Manager and Chief Engineer requires a prospective bidder to file a "Standard Qualification Questionnaire for Prospective Offerors on Department of Water Contracts," the prospective bidder shall return a completed Standard Questionnaire, on the form provided by the Department, at least 48 hours prior to opening of bids. If this proves satisfactory, the bidder's Offer will be received.

1.3.7 Bid Bond: A bid bond for the value of 5% of the bid value shall accompany the bid.

1.3.8 Performance and Payment Bonds: If the contract which is awarded exceeds $25,000 and is for construction, performance and payment bonds shall each be in an amount equal to one hundred per cent of the amount of the contract price.

1.3.9 Responsibility of Bidders to Study Site: At the time of opening of bids, the Department shall presume that each Bidder has inspected the project site(s) and has read the Plans, Specifications, and other Contract Documents, including all Addenda and has become thoroughly familiar with them. The failure or omission of any Bidder to receive or examine any form, instrument, or document shall in no way relieve that Bidder from any obligation under the Bid or the Contract.

Each bidder must form an opinion of the character of the work and of the materials to be excavated, from an examination of the project site(s), from studies and inspection of available samples, records and reports and from any other investigations the Bidder may wish to make. Each Bidder must form an

independent opinion of all the conditions affecting the work to be done and the labor and materials to be supplied, in order to make a Bid in sole reliance thereupon. Failure of a Bidder to become completely familiar with the labor and construction conditions under which the work is to be performed will not relieve that Bidder of any obligations to furnish all materials, equipment, and labor necessary to perform the work as set forth in this solicitation and to perform the Contract.

1.3.10 Insurance: Contractor shall procure and maintain, on a primary basis and at its sole expense, at all times during the life of the contract insurance coverages, limits, including endorsements as described Appendix "D" - Insurance, against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work by the Contractor or the Contractor's agents, representatives, employees, or subcontractors. The requirements contained therein, as well as the Department's review or acceptance of insurance maintained by the Contractor is not intended to and shall not in any manner limit or qualify the liabilities or obligations assumed by the Contractor. Unless otherwise approved by the Manager and Chief Engineer, the policy or policies of insurance maintained by the Contractor shall provide the minimum limit(s) and coverage(s) as specified in the attached Appendix "D" - Insurance and be placed with an insurance carrier authorized to do business in this state and rated A-VII by A.M. Best.

1.3.11 Tax Clearance: See: Subsection 3.5 - RESPONSIBILITY OF OFFERORS AND TAX CLEARANCE of the GENERAL PROVISIONS in its entirety. Further, the **Bidder shall be required to submit a tax clearance with the bid Offer**. Failure to comply with this provision will be grounds for disqualifying the Bidder. The successful bidder will also be required to submit a current valid tax clearance prior to final payment for this Project.

1.3.12 Preferences: The following preferences are applicable when preceded by a checked box. Information and legal and procedural requirements pertaining to all preferences can be found within the General Provisions:

☐ **Hawai'i Products Preference (See: Appendix C)**. Pursuant to HRS 103D-1002, Offers should complete the Certificate of Hawai'i Products Preference for application of this preference.

☐ **Reciprocal Preferences**: Pursuant to the provisions of Section 103D-1004, HRS and Subchapter 3, Chapter 124, Subtitle 11, Title 3, HAR, the Manager may impose a reciprocal preference against Bidders from those states which apply preferences.

☐ **Recycled Products Preference**. Pursuant to HRS 103D-1005, Offerors should contact the Procurement Officer for application of this preference.

☒ **Tax Payer Preference (Hawai'i Excise and Use Tax Preference)**. Pursuant to HRS 103D-1008, any "taxpaying bidder" shall qualify for this preference.

☒ **Qualified Community Rehabilitation Programs Preference**. Pursuant to HRS 103D-1009, a five per cent preference shall be given to services to be provided by nonprofit corporations or public agencies operating qualified community rehabilitation programs in conformance with criteria established by the DLIR for all competitive sealed bid and proposal procurements.

☒ **Apprenticeship Program Preference (See: Appendix G)**. Pursuant to HRS 103-55, applicable to public works projects with estimated values of $250,000 or greater. Section 103-55.6, HRS, as enacted by S.B. 19, Act 17, SLH 2009, and the State of Hawai‘i Comptroller’s Memorandum 2011-06 as amended, provides for a Hawai‘i Apprenticeship Preference for public works construction projects with estimated values of $250,000 or greater. The preference shall be in the form of five percent (5%) bid adjustment applied to the Bidder’s Offer amount.

☒**Safety and Health Program (See: Appendix K)**. Pursuant to HRS 396-18, applicable to construction projects where the offer amount is in excess of $100,000.

1.3.13 Tax Adjustment for Out-Of-State Vendors and Tax Exempt Bidders: Pursuant to the provisions of Section 103-53.5, HRS, where the Bidder is an out-of-state vendor not doing business in the State of Hawai‘i, or is a person exempted from paying the applicable general excise tax, the package bid or purchase price, for the purpose of determining the lowest price bid, shall be increased by the applicable retail rate of general excise tax and the applicable use tax. The lowest responsible bidder who satisfies all of the requirements of these bid documents, taking into consideration the above increases, shall be awarded the contract, but the contract amount of any contract awarded shall be the amount of the bid offered and shall not include the amount of the increase.

1.3.14 Worker’s Compensation Act: The Contractor will be required to comply with the provisions of Chapter 97, Revised Laws of Hawai‘i 1955, known as the “Worker’s Compensation Laws,” and all laws amendatory thereof, relating to the compensation of employees for personal injuries sustained in the course of their employment. The Contractor’s surety or sureties shall be liable for any loss caused the Department by reason of the Contractor’s failure to comply with the provisions of said laws.

The Contractor shall furnish to the Department one copy of certificate of said insurance prior to commencement of work. Refer to the “RESPONSIBILITY OF SUCCESSFUL BIDDER” for additional requirements.

1.3.15 Subcontractor: Under the terms of this Contract, no subcontractor will be recognized. All subcontractors shall deal directly with the general Contractor; however, each and every subcontractor shall manage and take care of its own material and waste.

1.3.16 Listing Joint Contractors or Subcontractors:

Bidder shall complete the "Joint Contractors or Subcontractors List." It is the sole responsibility of the bidder to review the requirements of this Project and determine the appropriate specialty contractor licenses that are required to complete the Project.

Bidder shall specify the name of each person or firm to be engaged by the Bidder as a joint contractor or subcontractor in the performance of the contract and the nature and scope of the work to be performed by each regardless of the percentage of the value of the work to be performed by the joint contractor or subcontractor. (HRS 103D-302(b))

Failure of the Bidder to provide the correct names and specialty contractor's nature of work to be performed may cause the bid to be rejected.

Bidder agrees the completed listing of joint contractors or subcontractors is required for the Project and that Bidder, together with the listed joint contractors and subcontractors, have all the specialty contractor licenses to complete the work.

Based on the Hawai'i Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Hawai'i 450 (2002), the bidder as a general Contractor ('A' or 'B' license) is prohibited from undertaking any work solely or as part of a larger project, which would require the bidder ('A' or 'B' general Contractor) to act as a specialty ('C' license) Contractor in any area in which the bidder ('A' or 'B' general Contractor) has no specialty Contractor's license. Although the 'A' and 'B' Contractor may still bid on and act as the "Prime Contractor" on an 'A' and 'B' project (See: HRS § 444-7 for the definitions of an 'A' and 'B' project.), respectively, the 'A' and 'B' Contractor may only perform work in the areas in which they have the appropriate Contractor's license. The bidder ('A' or 'B' general Contractor) must have the appropriate 'C' specialty Contractor's licenses either obtained on its own, or obtained automatically under HAR §16-77-32.

General Engineering 'A' Contractors automatically have these 'C' specialty contractor licenses: C-3, C-9, C-10, C-17, C-24, C31a, C32, C-35, C-37a, C-37b, C-38, C43, C49, C-56, C-57a, C-57b, and C61.

General Building 'B' Contractors automatically have these 'C' specialty contractor licenses: C-5, C-6, C-10, C-12, C-24, C-25, C31a, C32a, C42a, and C-42b.

1.3.16.1 Instructions to complete the Joint Contractors or Subcontractors List:

1.3.16.1.1 Describe the nature of work to be performed by the specialty contractor for this Project and provide the complete firm name of the joint contractor or subcontractor in the respective columns. If the bidder is a general contractor and providing the work of the required specialty contractor, fill in the Bidder's (general contractor's) name and nature of work to be performed for this Project.

1.3.16.1.2 List only one joint contractor or subcontractor per required specialty contractor classification.

1.3.16.1.3 For projects with alternate(s), fill out the respective "Joint Contractors or Subcontractors List for the Alternate(s)." Bidder shall describe the nature of work to be performed by the specialty contractor on this Project for the respective alternate. Bidders shall fill in the complete firm name and nature of work to be performed by the respective joint contractor or subcontractor. If the joint contractor or subcontractor was previously listed under base bid, listing under Alternate(s) is not required.

1.3.17 Wages and Labor Requirements: Pursuant to HRS Section 103-55, each bidder submitting an offer and list of subcontractors certifies that: WAGES: The service to be rendered shall be performed by employees paid not less than wages paid to public officers and employees for similar work; and COMPLIANCE WITH LABOR LAWS: All applicable laws of the Federal and State governments relating to workmen's compensation, unemployment compensation, payment of wages, and safety will be fully complied with. The successful Bidder shall complete the Wage Certification in Appendix E.

1.3.17.1 In accordance with HRS Section 104-2 et seq., the Hawai'i Director of Labor and Industrial Relations determines the prevailing wages applicable to the project. The wage rates are the minimum rates to be paid and may be revised. Contractors shall pay the applicable rates, as revised, at no cost to the Department. This is not a representation that labor can be obtained at these rates. It is the responsibility of bidders to inform themselves of local labor conditions and prospective changes or adjustments of wage rates. No increase in the contract price shall be allowed or authorized on account of the payment of wage rates in excess of those listed herein. Wage rate schedules are available at the office of the Department of Labor and Industrial Relations, State of Hawai'i.

Current Wage Rate Bulletin: **509**

1.3.18 Asbestos Cement Pipe: For all construction contract bids involving asbestos cement pipe, the Contractor shall remove, handle, and dispose of asbestos cement pipe in conformance

with all applicable OSHA, State, and Federal regulations. The asbestos cement pipes shall only be disposed of at an approved disposal site.

1.3.19 Chlorination Subcontractor: All construction contract bids involving any chlorination work shall have a name listed for the C-37d Water Chlorination Subcontractor. Any bid not listing this subcontractor shall be rejected and disqualified.

1.3.20 Substitute Materials: Bidders contemplating submission of bids based on substitute materials must obtain prior written permission from the Department. Lists of substitute materials together with qualifying data shall be submitted on the Department's Request for Substitution form by the date set in the Procurement Schedule in Section 1.1, as evidenced by the time stamp of the Department, to the Procurement Officer for approval (the Request for Substitution form may be obtained from this individual). It is not the intent of the Department to exclude or limit the products. Any substitute material determined by the Department upon evaluation to be an acceptable equal, will be listed in an addendum to this solicitation, issued prior to the bid opening date. The Department is the sole judge as to the comparable quality and suitability of any substitute material and its decision shall be final. If a Bidder offers a product without the Department's pre-approval, the substitute material shall not be considered for award.

1.3.21 Independent Price Determination: By submitting a bid, the bidder certifies that the price submitted was independently arrived at without collusion.

1.3.22 Protests: Any protest shall be submitted in writing within five (5) working days after the posting of the notice of award; provided that a protest based upon the contents of the solicitation shall be submitted in writing prior to the date set for the receipt of offers. Any and all protests pursuant to Hawai‘i Procurement Code, Chapter 103D-701 HRS and Section 3-126-3 HAR shall be submitted in writing to the Procurement Officer for this solicitation.

1.3.23 Incorporation By Reference: Bidders hereby agree that all documents referred to in the Table of Contents are hereby incorporated by reference into this solicitation.

1.3.24 Severability: If any covenant, condition, or provision of this solicitation is held to be invalid by any court of competent jurisdiction, such holding shall not affect the validity of any other covenant, condition, or provision contained herein or incorporated by reference.

1.3.25 Remedies; Attorneys Fees, and Costs: All remedies provided in this solicitation shall be deemed cumulative and additional, and not in lieu of or exclusive of each other or of any other remedy available at law or in equity arising hereunder. Should any legal proceedings at law or in equity arise under or in connection with this solicitation, the Contractor shall be responsible for all attorneys' fees and costs (including reasonable fees and charges for the services of paralegals or other personnel who operate for and under the supervision of such attorneys and whose time is usually charged to clients) and any other expenses incurred in connection with such proceedings.

1.3.26 Department's Right to Audit: Books and Records: The Contractor shall, at all times during the term hereof, maintain complete and accurate books and records of its operations, including employee time records, in a form consistent with good accounting practice, including such books and records as would normally be examined by an independent certified public accountant in performing an audit or examination of the Contractor's receipts and expenses in accordance with generally accepted auditing standards. The Department has the right to designate an independent auditor to review books and records that specifically relate to this project. Subcontractors shall be bound by the same requirements. See: SECTION 6.9 - CONTROL OF THE CONTRACT of the GENERAL PROVISIONS in its entirety.

1.3.27 Confidential Material: All bids are subject to public inspection as set forth in 3-122-30, HAR. Bidders shall request in writing nondisclosure of designated trade secrets or other proprietary data to be confidential. Such data shall accompany the bid and shall be readily separable from the bid in order to facilitate eventual public inspection of the non-confidential portion of the bid. To facilitate the release of the information requested, the Department is prepared to sign a Non-Disclosure Agreement if necessary, however, the Department cannot guarantee that designated data will be kept confidential. The offers are subject to disclosure rules set forth in Chapter 92F, HRS and Non-Disclosure Agreements are enforceable only to the extent that they do not conflict with the provisions of Chapter 92F, HRS. The Bidder bears the burden of establishing that the designated data is exempted from the disclosure requirements set forth in Chapter 92F.

1.3.28 Cancellation of the Solicitation and Offer Rejection: The Department reserves the right to cancel this solicitation and to reject any and all offers in whole or in part, and waive any defects, when it is determined to be in the best interest of the Department, pursuant to HAR 3-122-96 and 3-122-97.

The Department shall not be liable for any costs, expense, loss of profit, or damages whatsoever, incurred by the Offeror in the event this solicitation is cancelled or an offer is rejected.

1.4 GENERAL PROVISIONS, SPECIFICATIONS, AND STANDARD DETAILS.

The Special Provisions, plans, General Provisions, Water Standards, County of Kaua‘i Department of Public Works ("DPW") Standard Specifications and Details, as amended, contract documents, and all supplemental documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for the complete work. In case of conflict or discrepancy within any part of the contract, the stricter requirements, including Hawai‘i State Statutory requirements, shall govern. Unless it is apparent that a different order of precedence is intended, the special provisions shall govern over plans, general provisions, and Water Standards; plans shall govern over general provisions; general provisions shall govern over Water Standards; Water Standards shall govern over DPW Standard Specifications; figured dimensions and drawings take precedence over measurements by scale, and detail drawings;

instructions to proposers shall be incorporated and made a part of the special provisions.

It is the responsibility of the prospective offerors, offerors, and Contractors to review the General Provisions, Water Standards, Specifications, and Standard Details and a submission of an offer to this solicitation shall be deemed an acknowledgement of the incorporation of these into this solicitation and the resulting contract, if any.

1.4.1 General Provisions for Construction Contracts: The General Provisions for Construction Contracts of the Department of Water, dated April 25, 2016 ("General Provisions") are included in this solicitation. A copy may be found in Appendix "B."

1.4.2 Water System Standards. The "Water System Standards", 2002, as amended, as adopted by the Department of Water, County of Kaua'i; Board of Water Supply, City and County of Honolūlū; Department of Water Supply, County of Maui; Department of Water Supply, County of Hawai'i ("Water Standards") is by reference incorporated herein and made a part of these specifications. The Water Standards specifications are not bound in these contract documents, but shall by reference be incorporated herein and made a part hereof.

1.4.3 Department of Public Works, County of Kaua'i Standard Specifications: Whenever reference is made to the DPW Standard Specifications, the specifications referred to is the "HAWAI'I STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION" of the State of Hawai'i, 2005, as amended. These specifications are not bound in the Contract Documents, but shall by reference be incorporated herein and made a part hereof.

1.4.4 Department of Public Works, County of Kaua'i, Standard Details: Whenever reference is made within these Special Provisions or the contract plans to the DPW Standard Details, the Details referred to is the "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION", September 1984 and all subsequent amendments. These specifications are not bound in the Contract Documents, but shall by reference be incorporated herein and made a part hereof.

1.5 PROCUREMENT OFFICER AND CONTRACT ADMINISTRATOR.

The Procurement Officer is responsible for administrating/facilitating all requirements of the solicitation process and is the **sole point of contact for Offerors** from the date of release of the solicitation until the selection of the successful Bidder.

The Contract Administrator shall be responsible for the contract administration once the contract is awarded and shall be the point of contact throughout the term of the contract.

☒ If checked, the Procurement Officer and the Contract Administrator shall be the same individual.

The Procurement Officer and Contract Administrator are:

Procurement Officer:
Jason Kagimoto
Engineering Division
Department of Water, County of Kauaʻi
4398 Pua Loke Street
Līhuʻe, HI 96766
Phone Number: 808-245-5417
Email: jkagimoto@kauaiwater.org

Contract Administrator:
Jason Kagimoto
Engineering Division
Department of Water, County of Kauaʻi
4398 Pua Loke Street
Līhuʻe, HI 96766
Phone Number: 808-245-5417
Email: jkagimoto@kauaiwater.org

2 SCOPE OF WORK

2.1 SCOPE OF WORK.

This Contract consists of the following Scope of Work and includes all other necessary work, all as indicated in the contract drawings and specifications. The general location of the work is as shown on the contract plans and as described herein.

This contract consists of furnishing all materials, labor, tools, and equipment for the installation of the Project

2.2 TIME OF COMPLETION.

2.2.1 It is understood and agreed that the work called for under this Project must and shall be completed within **FIVE HUNDRED FORTY-FIVE (545) CALENDAR DAYS** after written notice has been given to the Contractor to commence work. No extension of time will be granted for shipping and manufacturer's delays. The Contractor shall be subject to liquidated damages for delay or nonperformance as stated in this solicitation.

2.2.2 Work on the basic contract agreement is to be completed within the stipulated completion time from the date to the "Notice to Proceed." All work shall be done in co-operation with and coordinated with any other Contractors in a manner to allow completion of the entire construction within the scheduled time.

Per Approved Plans Water Construction Note: all materials, shop drawings, chlorination plan, hazardous material and health related submittals, etc. shall be approved by the Department before a preconstruction meeting can be scheduled. In order for the contractor to meet this requirement, as well as any other requirements related to permitting for the project, including but not limited to building, grading, road, noise, demolition, NPDES for staging areas, NPDES duly authorized person designation, etc., the Department has included 90 calendar days for the contractor to complete the process within the total time of completion calendar day amount. Notice to proceed will be given before the contractor begins the project submittal approval process and it is expected that the contractor will complete the submittal and permit process within the 90 calendar day timeframe. No additional days will be granted if the contractor does not complete the process to attain a preconstruction meeting within 90 calendar days.

2.3 PERMITS.

The Contractor shall obtain all necessary permits needed for this job including, but not limited to, those listed below and in the Special Provisions. The Contractor shall obtain all necessary permits prior to the commencement of the work. The Contractor shall pay for all required charges and fees associated with these permits.

County of Kaua'i permits include, but are not limited to, demolition and building permits

from the Department of Public Works, Building Division.

The Department of Water has submitted a Building Permit Application for the 1.0-million-gallon tank and has pending permit number 25-xxxx. The construction plans are currently under Building Permit review. The Department of Water is responsible for obtaining Building Permit plan approval. The successful Contractor is responsible for finalizing all Building Permit requirements, pay Building Permit fees and obtain the Building Permit.

The Department of Water has obtained Class IV Zoning Permit Z-IV-2019-2, Use Permit U-2019-1, and Special Permit SP-2019-2 from the County of Kaua'i Planning Commission. See Appendix K for a copy of the permit. The Contractor shall comply with all conditions of the permits.

The Contractor shall obtain a Community Noise Permit and/or Variance with the Department of Health, State of Hawai'i, if necessary. The Contractor shall pay for all required charges.

The Department of Water is covered under the following National Pollutant Discharge Elimination System (NPDES) General Permits:

- NPDES Appendix C, NGPC File No. HIR10H962, for discharges of storm water associated with construction activities, and
- NPDES Appendix F, NGPC File No. HI25FH955, discharges of hydrotesting water.

See Appendix J for copies of the NPDES documents.

Should additional NPDES coverages and permits be required, the Contractor shall prepare the required documents and obtain additional approvals, as necessary. Notice to proceed will be given to the Contractor prior to obtaining any additional NPDES permits. No time extension will be granted for the Contractor's inability to obtain additional NPDES permits. The Contractor shall pay for all required charges and fees associated with additional NPDES permits.

2.4 CONTRACTOR'S RESPONSIBILITY FOR EXISTING UTILITIES AND STRUCTURES.

The existence and location of underground utilities and structures as shown on the plans are from the best information available but are not guaranteed and other obstacles may be encountered in the course of the work. Prior to the start of excavation, the Contractor shall contact all utility companies and have them locate their respective lines affected. The Contractor shall be held responsible for any damage to and for the maintenance and protection of existing utilities and structures. See: SECTION 6 - PERFORMANCE OF CONTRACT of the GENERAL PROVISIONS in its entirety.

2.5 POWER AND WATER SUPPLIES.

The Contractor shall make all the necessary arrangements and installation work that may

be required for power and water supplies for the work under this Contract. Cost for said power and water supplies shall be included in appropriate unit prices bid and no direct payment will be made therefore.

2.6 CONTRACTORS LICENSE REQUIRED.

The Department shall reject all bids received from contractors who are not licensed by the State Contractors License Board in accordance with Chapter 444, Hawai‘i Revised Statutes. It is the sole responsibility of the Bidder to review the requirements of this Project and determine the appropriate licenses that are required to complete the Project.

2.7 HOURS.

No work shall be done on Saturdays, Sundays, legal State Holidays and/or in excess of eight (8) hours each day without the written consent of the Contract Administrator. Should permission be granted to work at such times, the Contractor shall pay for all inspectional and administrative costs thereof. No work shall be done at night unless authorized by the Contract Administrator. No work shall be done at night during seabird fallout season (September 15 – December 15, annually). See: SECTION 6.9 and 6.12 of the GENERAL PROVISIONS.

2.8 QUANTITIES.

All bids will be compared on the basis of quantities of work to be done, as shown in the bid; the quantities shown in the Unit Price items are estimated, being given as a basis for comparison of bids. The Department reserves the right to increase or decrease the quantities or delete items entirely as may be required during the progress of the work. See: SECTION 7.2 and 7.3 of the GENERAL PROVISIONS.

2.9 MATERIALS FURNISHED FOR THE PROJECT.

All materials necessary for the completion of the project shall be furnished by the Contractor, unless specifically stated otherwise and full compensation thereof shall be included in the various items in the bid. All materials for this Project shall be ordered after the notice to proceed is issued and the shop drawings, if applicable, have been approved by the Department.

2.10 WORK TO BE DONE WITHOUT DIRECT PAYMENT.

Whenever it is specified in the contract that the Contractor is to do work or furnish materials of any kind for which no price is fixed in the contract, it shall be understood that such work or furnishing such materials was included in a unit price for the appropriate item, unless it is expressly specified that such work or material is to be paid for as extra work.

2.11 INTENT OF THE SPECIFICATIONS.

It is not the intent of the Department to limit Proposers to these specifications; however, the specifications designated as "requirements" contained herein are the minimum acceptable.

2.12 IMPLEMENTATION.

The Contractor will be required to:

2.12.1 Provide required permits for the construction of this Project, trained construction crew and project management necessary to ensure a complete constructed and fully functional water facilities as specified in this solicitation.

2.12.2 Provide all documentation, including all warranties and certification documents, on the construction materials being used.

2.13 GOVERNING LAW; APPLICATION OF LAW.

This solicitation and the Contract awarded based on such solicitation shall be governed by the laws of the State of Hawai‘i. The Contractor shall comply with all federal, State and local laws, regulations and ordinances, including occupational safety and health standards applicable to the performance of the services specified.

3 METHOD OF AWARD

3.1 METHOD OF AWARD.

3.1.1 Award, if made, shall be to the responsive, responsible Offeror submitting the lowest Total Sum Bid price.

3.1.2 Only those offers that meet all of the solicitation specifications, General Provisions, Special Provisions, and any other requirement contained herein will be considered for award. Any offer that proposes terms, conditions, or requirements that are contrary to those specified herein or does not meet the qualification requirements of this solicitation, as solely determined by the Department and as provided herein, may be considered nonresponsive and will be rejected as provided herein.

3.2 HAWAIʻI REVISED STATUTES.

The Contractor's attention is called to the following chapters within the HRS which affect this Contract and the performance thereof:

Chapter 103, relating to expenditure of public money;
Chapter 104, relating to wages and hours of employees on public works;
Chapter 376, relating to industrial safety;
Chapter 386, relating to workmen's compensation;
Chapter 321, relating to the Health Department;
Section 507-17, relating to recovery on bond for material and labor used on public works; and
Chapter 378, relating to fair employment practices

3.3 RESPONSIBILITY OF SUCCESSFUL BIDDER.

3.3.1 The successful Bidder is advised that it shall, immediately prior to award of the contract, furnish proof of compliance with the requirements of HAR §3-122-112, to wit: Chapter 237, tax clearance; Chapter 383, unemployment insurance; Chapter 386, workers' compensation; Chapter 392, temporary disability insurance; Chapter 393, prepaid health care; and one of the following: a) Be registered and incorporated or organized under the laws of the State (hereinafter referred to as a "Hawaiʻi business"); or b) Be registered to do business in the State (hereinafter referred to as a "compliant non-Hawaiʻi business."

3.3.2 To comply with these requirements, the successful Bidder shall produce the following documents to the Department to demonstrate compliance with this section.

3.3.2.1 HRS Chapter 237 Tax Clearance Requirement for Award and Final Payment. Instructions are as follows:

Pursuant to HRS §103D-328, successful Bidder shall be required to submit

a tax clearance certificate issued by the Hawai‘i State Department of Taxation (“DOTAX”) and the U.S. Internal Revenue Service (“IRS”). The certificate is valid for six (6) months from the most recent approval stamp date on the certificate and must be valid on the date it is received by the Department of Water.

The tax clearance certificate shall be obtained on the State of Hawai‘i, DOT TAX CLEARANCE APPLICATION Form A-6 (Rev. 2003) which is available at the DOTAX and IRS offices in the State of Hawai‘i or the DOTAX website and by mail or fax:

DOTAX Website (forms & Information):
http://www.state.hi.us/tax/alphalist.html#a
DOTAX Forms by Fax/Mail: (808) 587-7572 / 1-800-222-7572

Completed tax clearance applications may be mailed, faxed or submitted in person to the Department of Taxation, Taxpayer Services Branch, to the address listed on the application.

DOTAX (fax):	(808) 587-1488
IRS (fax):	(808) 539-1573

The application for the clearance is the responsibility of the Bidder and must be submitted directly to the DOTAX or IRS and not to the Department of Water.

3.3.3 HRS Chapters 383 (Unemployment Insurance), 386 (Workers’ Compensation), 392 (Temporary Disability Insurance), and 393 (Prepaid Health Care) Requirements for Award. Instructions are as follows:

Pursuant to HRS §103D-310, the successful Bidder shall be required to submit an approved certificate of compliance issued by the Hawai‘i State Department of Labor and Industrial Relations (“DLIR”). The certificate is valid for six (6) months from the date of issue and must be valid on the date it is received by the Department.

The certificate of compliance shall be obtained on the State of Hawai‘i, DLIR APPLICATION FOR CERTIFICATE OF COMPLIANCE WITH SECTION 3-122-112, HAR, Form LIR#27 which is available at www.dlir.state.hi.us/LIR#27, or at the neighbor island DLIR District Offices. The DLIR will return the form to the Bidder who in turn shall submit it to the Department.

The application for the certificate is the responsibility of the Bidder and must be submitted directly to the DLIR and not to the Department of Water.

3.4 REQUIREMENT FOR AWARD.

To be eligible for award, the Bidder must comply as follows:

3.4.1 Hawai‘i Business. A business entity referred to as a “Hawai‘i business” is registered and incorporated or organized under the laws of the State of Hawai‘i. As evidence of compliance, Bidder shall submit a CERTIFICATE OF GOOD STANDING issued by the State of Hawai‘i Department of Commerce and Consumer Affairs Business Registration Division (“BREG”). A Hawai‘i business that is a sole proprietorship, however, is not required to register with the BREG and therefore not required to submit the certificate. A Bidder’s status as sole proprietor or other business entity and its business street address indicated on the OFFER form will be used to confirm that the Bidder is a Hawai‘i business.

3.4.2 Compliant Non-Hawai‘i Business. A business entity referred to as a “compliant non-Hawai‘i business” is not incorporated or organized under the laws of the State of Hawai‘i but is registered to do business in the State of Hawai‘i. As evidence of compliance, Bidder shall submit a CERTIFICATE OF GOOD STANDING.

To obtain a CERTIFICATE OF GOOD STANDING go online to www.BusinessRegistrations.com and follow the prompt instructions. To register or to obtain a “Certificate of Good Standing” by phone, call (808) 586-2727 (M-F 7:45 to 4:30 HST). The “Certificate of Good Standing” is valid for six months from date of issue and must be valid on the date it is received by the Department.

3.4.3 Registration Costs. Bidders are advised that there are costs associated with registering and obtaining a “Certificate of Good Standing” from the DCCA.

3.5 TIMELY SUBMISSION OF ALL CERTIFICATES.

3.5.1 The certificates described in this section should be applied for and submitted to the Department as soon as possible after the Department notifies the successful Bidder that the Department intends to issue an award to the successful Bidder. If valid certificates are not submitted within **ten (10) calendar days** after the Department so notifies the successful bidder, the successful Bidder’s offer may be disqualified and any prospective award (or actual award if mistakenly issued), even though the successful bidder’s bid is otherwise responsive and responsible, may be canceled without any liability whatsoever to the Department. The Department, and not the successful bidder, shall determine whether all necessary certificates have been timely submitted.

3.5.2 If the Department cancels any prospective or actual award for failure to submit all required certificates, the Department reserves the right to make an award to the next lowest responsive and responsible Bidder who is able to submit all the required certificates.

3.6 FINAL PAYMENT REQUIREMENTS.

Contractor is also required to submit a tax clearance certificate for final payment on the contract. A tax clearance certificate, not over two months old, with an original green certified copy stamp, must accompany the invoice for final payment on the contract. In addition to a tax clearance certificate, an original "Certification of Compliance for Final Payment" (SPO Form-22), will be required for final payment. This form is attached hereto as Appendix F.

4 AWARD OF CONTRACT AND NOTICE TO PROCEED

4.1 AWARD.

The successful Bidder shall comply with SECTION 3 - AWARD AND EXECUTION OF CONTRACT of the GENERAL PROVISIONS in its entirety.

4.2 NOTICE OF AWARD.

The Procurement Officer will inform the successful Bidder of contract award selection within 48 hours of confirmation. Additionally, an official contract award notification letter will be executed by the Department and provided at the earliest date.

4.3 NOTICE TO PROCEED.

Upon contract execution, a "Notice to Proceed" letter will be provided to the Contractor specifying the "Commencement" (start work) date of the Contract. No work is to be undertaken by the Contractor prior to the commencement date specified in the Notice to Proceed letter. The Department is not liable for any work, contract, costs, expenses, loss of profits, or any damages whatsoever incurred by the Contractor prior to the official Notice to Proceed "Commencement" date.

APPENDIX A: Sample Contract.

(Attached separately)

APPENDIX B: General Provisions for Construction Contracts for the Department of Water, dated April 25, 2016 (bound separately).

APPENDIX C: Offer.

Contractor_____

OFFER

For

DEPARTMENT OF WATER, COUNTY OF KAUA‘I,
LĪHU‘E, KAUA‘I, HAWAI‘I

_____ 20___

Chief Procurement Officer
Department of Water
County of Kaua‘i
4398 Pua Loke Street
Līhu‘e, Hawai‘i 96766

Dear Sir:

Pursuant to and in compliance with your Invitation For Bids and other Contract Documents relating thereto, the undersigned Offeror, having familiarized itself with the terms of the contract, the local conditions affecting the performance of the contract and the cost of the work at the place where the work is done, the plans and specifications, “General Provisions for Construction Contracts of the Department of Water”, “Water System Standards, 2002”, Invitation For Bids, and other Contract Documents, hereby proposes and agrees to perform, within the time stipulated in the said documents, including all its component parts and everything required to be performed, and to provide and furnish any and all of the labor, materials, tools, expendable equipment, and all utility and transportation services necessary to perform the contract, in a workmanlike manner, in place complete all of the work covered by the contract in connection with these specifications and accompanying construction plans titled:

JOB NO. 02-06 WKK-15, CONSTRUCT KĪLAUEA 466’ TANK, 1.0 MG, KĪLAUEA, KAUA‘I, HAWAI‘I

on file in the office of the Department of Water for,

TOTAL SUM OFFER_____DOLLARS
(words)

($_____) said total sums being itemized on the following pages:

OFFER SCHEDULE

JOB NO. 02-06 WKK-15, CONSTRUCT KĪLAUEA 466' TANK, 1.0 MG, KĪLAUEA, KAUA'I, HAWAI'I

ITEM NO.	ESTIMATED QUANTITY	U/M	DESCRIPTION	UNIT PRICE	TOTAL
1	1	LS	Mobilization and Demobilization (Not to Exceed 6% of the sum of all items excluding Lump Sum Offer of this item).		$ _____
2	1	LS	Best Management Plan, Erosion Control Measures and implementation of NPDES Appendix C.		$ _____
3	1	LS	Prepare, maintain and close Staging and Stockpile site including Best Management Plan, Erosion Control Measures and implementation of NPDES Appendix C, temporary driveway approach,		$ _____
3	1	LS	Remove and dispose existing AC pavement, base course, concrete swale, inlets, vaults and other site features as necessary (Phase 1).		$ _____
4	1	LS	Remove and dispose of existing DI water lines, drain lines and other appurtenances as necessary (Phase 1).		$ _____
5	1	LS	Demolish, remove and dispose of the existing 100,000-gallon concrete tank, foundation and all appurtenances (Phase 1).		$ _____
6	10	EA	10,000-gallon temporary water storage tanks, including restraint system, bulkhead fittings, vent, concrete pad foundation, 4-inch DI Drain/Overflow pipe with valve and fittings, 4-inch Outlet Pipe with valve and fittings, connections, testing, all appurtenances (Phase 1).	$ _____	$ _____
7	10	EA	Remove 10,000-gallon temporary water storage tanks, including restraint system, bulkhead fittings, vent; 4-inch DI Drain/Overflow pipe, valve and fittings; 4-inch Outlet Pipe, valve and fittings; transport to designated site; unload and store at designated site; and demolish temporary concrete pads and foundation (Phase 3).	$ _____	$ _____
8	146	LF	Waterline "A", 12-inch DI pipe for temporary water storage tanks, including all appurtenances, valves, fittings, concrete blocks, connection to	$ _____	$ _____

ITEM NO.	ESTIMATED QUANTITY	U/M	DESCRIPTION	UNIT PRICE	TOTAL
			existing 12-inch DI water main (Phase 1); and abandon in place (Phase 3).		
9	10	EA	4-inch DI underground pipe from temporary tanks connecting to Waterline "A", including all appurtenances, fittings and concrete blocks (Phase 1); and abandon in place (Phase 3).	$	$
10	150	LF	Drain Line "A", 6-inch HDPE pipe for temporary water storage tanks, including all appurtenances, valves, fittings, concrete blocks, connection to Shallow Drain Manhole (Phase 1); and removal (Phase 3).	$	$
11	73	LF	Drain Line "B", 6-inch HDPE pipe for temporary water storage tanks, including all appurtenances, valves, fittings, concrete blocks, connection to Drain Line "A" (Phase 1); and removal (Phase 3).	$	$
12	10	EA	4-inch HDPE drainpipe from temporary tanks connecting to Drain Line "A" or Drain Line "B", including all appurtenances, fittings, concrete blocks (Phase 1); and removal (Phase 3).	$	$
13	1	EA	Shallow Drain Manhole, including excavation, backfill, and 12-inch DI pipe and fittings to connect to existing 12-inch DI drain line (Phase 1).	$	$
14	1	LS	Temporary tank level transmitter, including transmitter, ¼-inch copper tubing, ¾-inch copper tubing, appurtenances, fittings, valves, connections (Phase 1), and removal (Phase III).		$
15	260	CY	Grading Plan Phase 1, site excavation, including clearing and grubbing, demolition, and hauling, stockpile and disposal of excess material.	$	$
16	2,830	CY	Grading Plan Phase 2, site excavation, including clearing and grubbing, demolition, and hauling, stockpile and disposal of excess material.	$	$
17	1,870	CY	Grading Plan Phase 3, site embankment, including hauling and compaction.	$	$
18	23	LF	Influent/effluent line, 12-inch DI pipe, including fittings, valves, concrete blocks, connections and all appurtenances (Phase 2).	$	$
19	1	LS	Combination Air Relief Valve (influent/effluent line) including ARV, 1-inch copper tubing,		$

ITEM NO.	ESTIMATED QUANTITY	U/M	DESCRIPTION	UNIT PRICE	TOTAL
			fittings, valves, pipe support, connections and all appurtenances (Phase 1).		
20	18	LF	Water stubout for future well pump, 12-inch DI pipe, including fittings, valves, concrete blocks, connections and all appurtenances (Phase 2).	$ _____	$ _____
21	8	LF	Tank washout line, 12-inch DI pipe, including fittings, valves, concrete blocks, connections and all appurtenances (Phase 2).	$ _____	$ _____
22	8	LF	Tank overflow line, 12-inch DI pipe, including fittings, valves, concrete blocks, connections and all appurtenances (Phase 2).	$ _____	$ _____
23	325	LF	Perimeter drain, 6-inch perforated HDPE pipe, including excavation, filter fabric, crushed aggregate backfill, 4-inch observation ports, fittings, connections and all appurtenances (Phase 2).	$ _____	$ _____
24	8	LF	Drain line "C", 6-inch HDPE pipe, including excavation, backfill, fittings, connections and all appurtenances (Phase 2).	$ _____	$ _____
25	10	LF	Drain line "D", 6-inch HDPE pipe, including excavation, backfill, fittings, connections and all appurtenances (Phase 2).	$ _____	$ _____
26	1	LS	Type G4 Drain Inlet, including grate, appurtenances, excavation and backfill (Phase 2).		$ _____
27	1	LS	Water sampling station, including ¾-inch copper tubing, fittings, valves, connections and all appurtenances (Phase 2).		$ _____
28	1	LS	Water level transmitter, including transmitter, ¼-inch copper tubing, ¾-inch copper tubing, fittings, valves, connections and all appurtenances (Phase 2).		$ _____
29	620	LF	Retrofit existing 6-foot-high chain-link fence and gate with extension arm and three strands of barbed wire and all appurtenances, in place complete (Phase 3).	$ _____	$ _____
30	4,000	SF	Concrete Perimeter Road, including 6-inch-thick structural fiber reinforced PCC pavement, 6-inch aggregate base course, 6-inch select borrow subbase, compaction testing, concrete testing, in-place complete (Phase 3).	$ _____	$ _____

ITEM NO.	ESTIMATED QUANTITY	U/M	DESCRIPTION	UNIT PRICE	TOTAL
31	830	SF	Concrete "V" Swale, including 6-inch-thick structural fiber reinforced PCC, 6-inch aggregate base course, 6-inch select borrow subbase compaction testing, concrete testing, in-place complete.	$ _____	$ _____
32	8,560	SF	Ground Cover, including 3-inch thick 1-½-inch coarse aggregate, geotextile fabric and all appurtenances, in-place complete.	$ _____	$ _____
33	2,170	SF	Ground Cover, including 12-inch-thick rip-rap, geotextile fabric and all appurtenances, in-place complete.	$	$ _____
34	1	LS	1.0 MG water storage tank, ***(select one)*** **Reinforced Concrete Reservoir / Wound Concrete Reservoir**, including all appurtenances, in-place complete.		$ _____
35	1	LS	Clean, chlorinate and flush water system, including removal of temporary risers and incidental work, all in accordance with the specifications and implementation of NPDES Appendix F.		$ _____
36	1	LS	Furnish and install electrical equipment, and wiring, including but not limited to providing trenching and backfill, pullboxes, power, control and instrumentation ducts, cables, junction boxes, connections to power control and instrumentation devices, painting, testing, and all appurtenant electrical work in place complete and in accordance with the plans and specifications.		$ _____
37	1	LS	SCADA system, including but not limited to software programming of existing RTU; modifications to existing master SCADA; and all appurtenant SCADA work; in place complete, and in accordance with the plans and specifications, ready for operation.		$ _____
			TOTAL SUM OFFER (Items 1 to 33 inclusive)		**$** _____

SCHEDULE C
MANDATORY LICENSING REQUIREMENT

"A" general engineering contractors and "B" general building contractors are reminded that due to the Hawai'i Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. V. Board of Water Supply, et al., 97 Haw. 450 (2002), they are prohibited from undertaking any work, solely or as part of a larger project, that would require the general contractor to act as a specialty contractor in any area in which the general contractor has no license. Although the "A" and "B" contractor may still submit an offer on and act as the "prime" contractor on an "A" and "B" project *(See, HRS § 444-7 for the definitions of an "A" and "B" project.)*, respectively, the "A" and "B" contractor may only perform work in the areas in which they have the appropriate "C" specialty contractor's license *(An "A" or "B" contractor obtains "C" specialty contractor's licenses either on its own, or automatically under HAR § 16-77-32.)*. The remaining work must be subcontracted out to appropriately licensed "C" specialty contractors. It is the sole responsibility of the contractor to review the requirements of this project and determine the appropriate licenses that are required to complete the project.

LISTING OF SUBCONTRACTORS

Sec. 103D-302, H.R.S., provides that each offer for Public Works Construction Contracts shall include the name of each person or firm to be engaged by the Offeror as a joint contractor or subcontractor in the performance of the Public Works Construction Contract. The Offer shall also indicate the nature and scope of the work to be performed by such joint contractors or subcontractors. All offers which do not comply with this requirement shall be rejected pursuant to Sec. 103D-302(b) H.R.S.

To comply with the above provisions, the offeror shall complete the schedule of the nature and scope of work by listing, where applicable, the names of the joint contractors and subcontractors to be used after the description of the nature and scope of the work.

ALL JOINT CONTRACTORS OR SUBCONTRACTORS TO BE ENGAGED ON THIS PROJECT

The Offeror certifies that the following is a complete listing of all joint contractors and/or subcontractors who will be engaged by the Offeror on this Project to perform the nature and scope of work indicated **regardless of the percentage of the value of the work to be performed by the joint contractor or subcontractor**, pursuant to Section 103D-302, Hawai'i Revised Statutes, and understands that failure to comply with this requirement shall be just cause for rejection of the Offer.

The Offeror further understands that only those joint contractors or subcontractors listed shall be allowed to perform work on this Project. If no joint contractor or subcontractor for any subdivision of work is listed, it shall be construed that the work shall be performed by the Offeror with Offeror's employees.

All Offerors must be sure that they possess, and that the joint contractors or subcontractors listed in the Offer possess, all the necessary specialty licenses needed to perform the work for this Project. The Offeror shall be solely responsible for assuring that all specialty licenses required to perform the work is covered in the Offer.

The Offeror shall include the license number of the joint contractors or subcontractors listed below. Failure to provide the correct names and license numbers as registered with the Contractors Licensing Board may cause rejection of the offer submitted.

It is the sole responsibility of the contractor to review the requirements of this Project and determine the appropriate licenses that are required to complete the Project.

LISTING OF ALL JOINT CONTRACTORS OR SUBCONTRACTORS

	Contractor Classification	Name of Joint Contractor or Subcontractor	License Number
C-1	Acoustical and Insulation Contractor		
C-2	Mechanical Insulation Contractor		
C-3	Asphalt Paving and Surfacing Contractor		
C-3a	Asphalt Concrete Patching, Sealing, and Striping Contractor		
C-3b	Play Court Surfacing Contractor		
C-4	Boiler, Hot-Water Heating and Steam Fitting Contractor		
C-5	Cabinet, Millwork, and Carpentry Remodeling and Repairs Contractor		
C-5a	Garage Door and Window Shutters Contractor		
C-5b	Siding Application Contractor		
C-6	Carpentry Framing Contractor		
C-7	Carpet Laying Contractor		
C-9	Cesspool Contractor		
C-10	Scaffolding Contractor		
C-12	Drywall Contractor		
C-13	Electrical Contractor		
C-14	Sign Contractor		
C-15	Electronic Systems Contractor		
C-15a	Fire and Burglar Alarm Contractor		
C-15b	Telecommunications Contractor		
C-16	Elevator Contractor		
C-16a	Conveyor Systems Contractor		
C-17	Excavating, Grading, and Trenching Contractor		
C-19	Asbestos Contractor		
C-20	Fire Protection Contractor		
C-20a	Fire Repressant Systems Contractor		

	Contractor Classification	Name of Joint Contractor or Subcontractor	License Number
C-21	Flooring Contractor		
C-22	Glazing and Tinting Contractor		
C-22a	Glass Tinting Contractor		
C-23	Gunite Contractor		
C-24	Building Moving and Wrecking Contractor		
C-25	Institutional and Commercial Equipment Contractor		
C-27	Landscaping Contractor		
C-27a	Hydro Mulching Contractor		
C-27b	Tree Trimming and Removal Contractor		
C-31	Masonry Contractor		
C-31a	Cement Concrete Contractor		
C-31b	Stone Masonry Contractor		
C-31c	Refractory Contractor		
C-31d	Tuckpointing and Caulking Contractor		
C-31e	Concrete Cutting, Drilling, Sawing, Coring, and Pressure Grouting Contractor		
C-32	Ornamental, Guardrail, and Fencing Contractor		
C-32a	Wood and Vinyl Fencing Contractor		
C-33	Painting and Decorating Contractor		
C-33a	Wall Coverings Contractor		
C-33b	Taping Contractor		
C-33c	Surface Treatment Contractor		
C-34	Soil Stabilization Contractor		
C-35	Pile Driving, Pile and Caisson Drilling, and Foundation Contractor		
C-36	Plastering Contractor		
C-36a	Lathing Contractor		

	Contractor Classification	Name of Joint Contractor or Subcontractor	License Number
C-37	Plumbing Contractor		
C-37a	Sewer and Drain Line Contractor		
C-37b	Irrigation and Lawn Sprinkler Systems Contractor		
C-37c	Vacuum and Air Systems Contractor		
C-37d	Water Chlorination and Sanitation Contractor		
C-37e	Treatment and Pumping Facilities Contractor		
C-37f	Fuel Dispensing Contractor		
C-38	Post Tensioning Contractor		
C-40	Refrigeration Contractor		
C-40a	Prefabricated Refrigerator Panels Contractor		
C-41	Reinforcing Steel Contractor		
C-42	Roofing Contractor		
C-42a	Aluminum and Other Metal Shingles Contractor		
C-42b	Wood Shingles and Wood Shakes Contractor		
C-42c	Concrete and Clay Tile Contractor		
C-42e	Urethane Foam Contractor		
C-42g	Roof coatings Contractor		
C-43	Sewer, Sewage Disposal, Drain, and Pipe Laying Contractor		
C-43a	Reconditioning and Repairing Pipeline Contractor		
C-44	Sheet Metal Contractor		
C-44a	Gutters Contractor		
C-44b	Awnings and Patio Cover Contractor		
C-48	Structural Steel Contractor		
C-48a	Steel Door Contractor		
C-49b	Hot Tub and Pool Contractor		

	Contractor Classification	Name of Joint Contractor or Subcontractor	License Number
C-51	Tile Contractor		
C-51a	Cultured Marble Contractor		
C-51b	Terrazzo Contractor		
C-52	Ventilating and Air Conditioning Contractor		
C-55	Waterproofing Contractor		
C-56	Welding Contractor		
C-57	Well Contractor		
C-57a	Pumps Installation Contractor		
C-57b	Injection Well Contractor		
C-60	Solar Power Systems Contractor		
C-61	Solar Energy Systems Contractor		
C-61a	Solar Hot Water Systems Contractor		
C-61b	Solar Heating and Cooling Systems Contractor		
C-62	Pole and Line Contractor		
C-62a	Pole Contractor		
C-63	High Voltage Electrical Contractor		
C-68	Classified Specialist		
	Licensed Surveyor		
	Licensed Geotechnical Engineer		
	Licensed Structural Engineer		
	Archaeologist		
	Cultural Monitor		
	Licensed Civil Engineer		
	Supervising Control and Data Acquisition (SCADA) Contractor		
*			
*			
*			
*			

	Contractor Classification	Name of Joint Contractor or Subcontractor	License Number
*			
*			

* Contractor to add licenses as required to complete the scope of work. Attach additional sheet as needed.
It is understood and agreed that the Department reserves the right to reject any and/or all offers and waive any defects when, in the Department's opinion, such rejection or waiver shall be for the best interest of the Department.

For purpose of evaluating the criterion described in this solicitation, it is understood and agreed that offers will be compared on the basis of the Total Sum Offer which shall be considered to be the total sum of actual or corrected amounts proposed on each item. The offerors signed Offer shall constitute the Offeror's official offer. The Department reserves the right to designate the contract amount based on selected Offeror's Total Sum Offer depending on the funds available for this Project.

It is also understood and agreed that the work called for under this Project must and shall be completed within **FIVE HUNDRED FORTY-FIVE (545)** consecutive calendar days after written notice has been given to the successful Offeror to commence work. It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase or decrease and that the undersigned will perform all quantities of work, as either increase or decrease, in accordance with the provisions of the specifications.

It is also understood and agreed that the estimated quantities shown for items for which a UNIT PRICE is listed in the Offer are only for the purpose of comparing on a uniform basis offers offered for the work under this contract, and the undersigned agrees that the undersigned is satisfied with and will not dispute said estimated quantities as a means of comparing the offers. It is understood and agreed that the Offeror will make no claims for anticipated profit or loss of profit because of a difference between quantities of the various classes of work done or the materials and equipment actually installed and the said estimated quantities. On UNIT PRICE offers, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

It is also understood and agreed that if the product of the UNIT PRICE offer and the number of units does not equal the total amount stated by the Offeror in the offer for any item, it will be assumed that the error was made in computing the total amount. For purpose of evaluating the criterion described in this solicitation, the stated UNIT PRICE alone will be considered as representing the Offeror's intention and the total amount offered on such item shall be considered to be the amount arrived at by multiplying the UNIT PRICE by the number of units.

It is also understood and agreed that the liquidated damages in the amount of **ONE THOUSAND DOLLARS ($1,000.00)** for each and every calendar day in excess thereof prior to completion of the contract beyond the specified and approved completion date, shall be withheld from payments due to the Contractor, pursuant to the Damages for Delay provision contained in this solicitation.

It is also understood and agreed that if this offer is accepted, the successful offeror will contract with the Board and said offeror shall furnish the required bonds to the Board within ten (10) days from the date of receiving from the Board the contract prepared and ready for execution.

It is further understood and agreed that the successful offeror will provide all necessary materials, labor, tools, equipment, and other incidental necessary to do all the work and furnish all the materials specified in the contract in the manner and time herein prescribed and according to the requirements of the Department as therein set forth.

The undersigned further understands and agrees that by submitting this Offer, 1) the Offeror is declaring that the Offer is not in violation of Chapter 84, Hawai‘i Revised Statutes, and 2) Offeror is certifying that the price(s) submitted was (were) independently arrived at without collusion.

It is also understood and agreed that if this Offer is accepted and the undersigned shall fail to or neglect to contract as aforesaid, the Board may determine that the offeror has abandoned the contract and thereupon forfeiture of the security accompanying the Offer shall operate and the same shall become the property of the Board.

Enclosed herewith is a Bidder’s Bond (Bid Security)	( )	for the sum
Surety Bond	( )	
Legal Tender	( )	
Certificate of Deposit	( )	
Share Certificate	( )	
Cashier’s Check	( )	
Treasurer’s Check	( )	
Teller’s Check	( )	
Certified Check	( )	

of _____DOLLARS ($ _____) payable to the Department of Water, being not less than the sum required under Sub-Section 2.9 “Bid Security” of the “General Provisions for Construction Contracts of the Department of Water”, dated April 25, 2016.

Evidence of the undersigned Offeror having the authority to submit this Offer and to enter a contract is herewith furnished.

Respectfully submitted,

_____

Name of Offeror

_____

Authorized Signature

_____

Print/Type Name & Title of above

_____

Address, Zip Code

_____

Telephone

_____

Contractor's License No.

_____

State of Hawai'i General Excise Tax License No.

_____

Federal Employer Identification No.

Type of Organization: (Please designate) ☐ Sole Proprietorship ☐ Partnership
☐Corporation ☐ Joint Venture
☐ Other (*please specify*) _____

State of Incorporation: ☐ Hawai'i ☐ Other (*please specify*) _____

Name of Performance Bond Surety Co. _____

Address _____

Authorized to do Business in the State of Hawai'i? ☐ Yes or ☐ No

If corporation, state who will sign contract and signatory's title:

Name Title

_____ _____

Name	Title

If the Offeror is a <u>CORPORATION</u>, the legal name of the corporation shall be set forth on the Offer, together with the signature(s) of the Officer(s) authorized to sign on behalf of the corporation and the corporate seal affixed thereto. **<u>Evidence of the authority of the Officer(s) to sign on behalf of the Corporation SHALL be attached to this page and included in the Offer</u>**. Acceptable evidence of authority to sign includes, but is not limited to, a copy of the articles of incorporation, corporate resolution, or corporate by-laws. (See HRS Ch. 415, Hawai‘i Business Corporation Act).

If the Offeror is a <u>LIMITED LIABILITY COMPANY</u>, the legal name of the company shall be set forth on the Offer, together with the signature(s) of the member of the limited liability company or manager of the manger-managed limited liability company authorized to sign on behalf of the entity. **<u>Evidence of the authority of the Officer(s) authorized to sign on behalf of the company SHALL be attached to this page and included in the Offer</u>**.

If the Offeror is a <u>PARTNERSHIP</u>, the legal name of the firm shall be set forth on the Offer, together with the signature(s) of the General Partner(s) authorized to sign on behalf of the partnership. **<u>Evidence of the authority of the General Partner(s) authorized to sign on behalf of the partnership SHALL be attached to this page and included with the Offer.</u>** Acceptable evidence of authority to sign for the partnership includes, but is not limited to, a copy of the partnership registration statement or authorization signed by all of the partners. (See HRS Ch. 425, Partnerships).

If Offeror is a <u>SOLE PROPRIETORSHIP</u>, Offeror’s signature shall be placed above.

<u>NOTE</u>: PLEASE DO NOT DETACH THIS SAMPLE OFFER FROM THE SPECIFICATIONS. FILL IN ALL BLANK SPACES WITH INFORMATION REQUIRED OR OFFER MAY BE REJECTED.

APPENDIX D: Insurance.

(Attached separately)

APPENDIX E: Wage Certificate for Service Contracts

WAGE CERTIFICATE FOR CONSTRUCTION CONTRACTS
Projects subject to HRS 104

TO: Chief Procurement Officer

SUBJECT: Solicitation No.: _____

PROJECT: _____

Pursuant to **HRS 103-55.5 Wages and Hours of Employees on Public Works Construction Contracts**, I hereby certify that if awarded the contract in excess of $2,000, the work to be performed will be performed under the following conditions:

1. Individuals engaged in the performance of the contract on the job site shall be paid:

    a. Not less than the wages that the director of labor and industrial relations shall have determined to be prevailing for corresponding classes of laborers and mechanics employed on public works projects; and

    b. Overtime compensation at one and one-half times the basic hourly rate plus fringe benefits for hours worked on Saturday, Sunday, or a legal holiday of the State or in excess of eight hours on any other day; and

2. All applicable laws of the federal and state governments relating to workers' compensation, unemployment compensation, payment of wages, and safety shall be fully complied with.

Offeror: _____

By: _____

Title: _____

Date: _____

APPENDIX F: Certification of Compliance for Final Payment.

CERTIFICATION OF COMPLIANCE FOR FINAL PAYMENT

(Reference §3-122-112, HAR)

Reference: _____ _____
(Contract Number) (IFB/RFP Number)

_____ affirms it is in
(Company Name)
compliance with all laws, as applicable, governing doing business in the State of Hawai‘i to include the following:

1. Chapter 383, HRS, Hawai‘i Employment Security Law – Unemployment Insurance;
2. Chapter 386, HRS, Worker’s Compensation Law;
3. Chapter 392, HRS, Temporary Disability Insurance;
4. Chapter 393, HRS, Prepaid Health Care Act; and

maintains a “Certificate of Good Standing” from the Department of Commerce and Consumer Affairs, Business Registration Division.

Moreover, _____
(Company Name)
acknowledges that making a false statement shall cause its suspension and may cause its debarment from future awards of contracts.

Signature: _____

Print Name: _____

Title: _____

Date: _____

APPENDIX G: Apprenticeship Program.

Bidders seeking preference for this shall:

1. Be a party to an apprenticeship program registered with the State Department of Labor and Industrial Relations (DLIR) at the time of its Offer for each apprenticeable trade the Proposer will employ to construct the public works project for which the Offer is made; and

2. For each apprenticeable trade the proposer will employ for this project, submit with its Offer fully executed and authorized CERTIFICATION OF BIDDER'S PARTICIPATION IN APPROVED APPRENTICESHIP PROGRAM UNDER ACT 17. Schedule F attached to this solicitation verifying participation in apprenticeship program(s) registered with the DLIR.

3. The Contractor shall certify each month that work is being conducted on the project and that it continues to be a participant in the relevant apprenticeship program for each trade it employs. Monthly certification shall be made on MONTHLY REPORT OF CONTRACTOR'S PARTICIPATION IN APPROVED APPRENTICESHIP PROGRAM UNDER ACT 17 (Schedule F-I).

SCHEDULE F - CERTIFICATION OF BIDDER'S PARTICIPATION IN APPROVED APPRENTICESHIP PROGRAM UNDER ACT 17

I. Bidder's Identifying Information			
A. Legal Business Name:			
B. Project Bid Title & Reference No.:			
C. Contact Person's Name:			
1. Phone No.:			2. E-Mail:
II. Apprenticeable Trades To Be Employed* A. (List)	B. Apprenticeship Sponsor* (One Sponsor Per Form)	C. No. Enrolled (# of apprentices currently enrolled as of bidder's request date)	D. No. Completed (# of apprentices who completed the apprenticeship program in the 12 months prior to request date)
1.			
2.			
3.			
4.			
5.			
6.			

III. Bidder's Certification

I certify that the above information is accurate to the best of my knowledge, I understand that my willful misstatement of facts may cause forfeiture of the preference under Act 17 and may result in criminal action. I give permission for outside sources to be contacted and for them to disclose any information necessary to verify the bidder's preference.

A. Name (Type) _____ B. Title _____

C. Signature (original signature required) _____ D. Date _____

IV. Apprenticeship Sponsor's Contact Information

A. Training Coordinator's Name: _____

B. Address: _____

C. Phone No.: _____ D. E-Mail: _____ E. Fax No: _____

V. Apprenticeship Program Sponsor's Certification

I certify that the above information is accurate to the best of my knowledge. I understand that my willful misstatement of facts may cause forfeiture of the bidder's preference and may result in criminal action. I give permission for outside sources to be contacted and for them to disclose any information necessary to verify the bidder's preference under Act 17.

A. Name of Authorized Official _____ B. Title _____

C. Signature (original signature required) _____ D. Date _____

* Name of Apprenticeable Trade and Apprenticeship Sponsor must be the same as recorded in the List of Construction Trades in Registered Apprenticeship Programs that is posted on the State Department of Labor and Industrial Relations website. (Rev. 08/25/2010)

SCHEDULE F-1 - MONTHLY REPORT OF CONTRACTOR'S PARTICIPATION IN APPROVED APPRENTICESHIP PROGRAM UNDER ACT 17

I. Contractor's Identifying Information	II. Reporting Period	
A. Legal Business Name:	A. Month: (choose)	B. Year: (choose)
B. Project Bid Title & Reference No.:		
C. Contact Person's Name:		
1. Phone No.:	2. E-Mail:	
III. Apprenticeship Program (Complete a separate form for *each* apprenticeship program in which workers are employed on the project)		
A. Contractor was a party to an apprenticeship program or programs with the following sponsor: (Give sponsor's name(s).*	B. Was the contractor a party to the program during the *entire* report month?	
	1. YES ☐	
	2. NO ☐ If NO, state applicable period and why (may be subject to sanctions.)	

III. Contractor's Certification

I certify that the above information is accurate to the best of my knowledge. I understand that my willful misstatement of facts may cause forfeiture of the preference under Act 17 and may result in criminal action. 1 give permission for outside sources to be contacted and for them to disclose any information necessary to verify the bidder's preference.

_____ _____
A. Name (Type) B. Title

_____ _____
C. Signature (original signature required) D. Date

IV. Apprenticeship Sponsor's Contact Information

A. Training Coordinator's Name: _____
B. Address: _____
C. Phone No.: _____D. E-Mail: _____E. Fax No:_____

V. Apprenticeship Program Sponsor's Certification

I certify that the above information is accurate to the best of my knowledge. I understand that my willful misstatement of facts may cause forfeiture of the bidder's preference and may result in criminal action. I give permission for outside sources to be contacted and for them to disclose any information necessary to verify the bidder's preference under Act 17.

_____ _____
A. Name of Authorized Official B. Title

_____ _____
C. Signature (original signature required) D. Date

* Name of Name of Apprenticeship Sponsor must be the same as recorded in the list of Construction Trades in Registered Apprenticeship Programs that is posted on the State Department of Labor and Industrial Relations website. (Rev. 08/25/2010)

APPENDIX H: "DWSRF" Boilerplate – Federal Requirements for Consultants and Contractors

(Attached separately)

APPENDIX I: NPDES Documents

(Attached separately)

APPENDIX L: Consultation Request Letters and Response Letters with the U.S. Fish and Wildlife Service and State of Hawaii, Department of Land and Natural Resources, State Historic Preservation District

(Attached separately)

APPENDIX M: Zoning Permits

(Attached separately)

APPENDIX J: Employment of State Residents on Construction Procurement Contracts.

a. Definitions

"Contract" means contracts for construction under Chapter 103D HRS.

"Contractor" has the same meaning as in section 103D-104, HRS; provided that contractor includes a subcontractor where applicable

"Construction" has the same meaning as in section 103D-104 HRS

"Procurement Officer" has the same meaning as in section 103D-104 HRS

"Resident" means a person who is physically present in the state at the time the person claims to have established the person's domiciled in the state and shows the person's intent is to make Hawai'i the person's primary residence.

"Shortage trade" means a construction trade in which there is a shortage of Hawai'i residents qualified to work in the trade.

b. Requirements of Contractor

The contractor awarded this contract shall ensure that Hawai'i Residents compose not less than eighty percent (80%) of the workforce employed to perform this Contract, calculated as follows:

The eighty percent (80%) requirement shall be determined by dividing the total number of hours worked on a contract by Residents by the total number of hours worked by all employees of the Contractor in the performance of the Contract. Hours worked for any subcontractor of the contractor shall count towards the calculation for purposes of this subsection. The hours worked by employees within shortage trades, as determined by the Department of Labor and Industrial Relations, shall not be included in the calculations for purposes of this subsection.

This requirement shall be applicable during the entire duration of this Contract. A notarized Certification for Employment of State Residents on Construction Procurement Contracts (Schedule I) shall be submitted on a monthly basis with your request for progress payments. If no request for progress payments are made for any month, the Contractor is still responsible to submit the certification on a monthly basis.

c. Penalties

Failure to comply with this requirement shall be subject to any of the following sanctions:

A. Temporary suspension of work on the project until the Contractor or subcontractor complies with Act 68;

B. Withholding of payment on the Contract or subcontract as applicable, until the Contractor or subcontractor complies with Act 68;
C. Permanent disqualification of the Contractor or subcontractor from any further work on the project;

D. Recovery by the Department of any moneys expended on the Contract or subcontract, as applicable; or

E. Proceedings for debarment or suspension of the contractor or subcontractor under section 103D-702.

d. Conflict with Federal Law

Act 68 shall not apply if the application of the Act is in conflict with any federal law, or if application of Act 68 will disqualify the Department from receiving federal funds or aid.

CERTIFICATION OF COMPLIANCE
FOR
EMPLOYMENT OF STATE RESIDENTS
ACT 68, SESSION LAWS OF HAWAI‘I 2010

Project Title: _____

DOW Project No.: _____

Contract No.: _____

As required by Act 68, Session Laws of Hawai‘i 2010 – Employment of State Residents on Construction Procurement Contracts, I hereby certify under oath, that I am an officer of _____ *(Name of Company)* and for the month of _____, 20_____, _____ *(Name of Company)* is in compliance with Act 68, SLH 2010, by employing a workforce of whom not less than eighty percent are Hawai‘i residents, as calculated according to the formula in the solicitation, to perform this Contract.

□ I am an officer of the Contractor for this contract.
□ I am an officer of the Subcontractor for this contract.

CORPORATE SEAL

_____
(Name of Company)

_____
(Signature)

_____
(Print Name)

_____
(Print Title)

NOTARY CERTIFICATION

APPENDIX K: Certification of Compliance with HRS 396-18, Safety and Health Programs for Contractor Bidding On Board Construction Jobs

PROJECT NAME: _____

SOLICITATION NO.: _____

This is to certify that the undersigned will comply with the requirements of HRS 396-18, as follows:

(A) Pursuant to HRS 396-18, all bids and proposals in excess of $100,000 shall include a signed certification from the bidder that a written safety and health plan for the job will be available and implemented by the notice to proceed dates of the project. The written safety and health plan shall include:

(1) A safety and health policy statement reflecting management commitment;

(2) A description of the safety and health responsibilities of all levels of management and supervisors on the job, and a statement of accountability appropriate to each;

(3) The details of:

(a) The mechanism for employee involvement in job hazard analysis;
(b) Hazard identification, including periodic inspections and hazard correction and control;
(c) Accident and "near-miss" investigations; and
(d) Evaluations of employee training programs.

(4) A plan to encourage employees to report hazards to management as soon as possible and to require management to address these hazards promptly; and

(5) A certification by a senior corporate or company manager that the plan is true and correct.

(B) Failure to submit the required certification may be grounds for disqualification of the bid.

(C) Failure to have available on site or failure to implement the written safety and health plan by the project's Notice to Proceed Dates shall be considered willful noncompliance and be sufficient grounds to disqualify the award and terminate the contract.

Name of Contractor: _____

Signature and Title: _____

Date: _____

APPENDIX N: Foundation Investigation

(Attached separately)

APPENDIX O: Special Provisions.

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SECTION SP-3 – PERMITS

SECTION SP-4 – NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

SECTION SP-5 – GEOTECHNICAL REQUIREMENTS AND MONITORING

SECTION SP-6 – MOBILIZATION AND DEMOBILIZATION

SECTION SP-7 – PIPING AND FITTINGS

SECTION SP-8 – MECHANICAL

SECTION SP-9 – ALUMINUM METAL STAIRS

SECTION SP-10 – HOT WEATHER CONCRETING PROCEDURES

SECTION SP-11 – EPOXY ADHESIVE INJECTION OF CONCRETE CRACKS

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SECTION SP-13 – TANK EXPANSION AND CONSTRUCTION JOINTS

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SECTION SP-25 – DEMOLITION

SECTION SP-26 – ELECTRONIC SECURITY LOCKS

SPECIAL PROVISIONS

SECTION SP-1 – GENERAL REQUIREMENTS

1.1 GENERAL PROVISIONS, SPECIFICATIONS, AND STANDARD DETAILS: The special provisions, plans, general provisions, Water Standards, DPW Standard Specifications and Details, contract documents and all supplemental documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for the complete work. In case of conflict or discrepancy within any part of the contract, the stricter requirements, including Hawai‘i State Statutory requirements, shall govern. Unless it is apparent that a different order of precedence is intended, the special provisions shall govern over plans, general provisions and Water Standards; plans shall govern over general provisions; general provisions shall govern over Water Standards; Water Standards shall govern over DPW Standard Specifications; figured dimensions and drawings take precedence over measurements by scale, and detail drawings; instructions to proposers shall be incorporated and made a part of the special provisions.

1.1.01 GENERAL PROVISIONS FOR CONSTRUCTION CONTRACTS OF THE DEPARTMENT OF WATER, COUNTY OF KAUA‘I: The “GENERAL PROVISIONS FOR CONSTRUCTION CONTRACTS OF THE DEPARTMENT OF WATER, COUNTY OF KAUA‘I”, April 25, 2016 as amended, is by reference incorporated herein and made a part of these specifications.

1.1.02 WATER SYSTEM STANDARDS: The “WATER SYSTEM STANDARDS”, 2002, as amended, as adopted by the Department of Water, County of Kaua‘i; Board of Water Supply, City and County of Honolūlū; Department of Water Supply, County of Maui; Department of Water Supply, County of Hawai‘i is by reference incorporated herein and made a part of these specifications. These specifications are not bound in these contract documents, but shall by reference be incorporated herein and made a part of these specifications.

SECTION 302 - WATER MAINS AND APPURTENANCES

The following shall supplement the applicable subsections of Division 300 - Construction of the “Water System Standards”, 2002.

Make the following amendments to said section:

SECTION 302.02 – TRENCH EXCAVATION

Add the following paragraph to the “A. General” subsection:

Because construction will occur within residential neighborhoods, the Contractor shall secure all areas under construction with due regard for the safety of all persons and property at all times.

Amend the first paragraph of the “B. Payment” subsection to read:

Payment for trench excavation (without classification), backfill, select borrow, pipe cushion, and cost to safely secure all areas under construction will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of the various items in the Proposal.

SECTION 302.03 – TRENCH BACKFILL

Add the following paragraph to the "A. General" subsection:

If backfilling ground is continuously wet, pipe cushion and backfill material shall consist of coarse aggregate, ASTM C 33, Size Number 67, and shall be completely encapsulated with non-woven geotextile filter fabric unless approval for other material is granted.

Amend the first paragraph of the "G. Payment" subsection to read:

Payment for aggregate and sand pipe cushion surrounding the pipe, pipe bedding, non-woven geotextile filter fabric pipe cushion encasement, trench backfill, select borrow, warning tape, and backfill at valve boxes, meter boxes, manholes, and handholes will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of the various items in the Proposal.

SECTION 302.04 – SHEATHING

Add the following paragraph to the "A. General" subsection:

Contractor shall provide and maintain sheathing and bracing as necessary to support excavation and trenching and shall comply with Occupational Safety & Health Administration (OSHA) requirements. The contractor shall deem a competent person for trench excavation and that person shall be on-site during all trench excavation and backfill.

Amend the entire "B. Payment" subsection to read:

Payment for installation and removal of sheathing and bracing, and for additional excavation (without classification), additional aggregate and sand cushion to surround the pipe, additional non-woven geotextile filter fabric to surround the cushion, additional bedding, and additional backfill required because of sheathing or bracing work will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of the various items in the Proposal.

SECTION 302.05 – DEWATERING

Amend the first paragraph of the "A. General" subsection to read:

In locations where water is present in the trench, the Contractor must dewater by pumping or other means to keep the trench free of water during the installation of pipe cushion, the pipe itself, the testing, connection, relocation, lowering of the water mains, and until backfilling is completed to a point 12 inches above the top of the pipe. The Contractor shall provide proper facilities for delivering all pump water to its intended outfall location and attain all necessary permits required for discharge.

If the Contractor elects to discharge dewatering effluent into State Waters or existing drainage systems, the Contractor shall obtain NPDES General Permit Coverage authorizing discharges associated with construction activity dewatering from the Department of Health, Clean Water Branch (DOW-CWB). The Contractor shall prepare and submit permit application (CWB-NOI Form G) to DOH-CWB and shall not begin dewatering activities until DOH-CWB has

issued Notice of General Permit Coverage (NGPC) and shall conduct dewatering operations in accordance with the conditions in NGPC. Contractor shall submit a copy of NPDES dewatering Application and Permit to the Manager.

Amend the entire "B. Payment" subsection to read:

Payment for dewatering activities, including but not limited to the preparation and implementation of NPDES General Permit Coverage authorizing discharges associated with construction activity dewatering, and the installation, maintenance, monitoring, and removal of Best Management Practices (BMPs), will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of the various items in the Proposal.

For all fines received by the Department for non-compliance with the Notice of General Permit Coverage (NGPC), the Contractor shall reimburse the Department within 30 days for the full amount of the outstanding cost the Department has incurred, or the Department will deduct the cost from the Contractor's progress payment.

SECTION 302.06 – "ADOBE" OR CLAY

Amend the entire "B. Payment" subsection to read:

Exclusive of the payments due for work defined in Section 302.07 – MUD REMOVAL AND CRUSHED ROCK TRENCH STABILIZATION, no separate payment for excavation (without classification) and removal of adobe, clay or other unsuitable material from the pipe trench or for necessary backfill material approved by the Manager to replace those materials will be made; the compensation for such work shall be deemed to be included in the Unit Price for the furnishing and installation of the various items in the Proposal.

SECTION 302.07 – MUD REMOVAL AND CRUSHED ROCK TRENCH STABILIZATION

Amend the first paragraph of the "B. Payment" subsection to read:

Payment for excavation (without classification) to remove and dispose of mud or undesirable materials from the pipe trench whether native or caused by contractor means and methods will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of the various items in the Proposal.

SECTION 302.08 – BLASTING

Amend the entire "A. General" and "B. Payment" subsections to read:

No blasting shall be allowed on this project.

SECTION 302.09 – EXCAVATION FOR MANHOLES

Amend the second paragraph of the "B. Payment" subsection to read:

Payment for excavation (without classification) for manholes will not be paid for separately but shall be deemed to be included in the Unit Price for the furnishing and installation of Manholes.

SECTION 302.10 - EXCAVATION FOR THRUST BLOCKS, BEAMS, AND TEST BLOCKS

Amend the entire "B. Payment" subsection to read:

Payment for excavation (without classification) and backfill of concrete thrust blocks, thrust beams, reaction blocks, and test blocks will not be paid for separately but shall be included in the Unit Price for installation of Concrete Thrust Blocks, Thrust Beams, Reaction Blocks, and Test Blocks or Waterline installation line items.

SECTION 302.11 – SURPLUS EXCAVATION

Amend the entire "B. Payment" subsection to read:

Payment for the removal and disposal of surplus excavation material will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of the various items in the Proposal.

SECTION 302.12 - DUCTILE IRON PIPE

Add the following paragraph to the "A. General" subsection:

Transition couplings shall be Romac Style "501", Style "RC501", or approved equal. D.I. to A.C. transition couplings shall be 14" in length.

Add the following paragraphs to the "E. Payment" subsection:

The Unit Price for furnishing and installation of the various sizes of Ductile Iron Pipe shall be inclusive of trench excavation (without classification), trench backfill, pipe cushion, warning tape, sheathing and dewatering of trench, removal and disposal of adobe, clay, mud, and other unsuitable material from the trench, and removal and disposal of surplus excavation material, and all associated cost for licensed Geotechnical Engineer monitoring, analysis, and testing.

Payment for furnishing and installation of transition couplings shall not be made directly, costs for furnishing and installation of transition couplings shall be included in the Lump Sum for the various Connections to Existing Water Mains in the Proposal.

SECTION 302.14 PLASTIC PIPE

Add the following paragraphs to the "A. General" subsection:

The contractor shall furnish and install Polyvinyl Chloride (PVC) pipe for this project if required. All types and sizes of PVC pipes shall be AWWA C900, Pressure Class 200, DR14 pipe for pipes larger than 2 ½" or schedule 80 PVC pipe for sizes 2 1/2" and smaller.

Pipe cushion material as called for on the plans shall adhere to the requirements of "Water System Standards" Section 209.02, Pipe Cushion. When ground water is encountered or when required by the Engineer, the pipe cushion shall be wrapped in non-woven geotextile fabric in accordance with the "Water System Standards" Section 212.05, Geotextile Fabrics. The contractor shall retain the services of a licensed Geotechnical Engineer to monitor the quality

of pipe cushion material, installation, and compaction of the pipe cushion, geotextile encasement, and trench backfill. The Department of Water will require periodic sieve testing of the pipe cushion material during the course of construction.

If PVC installation will be within State Highways Right-of-Way, installation, work, and materials used for this project shall comply with the requirements in Section 624 – Water System, Section 703.21 – Trench Backfill Material, Section 716 – Geotextiles, and Section 716.03 – Geotextiles for Underdrain Applications of the "Specifications for Road and Bridge Construction", State of Hawai'i, dated 2005, unless otherwise approved by the authoritative agency.

Transition couplings shall be Romac Style "501", Style "RC501", or approved equal. C-900 PVC to A.C. transition couplings shall be 14" in length.

Amend the first paragraph of the "B. Payment" subsection to read:

Payment for furnishing and installation of various sizes of PVC Pipe including all necessary joints accessories and fusion process and accompanying ground restraints, will be made at the respective Unit Price per linear foot based on the actual linear feet of PVC pipe installed (exclusive of valves, fittings, bends, and adapters), cleaned or pigged and successfully hydrotested in the field.

Add the following paragraphs to the "B. Payment" subsection:

The Unit Price for furnishing and installation of the various sizes of PVC Pipe shall be inclusive of trench excavation (without classification), trench backfill, pipe cushion, geotextile filter fabric encasement, conducting cable, warning tape, sheathing, removal and disposal of adobe, clay, mud, and other unsuitable material from the trench, removal and disposal of surplus excavation material, and all associated cost for licensed Geotechnical Engineer monitoring, analysis, and testing.

Payment for furnishing and installation of transition couplings shall not be made directly, costs for furnishing and installation of transition couplings shall be included in the Lump Sum for the various Connections to Existing Water Mains in the Proposal.

SECTION 302.15 - FITTINGS AND SPECIALS (DUCTILE IRON, CONCRETE CYLINDER, PLASTIC PVC PIPE)

Add the following paragraph to the "A. General" subsection:

The contractor shall furnish and install EBAA Iron Series 2000PV MEGALUG Mechanical Joint Restraint for plain end PVC pipe at all mechanical joint fittings and EBAA Iron Series 2100 MEGAFLANGE Restrained Flange Adapter for plain end PVC pipe at all flange joints. Both shall be installed in accordance with the manufacturer's guidelines.

Amend the first paragraph of the "B. Payment" subsection to read:

Payment for furnishing and installing Cast Iron and Ductile Iron Fittings will be made at the Lump Sum Price, complete in place. The Contractor shall be responsible for the actual number of cast iron and ductile iron fittings furnished, installed and tested in the field. If a line item

for Cast Iron and Ductile Iron fittings is not specifically provided, the contractor shall include the cost in the furnishing and installation of the waterline unit price.

Amend the fourth paragraph of the "B. Payment" subsection to read:

Payment for furnishing and installation PVC Fittings, including copper toning wire will not be paid for separately but shall be included in the Unit Price for furnishing and installation of the various sized PVC Pipes in the proposal.

Amend the fifth paragraph of the "B. Payment" subsection to read:

Payment for furnishing and installation Flanged by Bell Adapters, Flanged Dismantling Joints, MEGALUG Mechanical Joint Restraint, and MEGAFLANGE Restrained Flange Adapters will not be paid for separately but shall be included in the Lump Sum Price for Cast Iron and Ductile Iron Fittings, in place complete.

SECTION 302.16 - GATE VALVES AND BUTTERFLY VALVES

Amend the first paragraph of the "A. General" subsection to read:

The contractor shall furnish and install all permanent and temporary gate valves and butterfly valves at locations shown on the plans or as directed by the Engineer. Unless otherwise specified, the installation shall be in accordance with the Standard Details. Specifications for furnishing and installing Temporary Gate Valves will comply with this section of the specification.

Amend the fourth paragraph of the "A. General" subsection to read:

Concrete anchor block with non-corrosive straps will not be required for this project.

Add the following paragraph to the "B. Payment" subsection:

The Unit Price for furnishing and installing Gate Valves and Butterfly Valves and furnishing and installing Temporary Gate Valves shall be inclusive of trench excavation (without classification), cast iron valve box, trench backfill, pipe cushion, warning tape, sheathing and dewatering of trench, removal and disposal of adobe, clay, mud, and other unsuitable material from the trench, and removal and disposal of surplus excavation material.

SECTION 302.17 - AIR RELIEF VALVES

Add the following paragraph to the "A. General" subsection:

Air relief valves shall be One-Inch Val-Matic Valve & Manufacturing Corp. Combination Air Valve 201C.2 with screened hood, or approved equal.

Amend the second paragraph of the "B. Payment" subsection to read:

The Unit Price for furnishing and installation of Air Relief Valve shall be full compensation for all labor, materials, tools and equipment for excavation (without classification) and backfill, sheathing and dewatering of trench, installation of copper pipes, fittings, various types of valves, ARV, cinder or crush rock cushion, brick saddle, ARV pipe stand, concrete

footing, roofing felt, stainless steel straps, screened hood, paint, testing, and all other incidentals to complete this work.

SECTION 302.18 - SERVICE LATERALS, CONNECTIONS AND PIPES

Add the following paragraphs under "A. General" subsection:

New service laterals shall be terminated with an angle valve in the existing meter boxes to facilitate the reconnection to the water meter.

Where existing meters are located within private properties, the new service lateral will be terminated within the public right-of-way and include a new Type "B" or Type "X" meter box with cast iron cover.

When a new lateral is being installed for an existing Department of Water consumer, the contractor shall furnish and install lateral piping including all fittings and appurtenances between the new meter and the existing consumer piping and perform reconnection work, and include a new meter box and cover.

When an existing lateral is being abandoned, the contractor shall cut and plug the existing lateral at the main. The existing meter box and cover shall be cleaned and transported to the Department's Baseyard in Līhuʻe or Puhi, unless otherwise directed by the Engineer.

Amend the entire "D. Payment" subsection to read:

Payment covered under service laterals and connections and appurtenances shall be as follows: Payment for furnishing and installing various sizes of new service laterals and service connections, regardless of the lengths of the laterals or connections, will be made at the Unit Price per each unit based on the actual number installed and tested.

The Unit Price for furnishing and installing various sizes of new service laterals, service connections, and appurtenances shall be full compensation for all labor, materials, tools, and equipment for all handling, hauling, unloading, placing, testing, and all other incidental necessary to complete the work.

No separate payment for the furnishing and installation of taps into mains, reconnections to existing consumer piping, temporary connections, cut and plug and removal of existing laterals, transferal of meters, pipes, fittings, ball corps, ball stops, angle valves, globe valves, double hub fittings, tapping tees, service saddles, meter boxes and covers, meter splices, brass pipes, caps, PVC conduits, warning tape, polyethylene wrap, plastic lateral for isolation, nor any other appurtenances will be made. Additionally, no separate payment will be for trench excavation (without classification) and backfill, sheathing and dewatering of trench, pipe cushion, nor transporting existing meter boxes and covers to the Department's Baseyard in Līhuʻe or Puhi. The compensation for this work and items shall be deemed to be included in the Unit Price for New Service Laterals.

SECTION 302.19 – METER BOXES

Amend the entire "B. Payment" subsection to read:

Payment for the furnishing and installation of meter boxes including frames and covers will not be paid for separately but shall be included in the Unit Price for Service Laterals or Air Relief Valve Assemblies.

Payment for the furnishing and installation of Meter Boxes shall be full compensation for all labor, materials, tools and equipment for all handling, hauling, unloading, placing, bricks, concrete, cast iron covers, painting, concrete slabs and all other incidentals necessary to complete the work.

No separate payment for excavation (without classification) and backfill of Meter Boxes will be made; the compensation for such work shall be deemed to be included in the Unit Price for Service Laterals or Air Relief Valve Assemblies.

SECTION 302.20 - FIRE HYDRANTS

Amend the third paragraph of the "B. Payment" subsection into the following paragraphs:

Payment for excavation (without classification), backfill, sheathing and dewatering of trench, and fire hydrant markers will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of Fire Hydrants.

No separate payment for the furnishing and installation of hydrant elbow, hydrant extension, pipe cushion, flat brick support, and all other appurtenances will be made; the compensation for such work shall be deemed to be included in the Unit Price for Fire Hydrants.

SECTION 302.21 - FIRE HYDRANT MARKERS

Amend the first paragraph of the "B. Payment" subsection to read:

Payment for hydrant markers will not be paid for separately but shall be included in the Unit Price for the furnishing and installation of Fire Hydrants.

SECTION 302.22 - CONCRETE BLOCKS, JACKETS, BEAMS, CURB GUARDS FOR FIRE HYDRANTS AND METER BOXES, MANHOLE AND VALVE BOX COLLAR

Amend the entire "B. Payment" subsection to read:

Payment for concrete reaction blocks, thrust beams, thrust blocks and test blocks will be made at the Unit Price per each either by specific proposal line item or as a portion within the furnishing and installation of waterline line item. The Unit Price for concrete reaction blocks, thrust beams, thrust blocks and test blocks shall be full compensation for all labor, materials, tools and equipment for all excavation (without classification), backfill, sheathing, dewatering, concrete, forms, tie wire and chairs, bracings, straps, structural struts, surface finishing, curing, mixing, hauling, furnishing and placing reinforcing steel, and all other incidental materials and work necessary to construct the concrete reaction block, thrust block or thrust beam, in place complete.

Payment for concrete jackets will be made at the Unit Price per linear feet of concrete jacket installed for the various sizes of pipe, regardless of pipe size either by specific proposal line item or as a portion within the furnishing and installation of waterline line item. The Unit Price for concrete jackets shall be full compensation for all labor, materials, tools and

equipment for all excavation (without classification), backfill, sheathing, dewatering, concrete, forms, tie wire and chairs, bracings, straps, surface finishing, curing, mixing, hauling, furnishing and placing reinforcing steel, and all other incidental materials and work necessary to construct the concrete jackets in place complete.

Payment for concrete jackets for smaller utility conduits crossing the project's waterlines shall not be made separately. Costs for furnishing and installation of concrete jackets, including miscellaneous items such as warning tapes, shall be deemed to be included in the Unit Price for furnishing and installation of the various sizes and types of pipes in the Proposal.

SECTION 302.24 - VALVE BOXES

Amend the first paragraph of the "A. General" subsection to read:

Valve boxes for air relief valves, butterfly valves and cleanouts shall be installed in accordance with the Standard Details. Valve boxes for temporary and permanent gate valves shall be furnished and installed in conformance with Standard Detail V11 of the WATER SYSTEM STANDARDS or as defined on the construction drawing for this project. Valve boxes shall be installed 3 feet minimum clear from gutter, curbs, utilities and any structures. For this section, Valve Box specifications for Temporary and Permanent Gate Valves are identical.

Amend the entire "B. Payment" subsection to read:

Payment for the furnishing and installing of valve boxes including cast iron frames and covers and adjusting valve boxes to the required grade will not be paid for separately but shall be included in the Unit Price for Gate Valves or Temporary Gate Valves or Tapping Valves or Cleanout assemblies.

Payment shall be full compensation for all labor, materials, tools and equipment for all excavation (without classification) and backfill, cast iron frames and covers, concrete settlement slab, reinforced concrete collar and leveling slab, standpipe (concrete, cast iron, ductile iron, or welded steel pipe), brick leveling course, crushed rock fill, pipe cushion, painting, general area clean up, and all other incidentals necessary to complete the work.

No separate payment for backfilling around valve boxes with black sand, sand or coral chips and for temporary backfill and additional excavation (without classification) to expose the risers after chlorination will be made; the compensation for such work shall be deemed to be included in the Unit Price for Gate Valves, Temporary Gate Valves, Tapping Valves, or Cleanout assemblies.

SECTION 302.30 – CONNECTIONS, RELOCATIONS & LOWERING OF WATER MAINS AND LATERALS

Amend the first paragraph of the "A. General" subsection to read:

Whenever connections to, disconnections from, relocations to, or lowering of existing mains, service laterals, or hydrant laterals are required, the Contractor shall perform all work necessary for the installation of the new or temporary water facility or abandonment of the existing water facility, as shown on the plans, under the coordination of the Manager or his authorized representative.

Add the following paragraph under "A. General" subsection:

The contractor shall utilize temporary waterlines to provide continuous water service and fire protection to existing consumers, as needed.

For this project, Connections to Existing Water Main involve connecting to various types of pipe. The Contractor shall not saw or cut or damage existing asbestos cement pipe. Asbestos cement pipes, fittings, and appurtenances shall be removed at the nearest coupling. The Contractor shall remove and dispose of asbestos cement pipes, fittings, and appurtenances in accordance with Section 302.31.

Amend the entire "B. Payment" subsection to read:

Payment for Connection to Existing Water Main, Connection to Existing Service Lateral, or Connection to Existing Hydrant Lateral which may include the furnishing and installing of pipes, fittings, fire hydrants, gate valves, tapping sleeves and valves, service saddles, hub clamps and other appurtenant materials, will be included in the Lump Sum Price for Connection to Existing Water Main or in the Unit Price for Connection to Existing Service Lateral, Connection to Existing Hydrant Lateral, or temporary bypasses and disconnects.

The Lump Sum Price or Unit Price shall represent full compensation for furnishing all materials, labor, tools, equipment, and incidentals required for excavation (without classification), backfill, sheathing and dewatering of trench, relocating existing gate valves, connections, relocations, disconnections, removal, or lowering of the existing mains as called for on the plans and in accordance with these specifications and inclusive of all incidentals required to complete the work.

No separate payment for cutting, plugging, relocating existing main, lowering of existing mains, providing temporary water service (if necessary), providing temporary fire protection (if necessary), or abandoning of existing mains will be made; the compensation for such work shall be deemed to be included in the Lump Sum for Connections to Existing Water Main or in the Unit Price for Connection to Existing Service Lateral or Connection to Existing Hydrant Lateral.

No separate payment for installation of bypass lines including cutting, plugging and abandoning existing bypass lines will be made; the compensation for such work shall be deemed to be included in the Lump Sum for Connections to Existing Water Main or in the Unit Price for Service Lateral Connections or Connection to Existing Hydrant Lateral.

SECTION 302.31 – REMOVING OR DEMOLISHING, REINSTALLING OR RETURNING EXISTING PIPES AND APPURTENANCES

Add the following paragraphs under "A. General" subsection:

The contractor shall be responsible for removal and disposal of existing pipes and appurtenances abandoned within the State and County Right-of-Way. Removal and disposal of pipes shall follow all applicable OSHA, HIOSH, State of Hawai'i and Federal Regulations. Abatement personnel shall oversee removal and disposal, when required. Unless otherwise directed by the Manager, pipes and appurtenances shall become the property of the Contractor and shall be expeditiously removed from the construction site.

Care shall be exercised when removing and disposing of asbestos cement pipe and appurtenances. If the contractor causes the asbestos cement pipe or appurtenance to become friable, he will not be reimbursed for extra costs incurred to handle, containerize, transport, and dispose of the waste. Disposal of asbestos cement pipe and appurtenances shall be at an approved asbestos disposal site and all disposal related costs shall be borne by the contractor. Disposal of all hazardous materials shall be completed within 24 hours of removal from the water system and shall not be stored within the project site beyond the 24 hour period.

Temporary pipes, fittings, valves, cleanouts, valve boxes with frames and covers, and appurtenances that were installed to provide temporary water service and fire protection shall be salvaged, cleaned, and transported to the Department's Baseyard in Līhuʻe or Puhi.

Amend the first paragraph of the "B. Payment" subsection to read:

Payment for the removal, cleaning, and transporting of existing fire hydrants, standpipes, cleanouts, and air relief valves will be made at the Unit Price per each unit, based on the actual number removed and accepted by the Manager. If a specific proposal line item is not provided, the contractor shall incorporate the costs into the unit price of the furnishing and installation of the applicable waterline. The Unit Price includes full compensation for all labor, materials, tools, and equipment for removing, cleaning, plugging existing water mains, providing temporary water service, restoring disturbed area, and transporting salvaged fire hydrants, standpipes, air relief valves, and appurtenances to the Department's Baseyard in Līhuʻe or Puhi.

Add the following paragraphs to the "B. Payment" subsection:

Payment for removal of existing gate and tapping valves will be made at the Unit Price per each unit, based on the actual number removed and accepted by the Manager. If a specific proposal line item is not provided, the contractor shall incorporate the costs into the unit price of the furnishing and installation of the applicable waterline. The Unit Price includes full compensation for all labor, materials, tools, and equipment for removing existing valve box components, removing concrete settlement slab, plugging of existing water mains, installing concrete and dirt backfilling, restoration of disturbed area, and cleaning and transporting the salvaged cast iron frames and covers to the Department's Baseyard in Līhuʻe or Puhi.

Payment for removal of temporary gate valves and valve box components will be made at the Unit Price per each unit, based on the actual number removed and accepted by the Manager. If a specific proposal line item is not provided, the contractor shall incorporate the costs into the unit price of the furnishing and installation of the applicable waterline. The Unit Price includes full compensation for all labor, materials, tools, and equipment for removing the temporary gate valves and valve box components, removing concrete settlement slab, installing concrete and dirt backfill, restoration of disturbed area, and cleaning and transporting salvaged gate valves and cast iron frames and covers to the Department's Baseyard in Līhuʻe or Puhi.

Payment for the removal of temporary pipes and fittings will be made at the Lump Sum or Unit Price for Removal Temporary Water Main. The Lump Sum or Unit Price includes full compensation for all labor, materials, tools, and equipment for excavating (without classification), sheathing, dewatering, disconnecting and removing the temporary pipe and fittings, backfill and restoration of disturbed area, and cleaning and transporting salvaged pipes and fittings to the Department's Baseyard in Līhuʻe or Puhi.

Payment for the removal and disposal of existing pipes, fittings, and appurtenances within the State and County Right-of-Way will be made at the Lump Sum or Unit Price for Removal of Water Main. The Lump Sum or Unit Price shall be full compensation for all labor, materials, tools and equipment for excavating (without classification), sheathing, dewatering, disconnecting, removing, processing, storing, hauling, and disposing of abandoned pipes and fittings, backfill and restoration of disturbed area, abatement personnel, disposal and inspection fees, cutting and plugging of existing water mains and laterals, and all other incidental materials and work necessary for the complete removal of abandoned pipes, fittings, and appurtenances.

Payment for the removal and disposal of existing pipes and appurtenances not specified above shall be considered incidental and shall not be paid for separately but shall be included in the Unit Price or Lump Sum for the various items in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment for excavating (without classification), sheathing, dewatering, disconnecting, removing, hauling, storing, and disposing of abandoned pipes and fittings, backfilling and restoring disturbed area, disposal and inspection fees, cutting and plugging of existing water mains and laterals, and all other incidental materials and work necessary for the complete removal of abandoned pipes and appurtenances.

SECTION 302.35 - VALVE MARKERS

Amend the entire "B. Payment" subsection to read:

Payment for the furnishing and installation of Valve Markers will not be paid for separately, but shall be included in the Unit Price for the installation of various sized of gate or tapping valves. Payment shall be full compensation for all labor, materials, tools and equipment for all excavation (without classification), backfill, concrete, painting, and all other incidental materials and work necessary to complete the work.

SECTION 302.36 – SLOW CURING ASPHALT PAVEMENT (COLD MIX)

Amend "B. Payment", replace the first paragraph with the following:

Payment for furnishing, placement, maintenance and removal of SLOW CURING ASPHALT (Cold Mix) shall be deemed to be included in the Unit Price for furnishing and installation of the various sizes and types of pipes in the Proposal.

SECTION 302.37 - RESTORING PAVEMENTS, DRIVEWAYS, SIDEWALKS, CURBS, GUTTERS, FENCES, WALLS, AND MISCELLANEOUS

Add the following paragraphs under "A. General" subsection:

Asphalt concrete (A.C.) pavement resurfacing work shall include cold planing a 2-inch thick layer of existing A.C. pavement and resurfacing with a minimum 2-inch thick layer of new A.C. pavement (State Mix IV or V). Cold planing and resurfacing of A.C. pavement shall be in accordance with the Hawai‘i Standard Specifications for Road and Bridge Construction, 2005. The contractor shall construct the project per the approved construction drawings details and notes and verify potential AC thicknesses that could be encountered prior to submitting a proposal.

Existing pavement striping disturbed by this project shall be restored using thermoplastic extrusion. Painting is not acceptable. Installation of thermoplastic extrusion shall be in accordance with the Hawai‘i Standard Specifications for Road and Bridge Construction, 2005.

Existing reinforced concrete sidewalks, curbs, gutters, ramps, driveways, and swales disturbed by this project shall be restored to State Highways Standards in accordance with the Hawai‘i Standard Specifications for Road and Bridge Construction, 2005 and the Highway's Division, Design Branch, Standard Plans, 2008.

Amend the entire "C. Payment" subsection to read:

Unless otherwise specified, payment for restoring fences, mail boxes, walls, landscaping, highway signs, highway markers and reflectors, and thermoplastic pavement striping shall not be measured nor paid for directly but shall be considered incidental to the construction work.

Payment for Restoring A.C. Pavement, inclusive of base and subbase courses, will be made at the Unit Price per square yard based on the minimum quantity required to be replaced on the approved plans, measured on the basis of the area of trenches specified for excavation plus an additional of twelve inches on each side of the trench for restoration within the State Right-of-Way or six inches on each side of the trench for restoration within the County Right-of-Way. The Unit Price shall be full compensation for all labor materials, tools, and equipment, for all handling, removing, placing, maintaining and all other incidental materials and work necessary to complete the Restoring A.C. Pavement work.

Payment for Cold Planing Existing A.C. Pavement and A.C. Pavement Resurfacing will each be made at the Unit Price per square yard based on the minimum quantities required as noted on the approved plans. Each Unit Price shall be full compensation for all labor materials, tools, and equipment, for all handling, removing, placing, maintaining and all other incidental materials and work necessary to complete the Cold Planing of Existing A.C. Pavement and A.C. Pavement Resurfacing work.

Payment for A.C. Pavement resurfacing, will be made at the Unit Price per square yard based on the minimum quantity required to be replaced on the approved plans, measured on the basis of the area of roadway required to be resurfaced within the State Right-of-Way or County Right-of-Way. The Unit Price shall be full compensation for all labor materials, tools, and equipment, for all handling, removing, placing, maintaining and all other incidental materials and work necessary to complete the A.C. Pavement resurfacing work.

Unless otherwise specified, payment for restoration of Reinforced Concrete Sidewalk, Curbs, and Ramps, Reinforced Concrete Driveway, AC Driveways and Reinforced Concrete Swale shall not be measured nor paid for directly but shall be considered incidental to the construction work. If specified as a Unit Price, the Unit Price shall be full compensation for all labor materials, tools, and equipment, for all handling, removing, placing, finishing, maintaining, installation of forms, steel or weld wire fabric reinforcement, base course, and all other incidental materials and work necessary to complete the restoration of Reinforced Concrete Sidewalk, Curbs, and Ramps, Reinforced Concrete Driveway, AC Driveway and Reinforced Concrete Swale work.

Add the Following Section:

SECTION 302.40 - BRACING OF UTILITY POLES

When excavating close to utility poles, when specified on the plans, or when directed by the Manager, the Contractor shall brace the utility pole if the utility pole is owned by Hawaiian Telcom or pay for bracing if the utility pole is owned by Kaua‘i Island Utility Cooperative (KIUC). In addition to “Bracing of Utility Poles”, the utility agency(s) may require the contractor to stabilize the ground adjacent to the pole(s). “Bracing of Utility Poles” and stabilizing the ground adjacent to the utility pole(s) includes all labor, materials, tools, and equipment necessary to install braces for existing utility poles, stabilize the ground adjacent to the utility poles, and for their removal when bracing and/or stabilizing are no longer necessary. Payment for bracing of utility poles or reimbursement for utility poles braced by KIUC or stabilizing the ground adjacent to the utility poles will not be made directly but shall be included in the Unit Price for the various items in the proposal.

Add the Following Section:

SECTION 302.41 – TRAFFIC CONTROL

Unless provided a specific line item in the proposal, Payment for traffic control work will not be made directly but shall be included in the Unit Price for the various items in the proposal.

SECTION 302.42 - REMOVING AND SALVAGING/DISPOSING OF MATERIALS

Payment for removal and salvage or disposal of materials (fire hydrants, standpipes, valve boxes, etc.) and for the restoration of the area shall not be made directly; costs for these items of work shall be included in the unit price offer for the various items in the proposal.

Add the Following Section:

SECTION 302.43 – EROSION CONTROL / BMP

Payment for all erosion control / BMP measures shown on the drawings will not be made directly but shall be included in the Unit Price for waterline installation.

1.1.03 DEPARTMENT OF PUBLIC WORKS, COUNTY OF KAUA‘I STANDARD SPECIFICATIONS: Whenever reference is made within these Special Provisions or the contract plans to the DPW Standard Specifications, the specifications referred to is the “HAWAI‘I STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND PUBLIC WORKS CONSTRUCTION” of the State of Hawai‘i, 2005, and all subsequent amendments. These specifications are not bound in these contract documents, but shall by reference be incorporated herein and made a part of these specifications.

1.1.04 DEPARTMENT OF PUBLIC WORKS, COUNTY OF KAUA‘I, STANDARD DETAILS: Whenever reference is made within these Special Provisions or the contract plans to the DPW Standard Details, the Details referred to is the “STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION”, September 1984 and all subsequent amendments. The DPW Standard Details are not bound in these contract documents, but shall be incorporated herein and made a part of these specifications by reference.

1.1.05 SPECIAL DEFINITIONS: The following definitions shall apply unless the context indicates otherwise. Wherever the terms “Engineer” or “Owner” are used in any document which forms

a part of this contract, they shall mean the Department of Water, County of Kaua‘i and its authorized agents.

1.2 PRECONSTRUCTION CONFERENCE: The Contractor shall arrange a preconstruction conference with the Project Manager, along with other affected agencies, firms and individuals within seven (7) days after issuance of "Notice to Proceed".

The Contractor shall submit a construction schedule to the Department of Water at the conference. This construction schedule shall be closely adhered to throughout the period of the contract.

At the preconstruction conference, the Contractor shall submit to the Department, the name of its authorized superintendent of the job.

The Contractor shall notify the Department at least three (3) working days prior to the start of construction.

1.3 CONTRACTOR'S RESPONSES BY HARDCOPY OR FACSIMILE: The Contractor may respond in writing by submitting a hardcopy or by facsimile only to the following Department's requests:

A. Notice of Intention to Propose.

B. Request for Clarification.

C. Pre-Proposal Due Date Modification or Withdrawal of Offers.

The hardcopy or facsimile shall be submitted as specified in the applicable subsection and shall include the following information:

To: Chief Procurement Officer
Department of Water, County of Kaua‘i

Fax Number: 1-808-245-5813

Attention: Procurement Officer

From:
Date:

Subject: (Subject of Facsimile)
Job No. / Job Name

1.4 FAILURE TO COMPLETE ON TIME AND LIQUIDATED DAMAGES: The Contractor shall complete the work within the number of calendar days specified in the contract. The specified number of calendar days shall commence from the date designated in the Notice to Proceed.

Completion of the work within the required time is important since delay in the prosecution of the work will inconvenience the public, obstruct traffic and interfere with business.

If the Contractor fails to complete the work on or before the final completion date specified in the contract, damages will be sustained by the Department of Water, County of Kaua‘i. Since the amount of damage, exclusive of the actual cost of engineering, inspection and superintendence, including

necessary traveling expenses, is difficult, if not impossible to definitely ascertain and prove, the amount of such damages are fixed in advance at the sum of One Thousand Dollars ($1,000.00) for each and every calendar day which the Contractor has delayed in the completion of the contract; and the Contractor shall pay that amount as liquidated damages and not by way of penalty, and in case the same are not paid, the Department may deduct the amount thereof from any monies due or that may become due to the Contractor under the contract.

1.5 MEASUREMENTS: Figured dimensions and drawings take precedence over measurements by scale. The Contractor must verify all measurements at the site and be responsible for the accuracy of the same.

1.6 PROJECT RECORD DOCUMENTS:

1.6.01 SECTION INCLUDES: Overview of maintenance of documents, recording requirements, and submittal of Project Record Documents.

1.6.02 MAINTENANCE OF DOCUMENTS:

A. Maintain a record copy of the following Project Record Documents on-site and record actual revisions to the work:

(1) Contract Drawings.
(2) Specifications.
(3) Amendments.
(4) Change orders and other modifications to the Contract.
(5) Reviewed submittals.
(6) Permits. (Road, Building, Noise, NPDES, etc.)
(7) Specified installer/tradesman certificates.
(8) Update Revisions to BMP plans as required by NPDES permit(s).
(9) Other Project Record Documents as indicated in specific Specification sections.

B. Store Project Record Documents apart from other documents. Provide separate files, racks, and secure storage for Project Record Documents.

C. Record information concurrent with construction progress.

D. Label and file Project Record Documents in accordance with these Specifications. Label each document “PROJECT RECORD” in neat, large, printed letters.

E. Maintain Project Record Documents in a clean, dry and legible condition.

F. Keep Project Record Documents available for inspection.

1.6.03 RECORDING REQUIREMENTS:

A. Use an erasable red pencil (not ink or indelible pencil) to clearly record information or changes on the Drawings by graphic line and note as required. Use an erasable yellow pencil to clearly mark for verification all major components shown as constructed.

B. Use different colors for overlapping changes if required for clarification.

C. Record information concurrently with construction progress. Do not conceal any work until required information is recorded. Date all entries reflecting change.

D. Legibly mark each item on the Drawings to record actual construction, including:

(1) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

(2) Field changes of dimension and detail.

(3) Changes made by Contract amendments and modifications.

(4) Details not on original Drawings.

(5) References to related shop drawings.

E. Specifications: Legibly mark each item to record actual construction, including the following:

(1) Manufacturer's name and product model and number.

(2) Product substitutions or alternates utilized, as approved by DOW.

(3) Changes made by amendment and contract modifications.

F. As-Built Drawings: The contractor shall provide and keep up-to-date a complete set of as-built prints for this project which shall be corrected regularly, showing every change from the original contract drawing set, including all addenda, change orders job decisions, etc. The as-built prints shall be used only as a record set and shall be kept on the job site available for the Department's review.

At the time of the final inspection, the contractor shall furnish the Department with one hard copy set of the as built drawings for review. After DOW provides review comments to the contract, the contractor shall provide one hard copy Mylar set with all original signatures and redline changes (**also CADD format and PDF format on CD**) showing all of the changes from the original contract set drawings including addenda, change orders, job decisions, etc. The "As-built Drawings" will be required to include the information stated in the General Provisions and prior to final acceptance as stated in the General Provisions. The "RECORD TRACINGS" block shall be utilized and signature blocks for the contractor, engineer and DOW Manager shall be provided on all sheets.

1.6.04 SUBMITTALS:

A. At the completion of construction, deliver Project Record Documents.

B. Transmit the Project Record Documents with a cover letter listing.

(1) Date.

(2) Project title and number.
(3) Contractor's name, address, and telephone number.
(4) Number and title of each Project Record Document.
(5) Signature of Contractor or authorized representative.

1.7 SUBSTITUTIONS

A. The materials or products specified herein by trade name shall be provided as specified. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Brand names where used on the plans or in the specifications shall be presumed to be followed by the words "or approved equal." Such approval will be granted only under the following conditions: Substitution of a brand other than specifically name in the contract documents will be approved by the Department of Water if it meets the following conditions:

That it is equal or superior to the brand name in the specifications in construction, efficiency and utility.

That it is equal or less in cost to the Owner.

That during the construction period, the material or product specified cannot be delivered to the job in time to complete the work in proper sequence due to conditions beyond the control of the Contractor.

B. To receive consideration, request for substitutions must be accompanied by documentary proof of the quality, difference in price and delivery, if any, in the form of certified quotations from suppliers of both specified and proposed materials or products. In case of a difference in price, the County shall receive all-benefit of the difference in cost involved by change order or credit the County with any savings so obtained.

C. If substitution of any brand other than the one specifically named requires changes to work detailed or specified under other headings, then the Contractor assumes all responsibility for this work.

D. Substitution request must be received by said date in Section 1.9 "Substitute Materials" (Section 1-Administration, Page 20).

1.8 STORAGE, WORK ZONE, CONSTRUCTION ACCESS: Department of Water shall not assume the responsibility to approve proposed storage areas, work zones, construction traffic pattern in and out of the project site. The Contractor shall be responsible for all additional NPDES permits, as well as, all updates to approved BMPs per NPDES permit approval requirements.

1.9 PRESERVATION OF PROPERTY: Due care shall be exercised to avoid injury to existing roadway improvements or facilities, utility facilities, adjacent property and roadside trees, shrubs and other plants that are not to be removed.

Roadside trees, shrubs and other plants that are not to be removed, and pole lines, fences, walls, signs, markers and monuments, buildings and structures, manholes and handholes, conduits, pipelines under or above ground, drain and sewer and water lines, all roadway facilities and any other improvements or facilities within or adjacent to the project shall be protected from injury or damage and if ordered

by the Department of Water, the Contractor shall provide and install suitable safeguards, approved by the Department of Water, to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored at the Contractor's expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the work, or as good as required by specifications accompanying the contract. The Department of Water may require the Contractor to make or cause to be made such temporary repairs borne by the Contractor and may be deducted from any moneys due or to become due to the Contractor under this contract. The fact that any underground facility is not shown upon the plans shall not relieve the Contractor of his or her responsibility. It shall be the Contractor's responsibility to ascertain the existence of any underground improvements or facilities which may be subject to damage by reason of this operation.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in protecting or repairing property shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed.

1.10 EXTRA WORK: No work of any kind in connection with the work covered by these specifications and plans shall be considered as extra work, or entitles the Contractor to extra compensation, except when the work has been ordered in writing by the Department of Water, and specifically referred to as EXTRA WORK and the amount of compensation stated in the change order.

1.11 BUILDING LAWS: The Contractor shall comply with the local laws, ordinances, rules and regulations bearing on the work and he must obtain and pay for all permits, licenses, certificates and give all notices required thereby.

1.12 DELIVERY OF MATERIALS AT SITE: Have all materials delivered at the site in such quantities as will ensure the uninterrupted progress of the work and the least obstruction of the premises and the adjoining property.

1.13 DEFECTIVE MATERIALS: When requested, furnish, without charge, samples of all materials entering into the work. All materials not conforming to the requirements of these specifications shall be considered as defective and all such materials, whether in place or not, shall be rejected.

1.14 CLEAN UP: On the completion of each day's work during this construction project, the Contractor shall remove from the site all debris, tools and excess material resulting from his or his subcontractor's the work and leave the work and any affected surroundings area broom clean.

1.15 ENVIRONMENTAL PROTECTION: The Contractor shall comply with the requirements for pollution control in performing all construction activities as set forth in the General Provisions.

1.16 PROJECT SIGN: The Contractor shall furnish, erect, maintain and remove one (1) project sign. The project signboard shall be 3/4 inch thick "AC" exterior grade fir plywood, 4 feet in height and 8 feet long. Sign shall be painted with one prime coat and two finish coats. The sign layout detail and sign and post details shall be submitted to the Department for approval. The project sign shall be erected at the site designated by the Department of Water within seven (7) calendar days after approval of the sign layout. The Contractor shall apply and pay for all permits and fees required for the placement of the sign. The sign layout shall include the Department of Water's logo (graphic to be provided by the Department of Water) and the following information:

1.17 SUBMITTALS:

1.17.01 SECTION INCLUDES: Overview of transmittal of submittals, submittals requirements, definition of submittal for review and definition of submittal for closeout.

1.17.02 RELATED SECTIONS: Section 1.6 Project Record Documents.

1.17.03 TRANSMITTAL OF SUBMITTALS:

A. General: Transmit submittals, number of copies as indicated in subsequent articles, to the following address:

Kaua'i Department of Water
Attn: Contract Administrator
4398 Pua Loke Street
Līhu'e, Kaua'i, Hawai'i 96766

B. Submittals for Review: Transmit one (1) copy to the Department of Water for review. The Department will retain electronic set and return one (1) reviewed set. Should the contractor require more returned, he shall provide the additional sets at his or her cost. Where more copies are called for in any section of these Special Provisions, the Contractor shall be required to submit said number of prints for approval.

Whenever possible, submittals/transmittals shall also be submitted electronically.

C. Submittals for Closeout:

(1) Operations and Maintenance Manuals:

a. Preliminary Submittal: Transmit one (1) copy of manual to the Department of Water two (2) weeks prior to final inspection. These copies will be returned after final inspection, with comments.

b. Final Submittal: Revise manuals and submit two (2) copies to the Department of Water two (2) weeks after receipt of comments to Preliminary Submittal.

(2) Project Record Documents: Submit Project Record Documents at the time of final inspection.

1.17.04 SUBMITTAL REQUIREMENTS:

A. Required submittals shall include:

(1) Shop drawings.
(2) Piping layout.
(3) Manufacturer's Data.

(4) Certificates of Warranty.
(5) Any others as called for in the plans, specifications, or by the Engineer.

B. The Contractor's stamp and verification of drawings shall consist of the following information:

CONTRACTOR NAME

PROJECT: _____

JOB NO.:_____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR. IT IS CERTIFIED CORRECT, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL INTO THEIR OWN WORK.

DATE RECEIVED: _____
SUBMITTAL NUMBER: _____
SPECIFICATION SECTION: _____
SPECIFICATION PARAGRAPH: _____
DRAWING NUMBER: _____
SUBCONTRACTOR NAME: _____
SUPPLIER NAME: _____
MANUFACTURER NAME: _____
CERTIFIED BY: _____

C. This stamp, "filled in", should appear on the title sheet of each shop drawing, on a cover sheet of submittals in an 8½"x11" format, or on a one face of a cardstock tag (min. 3"x6") tied to each sample. The tag on samples should state what the sample is, so that, if the tag is accidentally separated from the sample, it can be matched up again.

D. The person signing the Contractor's submittal stamp shall be the person with authority to act for the Contractor in connection with the contract during the performance of the contract. The signature shall be in original ink. Stamped signature will not be acceptable.

E. Prepare submittals to show that the material, equipment, or work shown is in accordance with contract requirements and has been checked for dimensions and relationship with work of all other trades involved. All deviations from the plans and specifications shall be noted.

F. Approval shall extend only to general conformance and shall not relieve the Contractor from his or her responsibility for coordinating his or her work with other trades and complying with the provisions of the contract documents for lengths, fits, quality of materials, quantities, applicable code requirements and other details. Approval does not authorize changes from the contract requirements unless stated in a separate letter or change order.

G. Submittals shall be made in sufficient time to allow the Engineer not less than twenty regular working days for examining the drawings. The Contractor shall make submittals at the earliest possible date after the Notice to Proceed date to meet the construction schedule. The Engineer will not consider delays caused by the Contractor's failure to make submittals on time as justifiable reasons for contract time extensions.

H. When the submittals have been reviewed by the Engineer, two sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the submittal may be rejected and one set will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit six copies of the drawings, unless otherwise directed by the Engineer. No changes shall be made by the Contractor to the resubmitted shop drawings other than those changes indicated by the Engineer. The resubmittal shall be so indicated on the shop drawing.

I. Prior to approval of such drawings, any work which the Contractor may do on fabrications covered by the same is at his or her own risk, as the County will not be responsible for any expense incurred by the Contractor for changes to make the same conform to the drawings as finally approved.

J. Upon approval of the above drawings, lists, prints and other data, a copy of the same shall be kept with the job site plans, and the fabrications furnished shall be in conformance with the same. However, approval of above drawings, lists, prints, specifications and other data shall in no way release the Contractor from his or her responsibility for the proper fulfillment of the requirements of this contract nor for fulfilling the purpose of the installation nor from his or her liability to replace the same should it prove defective or fail to meet the specified requirements.

K. Submittal Clarity:

(1) Drawings:

a. Prepare finished drawings so that prints, reproducables, and reductions to half size will be clear and legible.

b. Make free-hand lettering no less than 5/32 inch high and typewritten notes no less than 1/8 inch high to allow for reduction. Do not crowd lettering.

(2) Manufacturer's Literature:

a. Submit a minimum of one original of manufacturer's printed material. Remaining number of submittals may be reproductions. Ensure reproductions of original materials are clear and legible.

b. Clearly mark the item(s) and/or information applicable to this project with arrows, bubbles, etc. Do not use high-lighted markings.

c. Provide the name and phone number of manufacturer's sales and service representative for each device submitted.

1.17.05 DEFINITION OF "SUBMITTALS FOR REVIEW":

A. Catalog Data: Manufacturer's standard printed information on materials, products and systems, which shows performance characteristics, dimensions, material of fabrication, and other characteristics necessary to assure conformity with the design requirements. Where other items or information not related to the work of this project are included in the literature submitted, the item(s) and/or information applicable to this project shall be clearly marked.

B. Shop Drawings: Drawings necessary to show fabrication details to ensure compliance with contract documents.

C. Block Diagrams: Block Diagrams necessary to show system connections and details to ensure compliance with contract documents.

D. Wiring Diagrams: Drawings showing the point-to-point or schematic wiring of a piece of equipment or between pieces of equipment in a system.

E. Calculations: The methods and results of calculations in documented form where specified.

F. Material / Parts List: A list of system components or material components.

G. Samples / Colors: Samples, including colors, of proposed materials.

H. Certifications: A written statement, signed by a qualified party, attesting that items or services are in accordance with specified requirements. Typically, this written statement is accompanied by additional information to substantiate the statement.

I. Installation Instructions / Test Procedures: Manufacturer's instructions, step-by-step if necessary, showing the field installation and testing of parts, components, equipment, and other similar items.

J. Test Reports: Results of specified test requirements.

K. Meetings: Schedule, agenda, attendees, and location for required meetings and meeting notes.

L. Other: Other submittal information as described in individual specification sections.

1.17.06 DEFINITION OF "SUBMITTALS FOR CLOSEOUT":

A. Operations and Maintenance (O&M) Manuals:

(1) Format:

a. Hardcopy: Three (3) full sets

1) Size: 8½"x11". Fold 11"x17" drawings to 8½"x11" size. Reduce drawings larger than 11"x17" format to 11"x17" format.

2) Binders: Use commercial quality expandable post binders meeting the following requirements:

(a) Binder Covers: 1/8" thick construction (minimum).

(b) Hinges: Continuous, metal piano hinge.

(c) Binder Expandability: 3½" – 5½".

(d) Sheet Size: 8½"x11".

(e) Binder Cover Material: Heavy vinyl.

(f) Binder Printing: Provide custom printed spine and front imprinted with the following information:

County of Kaua‘i
Department of Water
(Print O&M manual titles and project title)

(g) Manufacturer’s Reference: Specialty Loose Leaf, Inc.

3) Fill: Do not fill binders more than 75% full.

4) Indexed Tabs: Internally subdivide the binder contents with permanent page dividers, logically organized, with tab titling clearly printed under reinforced laminated plastic tabs.

b. Adobe PDF Electronic Copy: Provide a facsimile of the hardcopy O&M Manual in Adobe PDF Electronic Format on compact disk(s).

c. Electronic Data: Provide electronic files on compact disk(s) or jump drive of any material created electronically by Integrator, in file format in which document was created, that is, Microsoft Word, AutoCAD, etc., including but not limited to:

1) Drawing Files.

2) Installation Instructions.

3) Software Documentation.

4) Operating and Maintenance Instructions.

d. Odd Sized Material: Where O&M information does not lend itself to incorporation into 8½"x11" format, such as the material listed, below, provide it separate from the O&M Manuals. However, clearly label each item, and provide reference in the O&M Manual to the material that is provided separate from the O&M Manuals.

1) Edge-glued books or manuals without 3-hole punched binding.

2) Material of a size other than 8½"x11".

3) Compact disks in jewel cases.

(2) Contents:

a. Table of Contents: Prepare a Table of Contents, for each volume, with each product or system description identified, and include with each volume of manual. Type on 24-pound white paper.

b. Directory: Provide names, addresses, and telephone number of Prime Contractor, Integrator, Installation Contractor, other subcontractors, and major equipment suppliers. Clearly identify contact for warranty support.

c. General: Provide operations and maintenance data for equipment described in the individual sections of the Specification. Prepare and include additional data when the need for such data becomes apparent during training.

d. Description of System and Component Parts:

1) System block and interconnection diagrams.

2) Control diagrams by controls vendor and as-installed control drawing by Contractor.

3) As-installed wiring diagrams, that is, ladder diagrams, point to point diagrams, loop diagrams, circuit directories of panel boards, and similar items.

4) Manufacturer's printed installation, operating, and maintenance instructions for the exact item of equipment supplied.

5) Catalog data containing information required for service, future additions or substitutions.

6) Function, normal operating characteristics, and limiting conditions.

7) Performance curves, engineering data and tests.

8) Complete nomenclature and commercial number of replaceable parts.

e. System Operating Procedures:

1) Description of sequence of operation by control manufacturer.

2) Routine and normal operating instructions.

3) Sequences required.

4) Special operating instructions.

f. System and Equipment Maintenance Procedures:

1) Routine operations.

2) Guide to "trouble-shooting"

3) Disassembly, repair and reassembly.

4) Alignment, adjusting and checking.

g. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

h. Spare Parts List: List of manufacturer's spare parts provided with the job, manufacturer's current prices for spare parts, and recommended quantities to be maintained in storage.

B. Project Record Documents: Provide Project Record Documents as required.

C. Spare Parts / Maintenance Materials:

(1) Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections prior to Final Acceptance.

(2) Deliver to Project site and place in location as directed by the Department of Water. Contractor shall obtain receipt.

D. Test Reports: Results of specified test requirements. Provide Table of Contents of test results and incorporate into Operation and Maintenance Manuals described above.

E. Warranty Certificates:

(1) For each item required by specific sections of this specification, provide a notarized warranty certificate.

(2) Execute and assemble documents from subcontractors, suppliers, and manufacturer.

(3) For each item of copyrighted software provide under this contract, provide a software license certificate naming the Department of Water as the licensee and stating the number of licenses provided.

(4) Provide Table of Contents of software licenses and incorporate into Operation and Maintenance Manuals described above.

1.18 CONTRACTOR'S OPERATIONS: The Contractor must employ, insofar as possible, such methods and means of carrying out his work so as not to cause any interruption or interference to the Department of Water's or the landowner's operations. Where the Contractor's operations would result in

interruptions which would hamper the operations, the Contractor shall coordinate his schedule of work with the Department of Water or the landowner, accordingly.

In the event that the Contractor obtains permission from the landowner for use of any area or resources outside of the designated lot(s), County Right-of-Way, State Highway's Right-of-Way, and/or designated easement(s), the Contractor shall meet the requirements of Division 300, Section 301.15 – USE AND/OR DAMAGE TO PRIVATE PROPERTY (PROPERTY OWNED OTHER THAN BY THE CONTRACTOR) of the Water System Standards, 2002.

END OF SECTION

SECTION SP-2 – WATER SYSTEM STANDARDS – OTHER ADDENDUMS AND AMENDMENTS

2.1 SECTION 211 BRASS PRODUCTS:

All waterworks brass fittings shall be in compliance with the amended Section 1417 of Safe Drinking Water Act (SDWA) which takes on January 4, 2014. The amendment includes a change to the definition of "Lead-Free" by reducing lead content from 8% to a weighted average of not more than 0.25% in the wetted surface material. All waterworks brass fittings installed for potable water service on January 4, 2014 and beyond shall conform to the amended definition of "Lead- Free".

As indicated in Section 211 of "Water System Standards," dated 2002 – Brass Products, all brass fittings shall conform to the NSF standard 61 and Section 1417 of the Safe Drinking Water Act (SDWA). In addition, all brass fittings shall conform to NSF standard 372.

***All service saddles used on the project shall be stainless steel. This specification shall supersede the approved construction drawing detail callouts. The following will be allowed on the project:**

Ford Meter Box Company, Inc (Stainless Steel Saddle-Double Band FS323)

Powerseal (3417AS – Double Strap)

Romac Industries (Style 306 Double Bolt)

2.2 SECTION 303 – STRUCTURES

The following shall supplement the applicable subsections of Division 300 – Construction of the "Water System Standards," dated 2002.

Make the following amendments to said section:

SECTION 303.03 – CONCRETE WORK:

Amend the entire paragraph "1. Cement" of the "B. Materials" subsection to read:

Cement shall conform to "Standard Specifications for Portland Cement" (ASTM C150) for Type II cement. Only one brand of cement from one manufacturing plant may be used.

The Contractor shall submit a certificate of a test with each lot of cement proposed for use on the project. The Manager may require additional testing of the cement as required.

Add the following paragraphs to paragraph "3. Concrete Aggregates" of the "B. Materials" subsection:

A. Aggregate shall not contain elongated particles in quantities considered deleterious. A thin, flat or elongated particle is defined as a particle having a maximum dimension in excess of five times its minimum dimension.
B. When crushed stone is used, the crusher shall be equipped with a screening system which will entirely separate dust from the stone and convey dust to a separate bin.

Add the following paragraphs to paragraph "4. Admixture" of the "B. Materials" subsection:

Use integral waterproofing admixture to concrete for bottom slab, walls and columns of Reservoir(s). The admixture shall be added at the plant and shall conform to ASTM C94 and be approved for use with potable water by the NSF. Admixture shall be "KIM" as manufactured by Kryton or other approved manufacturer. Dosage rate shall be as recommended by the manufacturer.

Add shrinkage reducing admixture to concrete for walls and floor slab of reservoir. Shrinkage dosage shall be such that it compensates for total shrinkage anticipated of concrete. Total shrinkage shall be based on historical or test data by ready mix concrete producer. Dosage shall be as determined by ready mix concrete producer to compensate for total shrinkage anticipated.

Amend the entire "Table 300-9 – CONCRETE CLASSES AND USES" of the "C. Proportioning Concrete Mix" subsection to read:

Table 300-9 – CONCRETE CLASSES AND USES

Class of Concrete	Min. 28-Day Compressive Strength (psi)	Min. Sacks per Cu. Yd. of Concrete	Max. Water, Gals per Sack of Concrete	Max. Size of Aggregate (in.)	Slump Range (in.)	Location Required In Project
DWS4000	4,000	7.0	--	3/4	3-5	Reservoir walls, columns, floor slabs (including jackets), roof slabs, and footings. Retaining wall footing, keys, and walls. Equipment Bldg., floor slab, thickened edge footings and roof slabs. Pump pads.
DWS4000M	4,000	7.0*	--	--	3-5	First 4-1/2 inch pour above construction joints of all reservoir walls. *One half the amount of coarse aggregate used in DWS4000 mix.
DWS2500	2,500	--	--	--	2-4	Manholes, catch basins, pipe jackets (not under reservoir), duct lines, pipe reaction blocks, curbs, gutters, drainage ditches, sidewalks, and head walls.

Amend the "P. Conveying, Placing and Handling" subsection such that wherever "DWS 3000M" is stated, it is replaced with "DWS4000M."

Amend the "Q. Construction and Expansion Joints" subsection as follows:

Delete paragraphs "3. Roof Sliding Joint" and "4. Waterstops."

SECTION 303.06 - REINFORCED CONCRETE RESERVOIR

Add the following paragraphs under paragraph "1. Construction and Expansion Joints" of the "C. Concrete Work" subsection:

Waterstops

A. Waterstops shall be of an approved type, supplied by an approved manufacturer and shall be plastic made of virgin polyvinylchloride compound, shall be ribbed, uniform in dimensions, dense, homogeneous, free from porosity, and as detailed on Drawings.

B. No reclaimed PVC shall be used in the compound.

C. Waterstop shall be held in place in the forms by use of split forms or other approved method that will positively hold the waterstop in the correct position and to the correct alignment. All horizontal and vertical waterstops, which are not accessible during the pouring, shall be tied off in two directions every 12 inches in such a manner that bending over one way or another is prevented. All waterstops shall be properly spliced and joints shall be checked for strength and pinholes after splicing. Splices shall be strong enough to develop a pulling force of 75 percent of the strength of the waterstop and shall be watertight. Connect the ends of the radial waterstop in the wall footing joints to the circumferential waterstop in the wall to wall footing joint and to the circumferential waterstops in the floor to wall footing joints if they should exist.

D. The finished waterstop material shall meet the following minimum requirements:

1.	Tensile strength	2,000 psi	ASTM D-412
2.	Ultimate elongation	350%	ASTM D-412
3.	Shore Hardness	70-80	ASTM D-2240
4.	Specific Gravity	1.3	ASTM D-792
5.	Stiffness in Flexure	600 psi	ASTM D-747
6.	Cold Brittleness	-35 degrees F	ASTM D-746
7.	Water Absorption	48 hours 0.32% max	ASTM D-570
8.	Tear Resistance	290 lb./in.	ASTM D-624

E. OMEGA PLASTICS, 2636 Byington-Solway Rd., Knoxville, TN 37921 (Phone 865-344- 0929) and SIKA GREENSTREAK, 3400 Tree Court Industrial Blvd., St. Louis, MO 63122 (Phone 800-325-9504) are two of several suppliers who can furnish waterstops meeting these requirements. Approved equal material may also be used.

The top surface reveal of construction joints in the floor of the reservoir shall be sealed with SIKAFLEX 2C POLYURETHANE ELASTOMERIC SEALANT, as manufactured by SIKA CORPORATION, 201 Polito Ave., Lyndhurst, NJ 07071 (Phone: 800-933-SIKA); PSI-270 RESERVOIR SEALANT, as manufactured by POLYMERIC SYSTEM INC., Phoenixville, PA (Phone: 610-935-1170); SELECT SEAL U-227 RESERVOIR GRADE, as manufactured by SPC, Upland, CA (Phone: 714-985-5571); or approved equal.

The interior surface of horizontal construction joint in the wall of the reservoir shall be sealed with CIM 1000 Trowel Grade, by C.I.M. Industries Inc., 23 Elm St., Peterborough, NH 03458 (Phone 800-543-3458) (Website www.cimindustries.com). The surface of the concrete shall be prepared, and the compound applied per manufacturer's recommendation.

Add the following paragraph to paragraph "4. Interior Perimeter Seal" of the "C. Concrete Work" subsection:

The sealing compound shall be CIM 1000, by C.I.M. Industries Inc., 23 Elm St., Peterborough, NH 03458 (Phone 800-543-3458) (Website www.cimindustries.com). The surface of the concrete shall be prepared, and the compound applied per manufacturer's recommendation.

Amend the entire paragraph "5. Roof Sliding Joint" of the "C. Concrete Work" subsection to read:

The roof sliding joint at the top of the reservoir wall shall be constructed as detailed on the plans. The Neoprene Bearing Pad shall be of the dimension and hardness shown on the Drawings and shall be made by an approved manufacturer. The material for 40 durometer neoprene pads shall conform to ASTM D-2000 M2BC414A14C12F17 and the material for 30 durometer pads shall conform to ASTM D-2000 M2BC310A14C12F17. Unless otherwise specified on the Drawings, neoprene pads shall be of 40 durometer. KIRKHILL RUBBER CO., 12023 Woodruff Ave., Downey CA 90241 (Phone: 562-803-1117) and WEST AMERICAN RUBBER COMPANY, LLC, 750 N. Main St., Orange, CA 92868 (Phone 877-229-2726) are two of several suppliers who can furnish neoprene pads meeting these requirements. Approved equal materials may be used.

Closed Cell Neoprene Pads shall be used as a filler material in flexible joints, in areas not taken up by the solid neoprene bearing pads. The material shall be medium grade closed cell neoprene conforming to 2A3 of ASTM D 1056-85 and as further specified herein and on the Drawings.

1.	Compressive Deflection	9 – 13 psi
2.	Shore 00 Durometer	60 – 80 PCF
3.	Density	12 – 28 PCF
4.	Water Absorption by Weight	5%
5.	Temperature Range:	
	Low (Flex without cracking)	-30 degrees F
	High Continuous	150 degrees F
	High Intermittent	200 degrees F
6.	Heat Aging (7 days at 150°F)	

	Lineal Shrinkage (max.)	5%
7.	Tensile Strength	115 psi min.
8.	Elongation	180% min.
9.	Resilience (bayshore % rebound average ½" thickness @ 72 degrees F)	20 – 40%

RUBATEX R413N or R423N, CYPRESS SPONGE 431N or 432N, or approved equal are acceptable material.

All Neoprene Bearing Pads and Closed Cell Neoprene Pads shall be glued to the concrete with an approved rubber cement material to prevent uplift of the pads during concrete pour.

Amend the entire paragraph "6. Surface Finish" of the "C. Concrete Work" subsection to read:

The exterior and interior wall and column surfaces shall be finished to show no unsightly defects, fins, and irregularities. All form tie holes shall be repaired flush with surface. All interior surfaces shall be made smooth by applying Sikaguard 75 to cover and patch air holes and other imperfections. All exterior surfaces shall have an architectural finish.

Revise the title of the "G. Payment" subsection to "I. Payment."

Add subsection "G. Earthquake Cables" as follows:

Earthquake cables used to connect the wall to wall footing/grade beam shall consist of 7 wire galvanized strands, meeting the minimum ultimate strength for 3/8-inch and ½-inch strands (as required on the Drawings) of 21,000 pounds and 38,200 pounds respectively. The strands shall be hot-dipped galvanized before stranding with a minimum zinc coating of 0.85 oz./square foot (sf).

The Closed Cell Neoprene sleeves for the seismic cables shall conform to the minimum dimensions shown on the Drawings to permit unrestrained flexing of the strands inside the sleeves under the maximum projected radial wall movement. The Closed Cell Neoprene sleeves shall have the following properties:

1.	Material shall be medium grade conforming to 2A3 of ASTM D 1056-85.	
2.	Compressive Deflection:	9 – 13 psi
3.	Shore 00 Durometer:	60 – 80 PCF
4.	Density:	12 – 28 PCF
5.	Water Absorption by Weight:	5%
6.	Temperature Range:	
	Low (flex without cracking):	-30 degrees F
	High continuous:	150 degrees F
	High intermittent:	200 degrees F
7.	Heat aging (7 days at 150°F)	
	Lineal Shrinkage (max.):	5%

8. Tensile Strength: 115 psi min.
9. Elongation: 180% min.
10. Resilience (bayshore % rebound average ½" thickness @ 72 degrees F): 20 – 40%
11. "MONARCH" by ARMACELL, CYPRESS SPONGE 431N or 432N, or approved equal are acceptable material.

Add subsection "H. Lateral Restraints, Roof to Wall" as follows:

Extra Strong pipe shall conform to ASTM A53 Grade B or ASTM A500 Grade A. Rod shall conform to ASTM A307. Hot-dipped galvanizing shall conform to ASTM A123-78.

SECTION 303.22 – MISCELLANEOUS IRON AND METAL WORK

Add the following to E. Aluminum:

Aluminum frame and insect screen shall be custom designed and fabricated by contractor. The insect screen shall be SWG (standard wire gage) 32 with mesh spacing at 14x14.

SECTION 303.33 – CHAIN LINK FENCE AND GATE

Amend the last paragraph of "C. Installation" to read:

For Kaua'i Only: The contractor shall furnish padlocks for all gates, hatches, ladder guards and hasps. Locks shall be CyberLock Model PL-02 Electronic Padlock. CyberLock is a Wilson Bohannan padlock with 2" x 3/8" shackle and CyberLock weather-resistant 6-pin Schlage format cylinder. The Contractor shall turn over the locks to the Department of Water for programming. No substitutes will be accepted.

2.3 LOCK QUANTITIES:

Location	Number of Padlocks
Kīlauea 466' Tank	12 padlocks

END OF SECTION

SECTION SP-3 – PERMITS

3.1 GENERAL: This item of work shall include the furnishing of all labor, materials, tools, and equipment necessary for obtaining and compliance with required permits.

The Contractor shall pay all charges, fees, and taxes; give all notices; and comply with all laws, ordinances, rules and regulations related to the permits. All fees provided in this Section are estimates and are not meant to identify all of the permits needed for this project. Contractor is responsible to pay permit fees.

The Contractor must comply with and fulfill the conditions set forth in the permits. Any modifications or amendments to permits by the Contractor shall be done at the Contractor's expense.

The Contractor shall make no claims for compensation due to delays or requirements imposed in obtaining permits and complying with permits. Notice to Proceed will not be delayed due to Contractor's inability to obtain permits.

Violation citations for noncompliance shall be the responsibility of the Contractor. The Contractor shall pay all fines and hold harmless the Department of Water.

3.2 BUILDING PERMIT:

3.2.1. GENERAL: The Contractor is responsible to obtain the Building Permits and payment of applicable fees. The Contractor shall develop the project schedule and include the processing of Building Permits.

The Department of Water has obtained approval for the Building Permits listed below. Should any permit lapse or expire, the Contractor is responsible to have the permit re-processed.

3.2.2. PROCEDURES:

3.2.2.1. Applications for Building Permits require a Review Fee. The Review Fee is based on 15% of the Building Permit Fee. The application will be reviewed by the appropriate departments and agencies. Once the comments have been addressed, the approved permit will be approved.

3.2.2.2. Once the Building Permit is ready to be issued, the applicant has one year to have the permit issued.

3.2.2.2.1. Once permit is issued, the first inspection must occur within 180 days. Otherwise, the permit will lapse. If the permit lapses, the Renewal Fee must be paid, and the drawings will be re-processed for approval.

3.2.2.2.2. If permit is not issued, approval for the building permit expires. The Review Fee must be paid again, and the application is re-processed for approval.

3.2.2.2.3. One Department of Public Works inspector will be assigned to each

parcel. The same inspector will conduct the inspections for all the building permits for that parcel. The initial inspection will satisfy the initial inspection requirement for all the building permits applicable to that parcel.

3.2.2.3. Summary of Building Permit procedures:

Building Permit (BP) Requirements			
Fees			
Building Permit Fee	Based on Valuation		
Review Fee	15% of BP Fee		
Renew Permit Fee	50% of BP Fee		
Timeline	Requirement	For Non-compliance	Action Required
During BP Review Process	180 days to respond to comments	BP becomes dormant	Pay Review Fee to reactivate process
BP Approved	One year to issue permit	BP not issued, Approval Expires	Pay Review Fee to reactivate BP review
BP Issued	180 days to request inspection	Permit Expires	Pay Renew Permit Fee

3.2.3. FEES: A summary of the Building Permit information and estimated Building Permit Fees and Fire Fees are shown below. Please see 21.3 for discussion of Fire Fees.

Fees									
			Building Permit			Fire Fees		Other Fees	
Building Permit (BP) Number	Desc.	App. Date	Permit Fee	Review Fee (15% of BP Fee)	Renewal Fee (50% of BP Fee)	Fire Fee	Fire Fee Review/ Renewal Fee	Fee	Review/ Renewal Fee
BP19-00000091	Tank A	1/16/19	$9,204	$1,381	$4,602	$1,105	$133	$37	$6
BP19-00000052	Tank B	1/9/19	$9,204	$1,381	$4,602	$1,105	$133	-	-

3.2.4. PAYMENT: Payment for Building Permits and Fire Fees shall not be made separately; the compensation shall be considered incidental to the Total Sum Offer of which it is a part.

3.3. FIRE FEES AND OTHER BUILDING PERMIT-RELATED FEES

3.3.1 GENERAL: The Contractor is responsible to pay for Fire Fees and Other Building Permit-Related Fees required for this project. Fire fees and other building permit-related fees are assessed during the building permit process. No additional application is required.

3.3.2 FEES: The estimated Fire Fees and Other Building Permit-Related Fees are shown in 3.2.3 with the Building Permit fees.

3.3.3 PAYMENT: Payment for Fire Fees and Other Building Permit-Related Fees shall not be made separately; the compensation shall be considered incidental to the Total Sum Offer of which it is a part.

3.4. NOISE PERMIT:

3.4.1. GENERAL: The Contractor is responsible for obtaining Noise Permit and Variance, as necessary, and payment of applicable fees.

3.4.2. REGULATIONS: The Contractor shall be familiar with and meet the latest requirements of Title 11, Chapter 46, Community Noise Control, Hawai'i Administrative Rules.

3.4.3. PROCEDURES:

3.4.3.1. If necessary, the Contractor shall apply for Noise Permits and comply with Noise Permit application requirements.

3.4.3.2. If necessary, the Contractor shall apply for Noise Variances and comply with Noise Variance application requirements.

3.4.4. FEES:

3.4.4.1. Each Noise Permit is subject to a $50 annual fee. Extensions and Renewals are subject to applicable annual fees.

3.4.4.2. The fee for a variance or renewal of a variance is $100 per year and all costs associated with public participation requirements. Public participation may include, but is not limited to, public notices, circulation of public notices, and public hearing. The Director may establish other fees.

3.4.5. PAYMENT: Payment for Noise Permits and Variance shall not be made separately; the compensation shall be considered incidental to the Total Sum Offer of which it is a part.

END OF SECTION

SECTION SP-4 – NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

4.1. HYDROTESTING EFFLUENT DISCHARGE:

4.1.1. General Provisions: This item of work shall include the furnishing of all labor, materials, tools, and equipment necessary for construction water disposal.

4.1.2. Regulations:

4.1.2.1. The Contractor shall be familiar with and meet the latest requirements of all applicable National Pollutant Discharge Elimination System (NPDES), State Department of Health (DOH), State Department of Transportation (DOT) laws, ordinances, rules, regulations and permits. Effluent discharge into State receiving waters shall not be made without approved permits. Discharge activities shall include, but shall not be limited to, effluent associated with pipeline hydro testing/chlorination operations.

4.1.2.2. The Contractor shall obtain all permits and licenses, pay all charges, fees, and taxes, give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified in the contract documents.

4.1.3. Procedures:

4.1.3.1. The Department of Water has obtained coverage under the National Pollutant Discharge Elimination System General Permit for discharges of hydrotesting waters (NPDES File No. HI25FH955). The Contractor shall review the Permit and file all necessary information, including but not limited to: Operator or General Contractor information and Drainage System Owner's Approval to Discharge with the State DOH at least 30 calendar days prior to the start of any construction activities. The Contractor shall submit a copy of the information filed with the State DOH to the Department of Water at least 30 calendar days prior to the start of any construction activities. Should additional NPDES coverage and permits be required, the Contractor shall prepare the required documents and obtain additional approvals, as necessary.

4.1.3.2. The Contractor shall notify DOH of the construction start date at least 7 calendar days prior to the start of any construction activities.

4.1.3.3. The Contractor is expected to comply with the conditions set forth in the permit. Any modifications or amendments to the permit by the Contractor shall be done at the Contractor's expense and no time extension will be granted. The Contractor shall submit all modifications or amendments to the Department of Water for review and approval.

4.1.3.4. The Contractor shall make no claims for compensation due to delays or requirements imposed in obtaining an approved NPDES permit. Notice to Proceed will not be delayed due to Contractor's inability to obtain an approved NPDES permit.

4.1.3.5. As required for the discharge of effluent, the Contractor shall also secure all other applicable State and County discharge and connection permits and pay all applicable fees. The Contractor shall fulfill all conditions of the NPDES Permit and all other permits when issued. A copy of all approved permits, when issued, shall be provided to the Department of Water for information only.

4.1.3.6. The Contractor shall be responsible for monitoring, collecting samples, and having samples analyzed by a qualified laboratory and shall submit a monthly discharge monitoring report to DOH. All costs shall be borne by the Contractor.

4.1.3.7. If the DOH is not completely satisfied with the Contractor's BMP plan or the discharge quality, the Contractor shall perform corrective work at his own expense.

4.1.3.8. Upon completion of the project, the Contractor shall submit the Notice of Cessation (CWB-NOC) form within 14 calendar days to the DOH and a copy of the submitted form to the Department of Water for information only.

4.1.4. Completion of Discharge Activities: At the conclusion of the discharge operations, the Contractor shall furnish the DOW with a signed affidavit indicating the date, location, volume, and treatment, if any, of all discharges. The location of storm drains, bodies of water, sewer manholes, and dry gulches shall be shown in relation to the discharge location.

4.1.5. Violations: Violation citations for non-compliance shall be the responsibility of the Contractor. The Contractor shall pay all fines and hold harmless the Department of Water.

4.1.6. Payment: Payment for the work described herein shall not be made directly but shall be considered incidental to the various items of the Offer and no additional compensation shall be made.

4.2. STORM WATER DISCHARGE:

4.2.1. General Description: This item of work shall include the furnishing of all labor, materials, tools, and equipment necessary for compliance with State of Hawai‘i Department of Health regulations for discharges composed of storm water runoff associated with construction activity.

4.2.2. Regulations:

4.2.2.1. The Contractor shall be familiar with and meet the latest requirements of all applicable National Pollutant Discharge Elimination System (NPDES), State Department of Health (DOH), State Department of Transportation (DOT), and the Kaua‘i County Department of Public Works (DPW) law, ordinances, rules, regulations and permits.

4.2.2.2. The Contractor shall obtain all permits and licenses, pay all charges, fees, and taxes, give all notices and comply with all laws, ordinances, rules and

regulations bearing on the conduct of the work as drawn and specified in the contract documents.

4.2.3. Procedures:

4.2.3.1. The Department of Water has obtained coverage under the National Pollutant Discharge Elimination System General Permit for discharges of storm water associated with construction activities (NPDES File No. HIR10H962). The Contractor shall review the Permit and file all necessary information, including but not limited to:

Operator or General Contractor information, Drainage System Owner's Approval to Discharge, County-Approved Erosion Control Plan and/or Grading Permit, and updated SWPPP with the State DOH at least calendar 30 days prior to the start of any construction activities. The Contractor shall submit a copy of the information filed with the State DOH to the Department of Water at least 30 calendar days prior to the start of any construction activities. Should additional NPDES coverage and permits be required, the Contractor shall prepare the required documents and obtain additional approvals, as necessary.

4.2.3.2. The Contractor shall notify DOH of the construction start date at least 7 calendar days prior to the start of any construction activities.

4.2.3.3. The Contractor is expected to comply with the conditions set forth in the permit. Any modifications or amendments to the permit by the Contractor shall be done at the Contractor's expense and no time extension will be granted. The Department of Water shall approve all modifications or amendments.

4.2.3.4. The Contractor shall make no claims for compensation due to delays or requirements imposed in obtaining an approved NPDES permit. Notice to Proceed will not be delayed due to Contractor's inability to attain an approved NPDES permit.

4.2.3.5. As required for the discharge of effluent, the Contractor shall also secure all other applicable State and County discharge and connection permits and pay all applicable fees. The Contractor shall fulfill all conditions of the Notice of General Permit Coverage and all other permits when issued. A copy of all approved permits, when issued, shall be provided to the Department of Water for information only.

4.2.3.6. The Contractor shall be responsible for monitoring, collecting samples, and having samples analyzed by a qualified laboratory and submit the analysis report to DOH. All costs shall be borne by the Contractor.

4.2.3.7. If the DOH is not completely satisfied with the Contractor's BMP plan or the discharge quality, the Contractor shall perform corrective work at their own expense.

4.2.3.8. Upon completion of the project, the Contractor shall submit the Notice of Cessation (CWB-NOC) form to the DOH and a copy of the submitted form to the DOW for information only.

4.2.4. Violations: Violation citations for non-compliance shall be the responsibility of the Contractor. The Contractor shall pay all fines and hold harmless the Department of Water.

4.2.5. Payment: Payment for the work described herein shall not be made directly but shall be considered incidental to the various items of the Offer and no additional compensation shall be made.

END OF SECTION

SP-5- GEOTECHNICAL REQUIREMENTS AND MONITORING

5.01 GENERAL:

This section covers requirements for geotechnical monitoring work to be performed during construction of any earthwork required to construct the Project. This item of work consists of furnishing of labor, tools, equipment, and materials necessary to complete the geotechnical monitoring. Contractor shall be responsible for coordinating all phases of the project with the DOW Engineer.

5.02 GEOTECHNICAL ENGINEERING:

Foundation design is based on the geotechnical engineering report prepared by Hirata & Associates, Inc., titled "Foundation Investigation, 1.0 MG Water Tank, Kilauea, Kauai, Hawaii, TMK: 5-1-005: 131" dated March 19, 2012. A copy of the report is included in Appendix L. The Contractor shall retain the services of a licensed geotechnical engineer to certify that the ground soil conditions, including the compaction of the subgrade material, are acceptable and have met the requirements of the geotechnical report. A written confirmation of the above shall be submitted by the geotechnical engineer retained by the Contractor prior to any installation of reinforcement steel. A representative of the Geotechnical Engineer shall be present at the site to observe and inspect the reservoir grading, pipelines along roadway, probing work, and foundation preparation and to take density tests.

5.03 OBSERVATION AND TESTING:

The earthwork shall be observed by a licensed geotechnical engineer in the State of Hawai‘i during construction to determine whether anticipated materials are encountered. Field density tests in backfills shall be taken and analyzed by the Geotechnical Engineer to determine whether the specified levels of compaction are consistently obtained.

The foundation excavation for the walls shall be observed by the Geotechnical Engineer during construction to determine whether anticipated materials are encountered.

The Geotechnical Engineer's representative shall be on-site at **ALL** times where and when backfill occurs within the project site to assure quality of backfill, proper compaction, and appurtenances as required by the various sections of the associated Invitation for Bids documents.

5.04 PAYMENT:

Payment for GEOTECHNICAL REQUIREMENTS AND MONITORING shall not be made directly; compensation shall be considered incidental to the various items of the Offer for which it is a part of.

END OF SECTION

SECTION SP-6 – MOBILIZATION AND DEMOBILIATION

The following shall also be made part of the project.

Mobilization shall consist of the transporting, assembling, constructing, installing and making ready for use at the site, all equipment, machinery, structures, utilities and incidentals necessary to do the work covered by this contract. Demobilization shall consist of the dismantling and removal from the project site all of the above-mentioned equipment, machinery, structures, utilities, and incidentals not incorporated in or a necessary part for the completed work and the cleanup of the site to the satisfaction of the Engineer.

The Contractor shall be completely mobilized at the site and shall begin his operations within thirty (30) calendar days after he has been notified, in writing, to proceed under this contract. Any provisions in the Standard Specifications to the contrary are hereby deleted.

When the project is completed, the Contractor shall clean up the site and shall be responsible for all grading work required leaving the site in a neat and orderly condition to the satisfaction of the Engineer. Payment for cleanup work will not be paid for separately but shall be included in the Lump Sum Bid for Mobilization and Demobilization as listed in the Offer, subject, however, to all provisions specified herein above. Also, demobilization shall include planting grass seed or hydro-mulching all disturbed areas if so ordered by the Engineer.

Payment for mobilization shall be made at the Lump Sum Bid for Mobilization and Demobilization as listed in the Offer and shall not exceed 6% of the total bid. The cost of demobilization shall be considered incidental to cost of mobilization.

END OF SECTION

SECTION SP-7 – PIPING AND FITTINGS

DUCTILE IRON PIPE AND FITTINGS:

7.1. GENERAL: The Contractor shall furnish and install ductile iron (DI) pipe in accordance with "Water System Standards," State of Hawai'i, dated 2002, as amended. DI pipe shall meet the requirements of Section 202.01 – General. Fittings for DI pipe shall be DI mechanical joint fittings meeting the requirements of Section 202.01.A – Fittings, unless specifically stated otherwise in the plans. Installation shall be in accordance with the "Water System Standards."

7.2. SUBMITTALS: The Contractor shall submit shop drawings and manufacturer's data on DI pipe, joints, fittings and geotextile fabric certifying that the product provided meets the specified item.

Prior to excavation, the Contractor shall provide a submittal that certifies that the pipe cushion material meets the requirements below. On-site sand must be tested by a licensed geotechnical engineer and test results submitted to the Department of Water Engineer for approval.

7.3. TRENCH EXCAVATION AND BACKFILL: Trench excavation and backfill shall meet the requirements of "Water System Standards" Section 302 – Water Mains and Appurtenances; Section 302.02 – Trench Excavation; Section 302.03 – Trench Backfill; Section 302.04 – Sheathing; Section 302.05 – Dewatering; Section 302.06 – Adobe or Clay; Section 302.07 – Mud Removal and Crushed Rock Stabilization; Section 302.09 – Excavation for Manholes; Section 302.10 – Excavation for Thrust Blocks, Beams and Test Blocks; and Section 302.11 – Surplus Excavation.

Pipe cushion material shall meet the requirements of "Water System Standards" Section 209.02 – Pipe Cushion. Pipe cushion material shall be free from hard lumps, debris, salt, hazardous substances above its corresponding regulatory action level, and other deleterious substances.

When groundwater is encountered, pipe cushion material shall be wrapped in a non-woven geotextile fabric as indicated on the drawings and as specified in Section 212.05 – Geotextile Fabrics. However, if groundwater is encountered within the State Highways right-of-way, pipe cushion material shall conform to ASTM C33, size number 67, and shall be completely encapsulated with geotextile conforming to Section 716.03 – Geotextiles for Underdrain Applications as specified in "Hawai'i Standard Specifications for Road and Bridge Construction," State of Hawai'i, dated 2005.

7.4. INSTALLATION: DI pipe installation shall meet the requirements of "Water System Standards" Section 302 – Water Mains and Appurtenances. Additionally, for pipe installation within State Highways right-of-way, pipe installation shall also adhere to the requirements of "Hawai'i Standard Specifications for Road and Bridge Construction," State of Hawai'i, dated 2005, Section 624 – Water System and Section 703.21 – Trench Backfill Material.

The Contractor shall retain the services of a licensed geotechnical engineer in the State of Hawai'i to monitor the quality of pipe cushion material and installation and compaction of the pipe cushion and trench backfill. The Department of Water will require periodic sieve testing of the pipe cushion material during the course of construction. Results of the geotechnical engineer's tests shall be provided to the Department of Water within seven (7) calendar days of sampling. The Contractor shall be responsible for all associated costs for the licensed geotechnical engineer, sieve analysis, and testing.

All exposed DI pipe, valves, and fittings shall be coated as specified in "Water System Standards," unless otherwise indicated in the Special Provision or as directed by the Department of Water Engineer. Color shall be Kaua'i Green.

REINFORCED CONCRETE PIPE:

7.5. GENERAL: The Contractor shall furnish and install reinforced concrete pipe (RCP) for drainage systems **within the Department's property** in accordance with "Water System Standards," State of Hawai'i, dated 2002, as amended. RCP shall meet the requirements of Section 303.31 – Drainage System. Installation shall be in accordance with "Water System Standards." Diameter shall be as indicated on the plans.

7.6. SUBMITTALS: The Contractor shall submit shop drawings and manufacturer's data on RCP certifying that the product provided meets the specified item.

Prior to excavation, the Contractor shall provide a submittal that certifies that the pipe cushion material meets the requirements below. On-site sand must be tested by a licensed geotechnical engineer and test results submitted to the Department of Water Engineer for approval.

7.7. TRENCH EXCAVATION AND BACKFILL: Trench excavation and backfill shall meet the requirements of "Water System Standards" Section 302 – Water Mains and Appurtenances; Section 302.02 – Trench Excavation; Section 302.03 – Trench Backfill; Section 302.04 – Sheathing; Section 302.05 – Dewatering; Section 302.06 – Adobe or Clay; Section 302.07 – Mud Removal and Crushed Rock Stabilization; Section 302.09 – Excavation for Manholes; and Section 302.11 – Surplus Excavation.

Pipe cushion material shall meet the requirements of "Water System Standards" Section 209.02 – Pipe Cushion. Pipe cushion material shall be free from hard lumps, debris, salt, hazardous substances above its corresponding regulatory action level, and other deleterious substances.

When groundwater is encountered, pipe cushion material shall be wrapped in a non-woven geotextile fabric as indicated on the drawings and as specified in Section 212.05 – Geotextile Fabrics. However, if groundwater is encountered within the State Highways right-of-way, pipe cushion material shall conform to ASTM C33, size number 67, and shall be completely encapsulated with geotextile conforming to Section 716.03 – Geotextiles for Underdrain Applications as specified in "Hawai'i Standard Specifications for Road and Bridge Construction," State of Hawai'i, dated 2005.

7.8. INSTALLATION: RCP installation shall meet the requirements of "Water System Standards" Section 303.31 – Drainage System. Additionally, for pipe installation within State Highways right-of-way, pipe installation shall also adhere to the requirements of "Hawai'i Standard Specifications for Road and Bridge Construction," State of Hawai'i, dated 2005, Section 603 – Culverts and Storm Drains and Section 703.21 – Trench Backfill Material.

The Contractor shall retain the services of a licensed geotechnical engineer in the State of Hawai'i to monitor the quality of pipe cushion material and installation and compaction of the pipe cushion and trench backfill. The Department of Water will require periodic sieve testing of the pipe cushion material during the course of construction. Results of the geotechnical engineer's tests shall be provided to the Department of Water within seven (7) calendar days of sampling. The Contractor shall be responsible for all associated costs for the licensed geotechnical engineer, sieve analysis, and testing.

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS:

7.9. GENERAL: The Contractor shall furnish and install PVC pipe in accordance with "Water System Standards, State of Hawai'i, dated 2002". PVC pipe shall meet the requirements of Section 204.01. Fittings for PVC pipe shall be per Section 204.01.D.2. Installation shall be in accordance with the Water System Standards.

Perforated PVC pipe shall conform to the 2002 Water System Standards, amendments to the 2002 Water System Standards for Perimeter Drains. Pipe should be Schedule 40, perforated with two rows of 1/2" diameter holes every five inches. Rows are parallel to the pipe axis and are 120 degrees apart.

7.10. SUBMITTALS: The Contractor shall submit manufacturer's data on PVC pipe, joints, fittings and fusion equipment certifying that the product provided meets the specified item.

7.11. INSTALLATION: PVC pipe installation shall be laid to the line and grade shown on the construction plans and shall be installed in accordance with these specifications, the pipe manufacturer's instructions, and as directed by the Department of Water. Any pipe which has been installed and proven defective shall be removed and replaced by the Contractor at no additional cost to the Department of Water. During and after installation, the pipe shall not be bent more than the minimum radius indicated per manufacturer's recommendations.

HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS:

7.12. GENERAL: The Contractor shall furnish and install High Density Polyethylene (HDPE) pressure pipe in accordance with "Water System Standards, State of Hawai'i, dated 2002". Fittings for HDPE pipe shall be molded type and joined by butt fusion. Installation shall be in accordance with the Water System Standards.

7.13. SUBMITTALS: The Contractor shall submit manufacturer's data on HDPE pipe, joints, fittings and fusion equipment certifying that the product provided meets the specified item.

7.14. INSTALLATION: HDPE pipe installation shall be laid to the line and grade shown on the construction plans and shall be installed in accordance with these specifications, the pipe manufacturer's instructions, and as directed by the Department of Water. Any pipe which has been installed and proven defective shall be removed and replaced by the Contractor at no additional cost to the Department of Water. During and after installation, the pipe shall not be bent more than the minimum radius indicated per manufacturer's recommendations.

FLANGED COUPLING ADAPTERS:

7.15. GENERAL: The Contractor shall furnish and install flanged coupling adapters in accordance with "Water System Standards," State of Hawai'i, dated 2002, as amended. Flanged coupling adapters shall be Dresser or DOW approved equal. Model number and size shall be as indicated on the plans. Followers and middle rings shall be ductile iron conforming to ASTM A536. Coating shall be fusion-bonded powder epoxy conforming to NSF International Standard 61; color shall be Kaua'i Green.

7.16. SUBMITTALS: The Contractor shall submit shop drawings and manufacturer's data on flanged coupling adapters certifying that the product provided meets the specified item.

7.17. INSTALLATION: Flanged coupling adapters shall be installed in accordance with the manufacturer's recommendations, applicable code requirements, and "Water System Standards."

7.18. PAYMENT: Payment for the furnishing and installation of the various sizes of flanged coupling adapters shall not be made directly but shall be part of the respective Unit Price of other Proposal items.

END OF SECTION

SECTION SP-08 – MECHANICAL

The following shall supplement the applicable mechanical subsections of Division 300 - Construction of the "Water System Standards," State of Hawai'i, dated 2002, as amended.

8.1. DESCRIPTION: This work shall consist of furnishing and installing the tank level transmitters, piping, valves, and appurtenances in accordance with the Special Provision, "Water System Standards," State of Hawai'i, dated 2002, as amended, and the details shown on the construction drawings.

8.2. SUBMITTALS: Submit shop drawings and technical data sheet(s) on each product listed below. The Contractor shall submit proof of certification that the valves, valve coatings, and flanged coupling adapters are registered as conforming to the standards of NSF/ANSI Standard 61 Annex G, or the combined standards of both NSF-61 and NSF-372. Proof of certification must include identifier text and certification marks as required by the EPA showing that the specific model being provided is certified to meeting the standard of NSF-61 Annex G, or the combined standards of both NSF-61 and NSF-372. The certification must also indicate the specific test conditions for which the certification is applicable. Certification will only be accepted from the following eight (8) American National Standards Institute (ANSI) accredited third-party certification bodies: NSF International, UL, IAPMO R&T Inc., ICC-ES, Intertek, Truesdail, WQA, or CSA Group.

8.3. MATERIALS:

8.3.1. Copper pipe and fittings: Copper pipe and fittings shall be in accordance with the Water System Standards except fittings shall be wrought copper or lead free bronze.

8.3.2. Ball corps shall be in accordance with the Water System Standards except all surfaces in contact with potable water shall be certified lead free in accordance with the Reduction of Lead in Water Act.

8.3.3. Service saddles, straps, nuts, and washers shall be stainless steel.

8.3.4. Brass pipe, fittings and couplings shall be lead free.

8.3.5. Pressure Transmitter. Pressure transmitter for reservoir level indication shall be Rosemount Model 3051C or an approved equivalent. The transmitter shall transmit a 4 to 20 milliamp DC signal proportional to pressure. Transmitter shall have a maximum span of 0 to 400" H_2O. The input supply voltage shall be 24 VDC.

Transmitter shall be provided with:

-1/4" NPT connection
-Monel side vents and drains
-RFI protection
-Voltage protection
-Voltage surge (lightning) protection
-Monel barrier diaphragms and process head
-Teflon head gasket

-SS meter body bolts and mounting bracket
-Silicone fluid filled
-Epoxy finish
-3000 psi body rating
-NEMA 4X housing
-Integral digital display
-NSF 61 Certification

8.3.6. Transmitter Support: Schedule 40 2" diameter steel pipe with threaded cap and ½ inch baseplate anchored to concrete footing. Hot dipped galvanized after fabrication.

8.3.7. Ductile Iron Pipe and Fittings: See Water System Standards 2002 as amended.

8.3.8. Gate Valves: See Water System Standards 2002 as amended.

8.3.9. Schedule 80 PVC Pipe and Fittings: PVC pipe and fittings shall be Schedule 80. PVC material shall conform to ASTM D1784. Schedule 80 PVC socket fittings shall conform to ASTM D2467. PVC solvent weld cement for socket connections shall meet the requirements of ASTM D2564. Schedule 80 PVC threaded fittings shall conform to ASTM D2464. PVC pipe and fittings shall be coated for UV protection with coating system recommended by the pipe manufacturer.

8.4 INSTALLATION:

The pressure transmitter shall be installed in accordance with the manufacturer's recommendations and instructions. A factory-trained representative shall be present at the site for start-up service, inspection and necessary adjustments. The Contractor shall be responsible for the additional costs for the services of the factory representative.

8.5 TESTING OF EQUIPMENT:

After installation of all equipment, a complete operating test of all valves and equipment shall be performed, and each item of equipment shall be demonstrated to be in proper operating condition.

The manufacturer's representative shall commission all equipment on-site and provide training to DOW personnel if requested.

8.6 WARRANTY:

Written manufacturer's warranties which guarantee against faulty parts and operation shall be provided for all equipment and materials covered in these specifications. All warranties shall extend for a period of 12 months after final acceptance of this work.

8.7 EQUIPMENT MANUALS AND SPARE PARTS:

Equipment manuals shall be submitted for applicable items to the Engineer for approval.

Contractor shall provide spare parts as normally recommended by the equipment manufacturer.

END OF SECTION

SECTION SP-9 – ALUMINUM METAL STAIRS

9.1 GENERAL:

A. DESCRIPTION: This section covers the work necessary to complete the industrial type aluminum stair structural framing, grating treads, including security enclosure, in place complete as shown on the drawings, as specified herein, and as needed for a properly functioning installation.

B. SUBMITTALS: Submit shop drawings, including:

(1) Manufacturer's product data, including properties, installation instructions and limitations to prove compliance with the specified requirements.

(2) Fabrication shop drawings indicating member sizes, assembly, connection details, fasteners, layout, installation, anchorage, and interface of the work of this section with the work of adjacent trades.

(3) Submit complete and detailed list of materials proposed for security fencing, including connection hardware, their installation instructions and certification that the proposed products meet the project requirements.

(4) Samples: Submit samples of security fencing mesh with powder coating finish demonstrating the color, texture and appearance of the mesh proposed to be provided for approval by DOW before ordering materials. Submit as many samples as required to secure approval from the DOW. Colors shall be as scheduled hereinafter.

9.2 QUALITY ASSURANCE:

A. Comply with OSHA and local building codes.

B. Bar Grating Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with no less than three years of experience.

C. The fencing manufacturer shall provide certification that the company has been manufacturing the proposed product for at least the last five (5) years.

D. Fencing manufacturer’s representative shall be available to be on-site during the installation of the fencing to answer questions or provide installation guidance for atypical site conditions in accordance with the manufacturer’s directions and in no way negate the manufacturer’s warranty.

E. Comply with recommendations of AWS, Structural Welding Code on Aluminum, D1.2 latest edition.

F. Stair shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

(1) Uniform Load: 100 pounds per square foot

(2) Concentrated Load: 300 pounds applied on an area of 4 square inches at any location on a stair tread.

(3) Uniform and concentrated loads need not be assumed to act concurrently.

(4) Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.

(5) Limit deflection of treads, platforms, and framing members to L/360 or ¼-inch, whichever is less.

G. Railing shall withstand the effect of gravity loads and the following loads and stresses within limits and under conditions indicated:

(1) Uniform Load: 50 pounds per linear foot, applied in any direction.

(2) Concentrated Load: 200 pounds, applied in any direction.

(3) Uniform and concentrated loads need not be assumed to act concurrently

9.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials to job site properly marked to identify the structure for which they are intended and at such intervals to ensure uninterrupted progress of the work. Markings shall correspond to markings indicated on the shop drawings.

B. Store all members and materials off the ground using pallets, platforms, or other supports, but does not result in twisting or distorting the members.

C. Do not store materials on the structure in a manner that might cause distortion or damage to the members of the supporting structure.

9.4 GENERAL REQUIREMENTS

A. Fit and shop assemble stair in the largest practical sections for delivery to the job site.

B. Miter the stringers at changes in direction with joints tightly fitted and secured by continuous welds and grind with #3 NOMMA Finish. Make exposed joints butt tight. Ease exposed edges to a small uniform radius.

C. Close and fit the ends of stringers at the landing surface. Position stringer to locate the top stair tread at the same rise height from the finished landing surface as the tread-to-tread rise height on the stair.

9.5 MATERIALS

A. Aluminum

(1) Plate: Alloy 6061-T6, Mill Finish, Heat Treatable.

(2) Structural Shapes: Alloy 6061-T6, ASTM B 308

(3) Sheet Aluminum: ASTM B209 (ASTM B209M), Alloy 5052, H32 or H22 Temper.

(4) Round Pipe: Alloy 6061-T6, ASTM B429

(5) Square Tubing: Alloy 6063-T52, Extruded

(6) Rectangular Tubing: Alloy 6063-T52, Extruded

(7) Aluminum- Alloy Bars: ASTM B211 (ASTM B211M), Alloy 6061-T6

B. Bar Grating- Aluminum

(1) Material: ASTM B 211, Alloy 6061-T6 or 6063-T6

(2) Construction Type: Swage-Locked , Standard Rectangular Bar, bearing bars shall be spaced 1-3/16-inches on center and cross bars shall be spaced at 4-inches on center. Cross bars shall be flush at top with bearing bars.

(3) Surface: Serrated

(4) All Grating edges shall be banded.

(5) Unless noted other, all bar grating landings shall not be welded to supports, provided saddle clips as required for attachment. Limit weight of each grating section to no more that 50-pounds.

C. Fasteners-Stair: Stainless Steel Bolts, Nuts, Washers and Anchors: 316 Stainless Steel.

D. Aluminum Bar Grating Stair Treads: Provide standard prefabricated aluminum grating treads and aluminum nosings with extruded re-enforced profile with non-slip ribs. Mechanically fasten grating treads with aluminum bearing angle to stringers.

E. Aluminum Pipe Handrail – See Section 5.3.10 for material requirements.

F. Fasteners- Guardrail: Alloy steel fasteners with JS-600 zinc plating.

9.6 ALUMINUM FINSIHES

A. Grind weld joints smooth with adjacent finish surface.

B. Coat aluminum in contact with dissimilar metals, concrete or mortar products with one-coat of bituminous paint.

9.7 STAIR FRAMING INSTALLATION

A. Install metal stair treads in accordance with the manufacturer's recommendations and approved shop drawings.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Securely bolt or anchors, plates, angles, hangers, and struts required for connecting stairs to reservoir.

D. Provide welded field joints where specifically indicated on shop drawings. Perform field welding in accordance with the appropriate AWS Specification.

E. Obtain approval prior to site cutting or creating adjustments not scheduled.

9.8 STAIR HANDRAILING INSTALLATION

A. Rail components used shall be as recommended by manufacturer for stair handrail application.

B. Rail posts shall be secured to the top of the stair stringer member with base component specifically designed for stair handrails.

C. Provide termination of handrail in compliance with OSHA requirements for industrial stair application.

9.9 EXPANDED METAL SECURITY FENCING

A. General: This item of work shall include the furnishing of labor, materials and appurtenances, tools, and equipment necessary for completing installation of the security fencing at the base of the exterior stairs in general conformance with Section 303.33 of the Water System Standards, dated 2002, and specifically as supplemented hereinafter, and applicable to this project.

B. Materials:

(1) Security Mesh Panels: Fencing mesh shall be 9 gauge standard expanded carbon steel metal mesh with a 3/4-inch mesh short width hole size. The panel size shall be the standard 48 inches wide by 108 inches tall, as required to provide an eight foot fence height with a one foot fence extension beneath grade to serve as an anti-burrowing measure. The mesh shall have a powder-coating consisting of a preparation media blast of the metal prior to one coat of polyester powder. The color of the powder coating shall be the standard green. Mesh orientation shall be confirmed by the DOW before ordering materials.

(2) Examples of products that meet these requirements are:
   a. Securex Diamond Expanded Metal Fence System: by Niles Fence & Security Products, LLC, Niles, OH (800) 321-7464 [www.nilesfence.com]

   b. Approved equal

(3) Fence Framework: Fence line posts, end posts, and horizontal rails shall be the size and length and installed at the specified spacing and locations as indicated on the Project Drawings and per the manufacturer's specifications for an 8-foot high fence, whichever is more stringent. The posts and rails shall be finished using the same

powder-coating color and finish as the fence mesh. The fence enclosure shall be constructed with three horizontal rails.

(4) Fence Attachment Fittings and Hardware: All the necessary clips, clamps, fittings, bracing members, post caps, tension rods, anchors and other accessories required for a complete fence installation shall be hot-dipped galvanized and sized to framework specific to an 8 foot high fence, installed as specified by the fencing manufacturer.

(5) Fasteners: Nuts and bolts shall be stainless steel carriage bolts with breakaway nuts to maximum security. Bolt size and length shall be per the manufacturer's specifications. All nuts and bolts shall be painted to match the fence mesh and framework after installation.

(6) Gate: The fence gate shall be constructed of the same or similar materials as the fence. Fence gate shall be a single swing pedestrian gate with the gate frame consisting of round pipe fully welded with fittings, hinges, and accessories (i.e. truss rod, tighteners, post caps, brackets, etc.) structurally capable of supporting the gate and providing smooth working operation. The swing gate shall be covered with the Securex mesh fabric and shall fit flush on all sides of the gate frame allowing no open spaces between the fabric and the gate frame. Contractor shall coordinate with the gate manufacturer to install detailed lock box on fencing gate frame.

(7) Security Appurtenances:
   a.) Barbed wire shall be 4-point using 12½ gauge twisted galvanized steel wire. Barbed wire support arms shall be designed to fit on top of the fence posts and the top of the gate frame using the manufacturer's approved method of attachment and installation methods.
   b.) Gate Padlock: Cyberlock - See Section 5.1.07.I

C. Security Fencing Installation

(1) Do not begin fence installation until the reservoir stairs have been properly constructed and installed.

(2) Preparation: The post locations shall be laid out within the maximum recommended spacing as indicated on the drawings or specified by the manufacturer. Make any adjustment to the post locations if necessary in order to provide the most efficient post layout for the application following the manufacturer's installation recommendations.

(3) Provide the recommended size of fence post, noting the increased size at corners and termination (gate) points in the fence. The post shall be set on center and within ½-inch plumb for the full height of the post or as specified by the manufacturer, whichever is less. Consolidate the concrete and crown the top to keep water from ponding on the post footing.

(4) Assemble the fence rails and attach the expanded metal mesh as recommended by manufacturer to provide a taut, secure installation. Provide the required mesh overlap and connections, anchors and clips at corners and termination posts for a complete system as per the manufacturer's instructions.

(5) Install gate where indicated on Drawings. Adjust gate hinge connections as necessary in order to have a level, smooth operating gate. Install gate stops in a location that will hold the gates a minimum of 90 degrees open. Install lock box on gate frame as detailed on Drawings.

(6) Install three strands of barbed wire with use of angled support arms installed to bend away from the stairs – see fencing details in Drawings. Install three strands of barbed wire on top of fencing and gates with support arms straight up if the bent arms will impede the swing of the gate. The barbed wire shall be taut, straight and secure.

9.10 ALUMINUM GUARDRAILING

A. Installation:

(1) Fit exposed connections together to form tight, hairline joints.

(2) Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

a.) Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

b.) Set posts plump within a tolerance of 1/16 inch in 3 feet.

c.) Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

(3) Adjust railings before anchoring to ensure matching alignment at abutting joints.

B. Railing Connections:

(1) Non-welded Connections: Use mechanical joints for permanently connection railing components. Use wood blocks and padding to prevent damage to railing members and fittings.

(2) Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

C. Protection:

(1) Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of substantial completion.

(2) Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

9.11 PAYMENT: Payment for the installation of the metal stairs with the expanded metal security fencing, gate and barbed wire, including installation of barbed wire supports will not be made directly but shall be included in the payment item of which it is a part. Such payment shall represent full compensation for furnishing all materials, labor, tools, equipment and incidentals to complete the work.

END OF SECTION

SECTION SP-10 - HOT WEATHER CONCRETING PROCEDURES

10.01 GENERAL:

A. Description: Hot weather is defined as any combination of high air temperature, low relative humidity and wind velocity that results in a rate of evaporation of 0.2 pounds per square foot per hour based upon the evaporation rate figure in ACI 305. During hot weather, any or all of the methods specified herein for temperature control of concrete shall be used as required to maintain the concrete temperature below the limits specified.

B. Related Work: Related work specified in other sections:

Section 303.03 Concrete Work

Section 303.03A Concrete Work for Strandwrapped Prestressed Concrete Tank

C. Shop Drawings: Not less than 30 days prior to expected placement of concrete under hot weather conditions, a complete procedure shall be submitted for review covering the aspects of protection of concrete and its ingredients from the detrimental effects of hot weather. Concrete placement during hot weather shall not commence prior to the return of the procedure marked "Reviewed".

D. Product Delivery, Handling and Storage

(1) Aggregate piles, cement bins and batch plant bins shall be shaded from the direct rays of the sun.

(2) Aggregate piles shall be cooled by wetting and evaporation. Aggregate wetting shall be performed in such a manner that it will not cause wide variations in moisture content impairing slump uniformity.

E. General Practices and Measures: The following list of practices and measures, as described in ACI 305, may be used to reduce or avoid the potential problems of hot weather concreting:

(1) Use concrete materials and proportions with satisfactory records in field use under hot weather conditions.

(2) Use cool concrete.

(3) Use a concrete consistency that permits rapid placement and effective consolidation.

(4) Transport, place, consolidate, and finish the concrete with least delay.

(5) Plan the job to avoid adverse exposure of the concrete to the environment; schedule placing operations during times of the day or night when weather conditions are favorable.

(6) Protect the concrete against moisture loss at all times during placing and during its curing period.

10.02 MATERIALS

A. Batching and Mixing

(1) Concrete mix water shall be refrigerated or up to 100 percent of the water requirement may be ice added to the concrete mix. Ice, when introduced into the mixer, shall be in such form that it will completely melt and disperse into the mix at the completion of the mixing time. The mixing time shall be held to the minimum practicable consistent with producing concrete meeting the specified requirements.

(2) All methods and equipment for cooling water and aggregate shall be subject to the approval of the Manager and shall conform to ACI 305.

10.03 CONSTRUCTION

A. Concrete Temperature: The temperature of concrete, as delivered at the time and location of placement, shall not exceed 100° F under any conditions. The temperature of concrete as delivered at the time and location of placement under the following combined ambient conditions, except concrete that will be deposited within wall or column forms, shall not exceed the following temperatures:

Relative humidity less than %	Ambient temperature greater than F	Maximum concrete temperature F
80	90	100
70	90	95
60	90	90
50	90	85
40	90	80
30	80	75
20	75	70

B. Delivery: Concrete shall be placed in the Construction within 90 minutes after the completion of mixing.

C. Preparation for Placing: Elevated forms and reinforcing steel for beams and slab members shall be cooled by fog spraying and evaporation immediately prior to placing concrete. Forms shall be free of standing water when concrete is placed herein.

D. Placing: Concrete shall be placed in shallower layers than under normal weather conditions if necessary to assure coverage of the previous layer while it is still in plastic state and will respond readily to vibration.

E. Finishing: Fog spray shall be used during finishing operations whenever necessary to avoid surface plastic-shrinkage cracking. Fog spray shall also be used after finishing and before the specified curing is commenced to avoid surface plastic-shrinkage cracking.

F. Protection and Curing: Forms shall be kept covered and continuously moist. Once forms are loosened and during form removal, concrete surfaces shall be protected from drying and shall be kept continuously wet by fog spraying or other approved means.

10.04 PAYMENT

There will not be any additional reimbursement made to the Contractor for costs incurred for placing concrete in hot weather. Payment for the work in this section will be included as part of the lump sum bid amount for the concrete construction item listed in the Proposal.

END OF SECTION

SECTION SP-11- EPOXY ADHESIVE INJECTION OF CONCRETE CRACKS

11.01 DESCRIPTION: The Contractor or his Subcontractor shall furnish all materials, tools, equipment, appliances, transportation, labor and supervision required to repair cracks by the injection of an epoxy resin adhesive within water-retaining structures larger than 0.02-inches in width.

11.02 QUALIFICATIONS

A. Epoxy injection shall be performed by a certified applicator.

B. Contractor's/Subcontractor's operator engaged in the epoxy injection process shall have satisfactory operator experience in the methods of restoring concrete structures utilizing the specific epoxy injection process indicated. Operator's experience shall include previous repairs of cracked or damaged concrete structures, the technical knowledge of correct material selection and use, and the operation, maintenance and troubleshooting of equipment.

11.03 EPOXY RESIN ADHESIVE FOR INJECTION

A. Epoxy adhesive grout shall be a 100% solids 2-part water insensitive low-viscosity epoxy resin system. Epoxy shall be suitable for grouting both dry and damp cracks. Epoxy shall develop a minimum tensile strength (ASTM D695) of 6,000 psi and a minimum compressive strength of 8,000 psi.

B. Epoxy shall be **SELECT BOND GP-4440**, as manufactured by SPC, Costa Mesa, CA, **SIKADUR 35, HI-MOD LV** as manufactured by Sika Corp., Lyndhurst, NJ or approved equivalent.

11.04 SURFACE SEAL

A. The surface seal material is used to confine the injection adhesive in the fissure during injection and cure.

B. The surface seal material shall have adequate strength to hold injection fittings firmly in place and to resist injection pressures adequately to prevent leakage during injection.

C. The material shall be compatible and from the same manufacturer as the epoxy resin adhesive product.

11.05 EQUIPMENT FOR INJECTION

A. The equipment used to meter and mix the two injection adhesive components and inject the mixed adhesive into the crack shall be portable, positive-displacement type pumps with interlock to provide positive ratio control of exact proportions of the two components at the nozzle. The pumps shall be electric or air powered and shall provide in-line metering and mixing.

B. The injection equipment shall have automatic pressure control capable of discharging the mixed adhesive at any pre-set pressure up to 200 psi plus or minus 5 psi and shall be equipped with a manual pressure control override.

C. The injection equipment shall have the capability of maintaining the volume ratio for the injection adhesive prescribed by the manufacturer of the adhesive within a tolerance of plus or minus 5 percent by volume at any discharge pressure up to 200 psi.

11.06 REPAIR PREPARATION

A. Surface adjacent to cracks or other areas of application shall be cleaned of dirt, dust, grease, oil, efflorescence or other foreign matter that may be detrimental to the integrity of the epoxy bond. Acids and corrosives shall not be permitted.

B. Entry ports shall be provided along the crack at intervals of not more than the thickness of the concrete section to be repaired.

C. Surface seal material shall be applied to the face of the crack between the entry ports. For through cracks, surface seal shall be applied to both faces.

D. Surface seal material shall be allowed to cure to gain adequate strength before proceeding with pressure injection.

11.07 EPOXY INJECTION

A. Injection of epoxy adhesive shall begin at lower entry port for vertical applications and at one end of the crack in horizontal applications and continue until epoxy adhesive appears at the next entry port along the crack.

B. Epoxy injection shall progress along the crack to the next adjacent port where epoxy adhesive has appeared.

C. Epoxy adhesive injection shall be performed continuously until cracks are completely filled.

D. If port-to-port travel of epoxy adhesive is not indicated, the work shall immediately be stopped and the Manager notified.

11.08 FINISHING

A. After cracks are completely filled, epoxy adhesive shall be cured to allow removal of surface seal without any draining or runback of epoxy material from cracks.

B. Surface seal material, injection ports and injection adhesive shall be removed from concrete surfaces.

C. The face of the crack shall be finished flush to the adjacent concrete surface showing no indentations or protrusions caused by the placement of entry ports.

11.09 PRESSURE TEST

A. The mixing head of the injection equipment shall be connected and the equipment run until clear uniformly mixed material flows into the purge pail. The Operator shall engage the

equipment shut-off nozzle valve and subsequently bump the on-off switch until the pressure reaches 200 psi. If pressure is maintained between 190-200 psi for one minute, check valves shall be considered to be functioning properly and the injection may proceed. If pressure drops below 190 psi, Contractor shall be required to have new seals installed on the check valves and the equipment shall be subsequently retested.

B. The pressure test shall be run for each injection unit at the beginning and after meal breaks of every shift that the unit is used.

C. The adequacy and accuracy of the equipment shall be solely the responsibility of the Contractor.

11.10 RATIO TEST

A. The epoxy mixture ratio shall be monitored continuously while injecting by placing a strip of masking tape on the sides of the A & B reservoirs full height. After filling reservoirs, the A & B levels shall be marked and monitored while running injection machine into purge pail for a period of one minute. The difference in liquid height shall then be compared to verify the correct volume ration is being dispensed.

B. If the dispensing ration is incorrect, the equipment shall be adjusted and retested.

C. The ratio test shall be run for each injection unit at the beginning and after meal breaks of every shift that the unit is used.

11.11 PROOF OF RATIO AND PRESSURE TEST

A. At all times during the course of the work the Contractor shall keep complete and accurate records available to the Manager of the pressure and ratio tests specified above.

B. In addition, the Manager at any time without prior notification of the Contractor, may request the Contractor to conduct the tests specified above in the presence of the Manager.

11.12 PAYMENT: Payment for EPOXY ADHESIVE INJECTION FOR CONCRETE CRACKS will not be made directly but shall be included in the payment of which it is a part. Such payment shall represent full compensation for furnishing all materials, labor, tools, equipment and incidentals required to complete the work.

END OF SECTION

SECTION SP-12- EARTHQUAKE CABLES

12.01 GENERAL

A. This item of work shall include the furnishing of all labor, materials, tools and equipment necessary to complete the tank earthquake cables work.

B. The Contractor shall submit five copies of the quantity, location and details for the Manager's approval before the earthquake cables are fabricated.

12.02 EARTHQUAKE CABLE STRANDS

A. Where called for on the Drawings, earthquake cables consisting of 7-wire galvanized strands, meeting the minimum physical and strength requirements on the Drawings and Section 303.07 of these Special Provisions, shall be installed to connect wall and wall footing. If no strength requirements are shown on the Drawings, the minimum ultimate strength for 3/8" and 1/2" strand shall be 21,400 lbs. and 38,200 lbs., respectively.

B. The strands shall be hot-dipped galvanized before stranding with a minimum zinc coating of 0.85 oz./ft^2.

C. Galvanized strands for earthquake cables shall meet the quantity and spacing specified on the Drawings.

12.03 CLOSED CELL NEOPRENE SEISMIC CABLE SLEEVES

A. Neoprene sleeves for seismic cables, which encase the galvanized strands, shall conform to the minimum dimensions shown on the Drawings to permit unrestrained flexing of the strands inside the sleeves under the maximum projected radial wall movements.

B. The material shall be medium grade closed cell neoprene conforming to 2A3 of ASTM D 1056-85 and as further specified here-in and on the Drawings.

(1)	Compression deflection:	9-13 PSI
(2)	Density:	18-28 PCF
(3)	Water absorption by weight:	0.5 lbs/ft^2
(4)	Temperature range:	
	a. low (flex without cracking):	-30° F
	b. high continuous:	150° F
	c. high intermittent:	200° F
(5)	Heat aging (7 days @ 158° F) lineal shrinkage (max.):	5%
(6)	Tensile strength:	100 PSI min.
(7)	Elongation:	150% min.
(8)	Resilience (bayshore-% rebound average 1/2" thickness @ 72° F):	20%-40%

C. **"Neoprene SCE-43 2C3-E1" by U.S. Rubber Co. (www.usrubberco.com) Inc or "SCE-43" by HANNA RUBBER Co., Kansas City, MO (www.hannarubbercompany.com)**, or approved equal, are acceptable products.

12.04 MILD STEEL REINFORCING BARS: The mild steel reinforcing bars for the support of the earthquake cable anchors shall conform to the requirements of Water System Standards, Section 303.04, REINFORCING STEEL and as amended herein these technical provisions as they apply to this project.

12.05 EARTHQUAKE CABLE INSTALLATION

A. Cable sets shall be installed equally spaced and in equal number in each wall section. The spacing shown on the Drawings is only approximate and the number of cable sets specified is the governing criteria for placement.

B. The cables may be cut to length with a burning torch.

C. Where necessary, the strands shall be pre-bent before placing into wall and wall footing forms, as called for on the Drawings.

D. The strands shall be separated and tied to circumferential wall reinforcing as required and shown on the Drawings.

E. At wall construction joints, the strands may be arched away from the joints or pass through the joints if the length of strand beyond the joint is at least 30 inches.

F. In the footing, the strands shall be fanned out and tied to the top of the radial bars at the bottom of the footing.

12.06 PAYMENT: No separate payment for EARTHQUAKE CABLES will be made; compensation for such work shall be deemed to be included in the Lump Sum Bid for the item of which it is a part.

END OF SECTION

SECTION SP-13 TANK EXPANSION AND CONSTRUCTION JOINTS

13.01 DESCRIPTION: This item of work shall include the furnishing of all labor, materials, tools and equipment necessary to complete the tank expansion and construction joints.

13.02 SUBMITTALS: Furnish certified mill certificates showing that the material meets all of the requirements specified here-in. The Manager, at his option, may take samples of any materials and have them tested by an independent testing laboratory to verify their compliance with these Specifications. All such costs shall be borne by the Department of Water Supply. If any materials should fail to meet these Specifications, all costs for further testing of the replacement material shall be borne by the Contractor.

13.03 OBSTRUCTIONS: Contractor shall pay particular attention to removing all obstructions such as concrete, nails, etc., from joints when movements of floor, wall and roof sections can be expected under prestressing, temperature and other conditions.

13.04 WATERSTOPS:

A. Waterstops shall meet the requirements of Water Systems Standards, Section 212.09, with the following revisions and additions.

B. Waterstops shall be manufactured from thermoplastic vulcanizate (TPV) or PVC extruded from an elastomeric plastic material of which the basic resin is prime virgin polyvinyl chloride.

C. The finished waterstop material shall meet the following minimum requirements:

(1) Tensile strength	2,000 psi	(ASTM D-412)
(2) Ultimate elongation	350%	(ASTM D-412)
(3) Shore hardness	70 +_10	(ASTM D-2240)
(4) Specific gravity	0.95 min.	(ASTM D-792)
(5) Stiffness in flexure	600 psi	(ASTM D-747)
(6) Cold brittleness pt. (@-35^{o})	No Failure	(ASTM D-746)
(7) Water absorption (48 hrs.)	0.320% max.	(ASTM D-570)
(8) Tear resistance	275 lb./in.	(ASTM D-624)

D. **JP SPECIALTIES, INC., (Earth Shield)** 551 Birch Street, Lake Elsinore, CA 92530 (Phone 800-821-3859) and **GREENSTREAK PLASTIC PRODUCTS**, Box 7139, St. Louis, MO 63177 (phone 314-225-9400) are two of several suppliers who can furnish waterstops meeting these requirements. Approved equal materials may also be used.

E. Waterstop intersection joints shall be prefabricated with a 12 inch minimum length from the joint.

13.05 CLOSED CELL NEOPRENE SHEETS/PAD

A. Neoprene sleeves for seismic cables, which encase the galvanized strands, shall conform to the minimum dimensions shown on the Drawings to permit unrestrained flexing of the strands inside the sleeves under the maximum projected radial wall movements.

B. The material shall be medium grade closed cell neoprene conforming to 2A3 of ASTM D 1056-85 and as further specified here-in and on the Drawings. See Section SP-12.03.B for required material properties.

C. **"Neoprene SCE-43 2C3-E1" by U.S. Rubber Co. (www.usrubberco.com) Inc or "SCE-43" by HANNA RUBBER Co., Kansas City, MO (www.hannarubbercompany.com)**, or approved equal, are acceptable products.

13.06 JOINT SEALERS

A. Joints, not requiring waterstops or when so indicated on the Drawings, shall be sealed with a mastic joint sealer material of uniform, stiff consistency that does not contain solvents.

B. The mastic shall tenaciously adhere to primed concrete surfaces, shall remain permanently mastic and shall not contaminate potable water.

C. The material shall be of a type that will effectively and permanently seal joints subject to movements in concrete.

D. The mastic joint sealer shall be an acceptable two-part, self-leveling (or gun grade), non-staining, polyurethane elastomeric sealant that cures at ambient temperature. Acceptable sealants shall conform to ASTM C-920 or Federal Specification TT-S-00227E.

E. For sloping joints, vertical joints and overhead horizontal joints, only "non-sag" compounds shall be used; all such compounds shall conform to the requirements of ANSI/ASTM C 920 Class 12-1/2, or Federal Specification TT-S-0027 E(3), Type II.

F. For plane horizontal joints, the self-leveling compounds which meet the requirements of ANSI/ASTM C 920 Class 25, or Federal Specification TT-S-0027 E(3), Type I shall be used. For joints subject to either pedestrian or vehicular traffic, a compound providing non-tracking characteristics, and having a Shore "A" hardness range of 25 to 35, shall be used.

G. Primer materials, if recommended by the sealant manufacturer, shall conform to the printed recommendations of the sealant manufacturer.

H. Acceptable polyurethane materials are **PSI-270 RESERVOIR SEALANT**, as manufactured by POLYMERIC SYSTEMS, INC., Phoenixville, PA (610-935-1170), **SIKAFLEX/2C POLYURETHANE ELASTOMERIC SEALANT**, as manufactured by SIKA CHEMICAL CORP., Santa Fe Springs, CA (310-941-0231) and **SELECT SEAL U-227 RESERVOIR GRADE**, as manufactured by SELECT PRODUCTS CORP., Costa Mesa, CA (714-429-0808), or approved equal.

13.07 PREFORMED JOINT FILLER: Preformed joint filler material shall be of the preformed non-extruding type joint filler constructed of cellular neoprene sponge rubber or polyurethane of firm texture. Bituminous fiber type will not be permitted. All non-extruding and resilient-type preformed expansion joint fillers shall conform to the requirements and tests set forth in ASTM D 1752 for Type I, except as otherwise specified herein.

13.08 BACKING ROD: Backing rod shall be an extruded closed-cell, polyethylene foam rod. The material shall be compatible with the joint sealant material used and shall have a tensile strength of not less than 40 psi and a compression deflection of approximately 25 percent at 8 psi. The rod

shall be 1/8-inch larger in diameter than the joint width except that a one-inch diameter rod shall be used for a ¾-inch wide joint.

13.09 BOND BREAKER: Bond breaker shall be **SUPER BOND BREAKER WATER BASE** as manufactured by Burke Company, San Mateo, California; **SELECT EMULSION CURE 309,** as distributed by Select Products Co., Costa Mesa, CA (clear or white pigmented) or equivalent. Fugitive dye may be used in bondbreakers if recommended by manufacturer.

13.10 INSTALLATION OF WATERSTOPS

A. The waterstop shall be correctly positioned in the forms with the center of the waterstop centered on the joint.

B. In cases where preformed expansion joint material is used in conjunction with the waterstop, allowance shall be made for equal waterstop embedment on each side in the concrete.

C. Waterstop shall be held in place in the forms by use of a split form or other approved method that will positively hold the waterstop in the correct position and to the correct alignment.

D. All waterstop intersection joints shall be welding in the shop and shipped to the project site.

E. Field Joints

(1) Field joints shall be restricted to properly aligned, straight butt joints only.

(2) Use only recommended splicing tool for field joints of waterstop.

(3) Centerbulbs shall be compressed or closed when welding to non-centerbulb type or edge.

F. Horizontal waterstops shall be bent up during placing of concrete until the concrete has been brought to the level of the waterstop; additional concrete shall then be placed over the waterstop, after which the concrete shall be thoroughly vibrated.

G. All horizontal and vertical waterstops, which are not accessible during pouring, shall be tied off in two directions every 12 inches to prevent bending over during concrete placement or consolidation.

H. A hog-ring or nail may be driven through both ends of the waterstop to facilitate placing and tying of waterstops to reinforcing steel forms or form-ties.

I. All waterstops shall be properly spliced and joints shall be checked for strength and pinholes after splicing.

J. Splices shall be strong enough to develop a pulling force of 75 percent of the waterstop strength, and shall be watertight.

K. Ends of the radial waterstop in the floor slab joints shall be connected to the circumferential waterstop in the floor to wall-footing joint.

13.11 INSTALLATION OF JOINT SEALER

A. Joint sealed areas shall be sandblasted or roughened and blown clean of dust and sand with compressed air before the material may be applied.

B. Joints shall be primed (if required) prior to installing the joint sealer, install bond breaker tape to bottom of joint. Sealant shall be applied in accordance with the manufacturer's recommendations.

13.12 PAYMENT: No separate payment for TANK EXPANSION AND CONSTRUCTION JOINTS will be made; compensation for such work shall be deemed to be included in the Lump Sum Bid for the item of which it is a part.

END OF SECTION

SECTION SP-14 - TANK WALL, BASE AND TOP JOINT

14.01 DESCRIPTION: This section covers the work necessary for the tank wall base and top joint (if shown on the Drawings), complete.

14.02 SUBMITTALS

A. The Contractor shall provide the Manager a 2-foot minimum length of each of the closed cell neoprene pads and the neoprene bearing pads in order that the Manager can test the pads for compliance with these Specifications.

B. Furnish certified mill certificates showing that the material meets all of the requirements specified here-in. The Manager, at his option, may take samples of any materials and have them tested by an independent testing laboratory to verify their compliance with these Specifications. All such costs shall be borne by the Department of Water. If any materials should fail to meet these Specifications, all costs for further testing of the replacement material shall be borne by the Contractor.

14.03 WATERSTOPS: Waterstops shall conform to requirements in Section SP-13, EXPANSION AND CONSTRUCTION JOINTS. The size and location of the waterstop shall be as shown.

14.04 NEOPRENE BEARING PADS

A. Neoprene pads shall be of dimensions and hardness shown on the Drawings and shall be made by an approved manufacturer.

B. The material for 40 durometer neoprene pads shall conform to ASTM D-2000 M2BC414A14C12F17 and the material for 30 durometer neoprene pads shall conform to ASTM D-2000 M2BC310A14C12F17.

C. Unless otherwise specified on the Drawings, neoprene pads shall be of 40 durometer.

D. **DACOM INDUSTRIES CO.**, 10661 N. Lombard, Portland, OR 97203 (Phone 503-978-0801 and **WEST AMERICAN RUBBER COMPANY**, INC. (Phone: 714-532-3355) are two of several suppliers who can furnish neoprene pads meeting these requirements. Approved equal materials may be used.

14.05 CLOSED CELL NEOPRENE FILLER PADS

A. Closed cell neoprene pads, shall be used as a filler material in the flexible joints between the wall and wall-footing and between the wall and roof connection in the areas not taken up by the solid neoprene bearing pads and waterstops.

B. The materials shall be medium grade closed cell neoprene conforming to 2A3 of ASTM D 1056-85 and as further specified here-in and on the Drawings. See Section SP-12.03.B for required material properties.

C. **"Neoprene SCE-43 2C3-E1" by U.S. Rubber Co. (www.usrubberco.com) Inc or "SCE-43" by HANNA RUBBER Co., Kansas City, MO (www.hannarubbercompany.com)**, or approved equal, are acceptable products.

14.06 SOFT MASTIC

A. Self-leveling soft mastic shall be installed in all voids and cavities around bearing pads, waterstops and seismic cable sleeves. Such material shall be installed with a consistency that will not adversely affect the quality of rubber or neoprene materials.

B. **SIKAFLEX 1A,** as manufactured by Sika Corporation or **SELECT SEAL U-230,** as manufactured by Select Products Company, or approved equal, are acceptable materials.

14.07 INSTALLATION OF WATERSTOP: Waterstops shall be continuous and shall be installed where shown. The method of installation shall be as specified in Section SP-13.

14.08 BEARING AND NEOPRENE FILLER PADS

A. Bearing and filler pads shall be installed as indicated on the Drawings.

B. Bearing and filler pads shall be glued to the concrete with an approved rubber cement material to prevent uplift of the pads during placement of concrete.

C. In addition, all pads shall be held down with approved plastic shim plates or 'adobes' placed under the reinforcing steel as shown.

D. Nailing down pads will not be permitted

E. All voids and cavities between bearing and filler pads, waterstop and seismic cable sleeves, irrespective of whether these voids are large or small, shall be filled with a soft mastic.

F. Closed-cell neoprene shall be ordered at least l/4-inch wider than theoretically required to facilitate placing and to reduce development of voids between filler pads, bearing pads and waterstops.

G. Contractor's workmanship shall be such that no cement grout or concrete seepage will occur through the bearing and filler pad area resulting in a restraint of radial wall-movements.

H. Neoprene bearing pads and one or more closed cell neoprene pads are required between the top of the wall and the underside of the roof. Secure pads as described above in item #2. Trim closed cell neoprene pads as required to fit around seismic tubes at top of wall. Any void areas between such pads shall be filled with soft mastic to prevent any mortar from the roof pour to come in contact with the wall top.

14.09 PAYMENT: No separate payment for TANK WALL, BASE AND TOP JOINT will be made; compensation for such work shall be deemed to be included in the Lump Sum Bid for the item of which it is a part.

END OF SECTION

SECTION SP-15 - CIRCUMFRENTIAL STRAND-WOUND PRESTRESSED CONCRETE TANK

PAGE

SECTION SP-15 - CIRCUMFRENTIAL WOUND PRESTRESSED CONCRETE TANK

15.01 DESCRIPTION

A. This section shall replace Water System Standards for the County of Kaua`i, Department of Water, Section 303.07 “PRESTRESSED CONCRETE RESERVOIR” in its entirety.

B. This section covers the qualifications for the Tank Contractor requirements for the construction materials used in the tank. This section also covers the furnishing and installation of seven-wire strand and bars for circumferential and vertical prestressing, respectively, of concrete walls and the complete shotcreting operations.

In the event of a discrepancy between this section of the Specifications and any other section of the Specifications, this section shall govern. The words "stressing machine" may refer to either the circumferential wrapping or vertical post-tensioning machinery.

C. The Tank Contractor furnish and erect a prestressed concrete tank of the capacity shown on the Drawings, consisting of a concrete roof, concrete floor and a poured-in-place concrete core wall, post-tensioned vertically with steel rods and circumferentially with wrapped strand and protected with several coats of shotcrete and paint.

D. The tank shall conform to the dimensions and be equipped with the appurtenances shown on the Drawings as specified herein.

E. Concrete work shall conform to the provisions of Sections 303.03 and the addendums included in these specifications and Section SP-10.

15.02 RELATED WORK: Related work specified in other sections:

Water System Standards, 2002, and amendments included in these specifications for the following sections:

Section 303.03 – Concrete Work
Section 303.06 – Reinforced Concrete Reservoir
Section 303.12 - Reservoir Protection
Section 303.22 – Miscellaneous Iron and Metal Work
Section 303.27 - Painting
Section SP-10 - Hot Weather Concreting Procedures
Section SP-11 - Epoxy Injection of Concrete Cracks
Section SP-12 - Earthquake Cables
Section SP-13 - Tank Expansion and Contraction Joints
Section SP-14 - Tank Wall Base and Top Joint
Section SP-16 - Miscellaneous Specialties for Concrete Reservoir

15.03 WORK BY TANK CONTRACTOR, SUPERINTENDENT

A. Due to the nature of the project, it is the intent of these Specifications to obtain a first class product with emphasis on overall safety, quality and quality control, both during and after the construction process.

B. As evidenced by these Specifications and Drawings, a strong emphasis on performance has been made to assure that desired details and proven construction methods be utilized to provide the highest quality structure available. For example, the minimum design requirements listed, the minimum design and construction experience of the Tank Contractor, the stringent forming and pouring methods, the close tolerance continuously recorded circumferential and vertical prestressing and the automated shotcrete specified are only a few of many ways that will help prevent structurally deficient problems from occurring during the service life of the tank. It is imperative that the specified features of these Documents are strictly adhered to and only bids from Contractors that have a successful performance record in prestressed concrete tank construction be considered.

C. The qualified Tank Contractor shall submit with his bid the name and address of the Owner and completion dates and location of at least ten (10) tanks located within the United States that have been constructed by the Tank Contractor during the last five years. In order to meet the experience requirements, the ten (10) tanks shall be similar (i.e. freed wall base, poured-in-place corewall, externally machine strand wrapped, etc.) in design to the specified tank. Experience with tanks having fixed wall bases, mild-steel reinforced tank corewalls, shotcrete tank corewalls, precast tank corewalls or tank corewalls incorporating internal stressing systems or external wire wrapping (in lieu of strand wrapping) shall not be considered in meeting the required experience requirements.

D. The proposed Tank construction superintendent shall be currently employed by the qualified Tank Contractor and shall have been the tank construction superintendent for at least 3 strandwrapped prestressed concrete tanks during the last five years. The qualified tank superintendent shall have been in the direct employment of the qualified Tank Contractor for all three of the tanks listed and will be required to be on the project site in responsible charge, full-time, during all tank concrete construction activities.

E. A bid may not be considered responsive unless the Tank Contractor's, and associated Superintendent's, experience requirements have been submitted with the bid as specified in Section SP.15.05.

15.04 PRESTRESSING WORK

A. No stressing system falling under any of the following requirements will be considered unless it has been successfully used on tanks of at least the same diameter, height and capacity. The Contractor shall submit with his bid the name and address of the Owner and the completion dates and location of at least ten (10) tanks located within the United States on which the proposed qualifying "stressing machine" and automated shotcrete equipment has been used within the past five (5) years. At the time of bid the qualified Tank Prestressor shall have a minimum of two operable strandwrapping and automated shotcrete machines meeting these requirements. Machines under construction shall not be considered in meeting the requirement of having two operable strandwrapping and automated shotcrete machines.

Descriptive literature shall also be submitted with the bid showing the proposed machinery with the recorders and a typical copy of an actual recording of the applied forces taken from one of the jobs on which such machinery has been used. Any stressing system that will not provide the substantial equivalent of the above requirements and experience will be rejected. This applies to the strand wrapping, tendon-stressing and automated shotcreting equipment.

B. A bid will not be considered responsive unless such data and experience record has been submitted with the bid as required in Section SP.15.05. This applies to both the wrapping as well as the tendon stressing equipment.

C. The prestressing shall be done solely by the Tank Contractor and Designer which shall be a firm or individual(s) having the equivalent of at least ten (10) years continuous experience in the installation of the type of prestressing specified. Experience with internal tendon systems or external tendon systems, not machine strand wrapped, and experience with external wire wrapping in lieu of strand wrapping shall not be considered in meeting the required experience requirements. The Tank Contractor and Designer shall not subcontract the design, forming, concrete placing, prestressing (installation or stress application) or shotcreting work. Specialty work such as rebar installation, scaffolding and concrete finishing may be subcontracted to contractors experienced in these aspects of prestressed concrete tank construction. Employees hired directly by the Tank Contractor shall perform all other tank construction activities.

D. All tanks listed for the Prestressor's experience requirements must have been prestressed in the Prestressor's own name. Experience from personnel association with the Prestressor or hired by the Prestressor will not be considered unless the Prestressor can demonstrate that the work was contracted and performed directly by the listed Prestressor in its business name.

15.05 BID-SUBMITTAL REQUIRED BY CONTRACTOR

As further defined in Sections SP.15.03 and SP.15.04 of these Specifications, the following information shall be included with the Contractor's Bid Submittal:

A. The name(s) of the proposed qualified superintendent who will be in direct charge of the tank construction for the full duration of the Contract.

B. A list of at least three reservoir jobs successfully completed by each of the superintendents listed by the Tank Contractor, which shall include a tank description, the name and address of the Owner and the Project Design Consultant, and the approximate completion date of each tank.

C. The name and address of the Tank Contractor and Designer, if different than the Contractor, and a list of at least ten tanks, similar in design to the tank specified herein, successfully completed by the Tank Contractor during the last five years.

D. The name and address of the Owner and the completion dates and location of ten structures on which the proposed qualifying prestressing and automated shotcrete system, meeting the substance of these Specifications requirements, has been used during the last 5 years.

E. Descriptive literature of the wrapping, the vertical prestressing and the shotcrete machinery meeting all of these Specification requirements. Include in such data photographs or prints of the means of recording of both the circumferential and vertical prestressing applications and copies of actual photographs, print-outs or other records of applied wrapping forces (as well as force-elongation diagrams if available) taken from jobs in which the machinery has

been used.

F. A written statement from the Tank Prestressor indicating that the Prestressor has a minimum of two operable strandwrapping and automated shotcrete machines meeting these specifications.

G. The Contractor shall provide with the bid a consent of surety letter from the Tank Contractor's surety stating that the Tank Contractor's surety is prepared to provide a three (3) year maintenance bond, that the Tank Contractor's surety is Treasury listed for the contract amount and that the Tank Contractor's surety is A.M. Best rated A12 or higher.

H. Failure to submit any of the above with the bid will cause the bid to be considered non-responsive and the bid can be rejected.

15.06 SHOP DRAWINGS: Contractor shall submit shop drawings of the circumferential prestressing wrapping schedule and the intermediate lock-off elevations for the Engineer's approval before the wall pour is made.

15.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Prestressing steel shall be adequately packaged against intrusion of chemical contaminants (from the atmosphere or otherwise) for the protection of the steel against physical damage and corrosion during (and subsequently as the result of) shipping and storage.

B. Prestressing steel that has sustained physical damage through rust or other means will be rejected.

C. All materials and prestressing material delivered to the job site shall be stored off the ground on planks, supported by 4" x 4" timber, which must be covered with polyethylene or sizalkraft paper to prevent any moisture from coming up from the bottom.

D. Reels of steel strand, prestressing tendons, anchorages, etc., shall be stacked neatly and as compact as possible.

E. All materials for tendons and all fabricated tendons shall be covered with tarpaulins in such a manner that they are not exposed to water, rain, moisture or dust.

15.08 SEVEN-WIRE STRAND

A. Hot-dipped galvanized seven-wire strand used for prestressing shall meet the following minimum requirements unless otherwise shown on the Drawings:

Item		Specification	
		Type A	Type B
(1)	Nominal strand diameter	1/2"	3/8"
(2)	Nominal area after galv.	0.153 in^2	0.089 in^2
(3)	Nominal weight/1000 LF	541 lbs.	303 lbs.
(4)	Pitch (Strand diameters)	12-16	12-16
(5)	Tensile strength (min.)	38,200 lbs.	21,400 lbs.

(6)	Yield strength @ 1% extension (min)	28,500 lbs.	16,000 lbs.
(7)	Elongation in 24" at fracture (min.)	4.5%	4.5%
(8)	Weight of zinc coating (min.)	0.85 oz./ft.^{2}	0.85 oz/ft^2

B. Hot-dipped galvanized seven-wire strand shall be manufactured in accordance with ASTM A-416 prior to galvanizing. Each wire of the strand shall be individually hot-dipped galvanized before being stranded.

C. Single wire prestressing material shall not be substituted for seven-wire strand prestressing material.

15.09 HIGH-STRENGTH THREADBARS

A. Deformations of the threadbars shall form a screw-thread suitable for mechanically coupling lengths of thread bar and also for positive attachment of anchor assemblies.

B. Deformations shall conform to ASTM A-722, Type II requirements and shall be uniform such that the bar may be cut at any point and the internal threads of a coupling can freely screw onto the bar. The bars and their deformations shall be hot rolled.

C. Tensile and Physical Properties shall meet the following requirements with bars being manufactured in accordance with ASTM A-722, Type II:

	Item	Unit	Specifications	
(1)	Nominal diameter	inches	1.25	1.375
(2)	Min. tensile force	kips (min.)	187	237
(3)	Yield force at 0.2% offset	kips (min.)	150	190
(4)	Elong. in 20 bar (diameter)	% (min.)	4	4
(5)	Nom. cross-sectional area	sq. inches	1.245	1.577
(6)	Nominal bar weight	lbs/ft.	4.39	5.56

Note: To provide reduced relaxation, more uniform elastic modulus and reduced residual stress in the critical thread area, only threadbars that are stress relieved after the threads are formed will be accepted. All threadbars shall be proof stressed after stress relieving and threading. Threadbars with cold rolled threads or threadbars with quenched or tempered steels will not be permitted. Threadbars shall have a maximum carbon content of 0.55 percent. Manufacturers with a minimum of 5 years of experience, under their current name, in the manufacturing of post-tensioning material meeting all the requirements of this specification will be accepted.

15.10 ANCHORAGES FOR VERTICAL POST-TENSIONED TENDONS

A. All post-tensioned prestressing shall be secured at the ends by means of approved permanent anchoring devices, which shall hold the prestressing steel at a force not less than 95% of the guaranteed minimum tensile strength of the prestressing steel.

B. The load from the vertical prestressing anchoring device shall be distributed to the concrete through steel bearing plates of dimensions and details shown on the Drawings.

C. All vertical prestressing anchor plate dimensions, all dimensions relating to the conical hole in the top and bottom of the bearing plate (35° cone angle with the vertical), all steel tubing attached to the top bearing plate, and the spacing of all tendons shall strictly conform to the details shown on the Drawings.

D. Fully-threaded anchor connections that incorporate a spherical-shaped bearing surface to match the conical surface in the bearing plate shall be used at both ends of the vertical prestressing bar.

E. The contact point of the spherical-shaped vertical prestressing bearing surface to conical hole shall be approximately 1/4" to 1/2" below the bearing plate surface.

F. Wedge anchors shall not be used for permanent anchor hardware.

15.11 TESTING OF PRESTRESSING MATERIAL

A. Contractor shall furnish at his own expense mill test certificates showing the dimensional and physical characteristics of each heat or reel of the prestressing steel to be furnished.

B. Contractor shall furnish evidence, to the satisfaction of the Engineer, prior to the preparation of shop drawings and installation of vertical tendons, that the proposed tendon anchorage system meets the requirements of these specifications. The Engineer may order additional tests to be taken. Should such additional tests not meet the specifications, the expenses of this testing shall be paid for by Contractor; otherwise such expenses shall be borne by the Owner.

C. Before any stressing operation may be started, Contractor shall calibrate all recording equipment at an approved testing laboratory to the satisfaction of the Engineer.

D. All continuous force readings for the vertical and circumferential prestressing operations shall be developed with electronic (or the substantial equivalent) force (strain gauge method) sensing transducers, all having a maximum nonlinearity error of ± 0.5% and a maximum hysteresis error of ± 0.25%.

15.12 ANCHOR POCKETS FOR VERTICAL TENDONS

A. Anchor pockets for vertical prestressing tendons shall consist of steel cans, hot-dipped galvanized after cutting (unless shown otherwise on the Drawings) and welded to the top bearing plate.

B. Anchor pockets shall be adequately sealed from moisture and concrete intrusion by wooden lids and 2-inch wide plastic adhesive tape.

C. Anchor pockets for vertical prestressing tendons must have adequate provisions for flushing of ducts with water during wall concrete placement.

15.13 DUCTS FOR VERTICAL TENDONS

A. Duct enclosures for vertical prestressing steel shall be standard 1.25" or 1.375" diameter PVC pipe class 160 or class 200, respectively, unless otherwise specified on the Drawings.

B. All ducts shall be provided with expandable valves at the bottom of the duct to facilitate the injection of epoxy after prestressing.

C. All connection details shall be as shown on the Drawings.

15.14 EPOXY GROUT FOR VERTICAL TENDONS

A. The vertical tendon system shall provide complete 2-part epoxy protection of the prestressing steel inside a PVC duct and anchors.

B. The injection of Portland Cement grout into the vertical tendon ducts will not be accepted.

15.15 PORTLAND CEMENT: Portland Cement for the tank construction and shotcreting shall meet the requirements specified in Section 303.03 of these Special Provisions.

15.16 SHOTCRETE

A. Fine aggregates

(1) Fine aggregates shall meet the requirements stated in Section 303.03A of these Special Provisions.

(2) A well-graded coarse sand shall be used for all shotcrete applications.

(3) Coarse sand shall generally consist of the following gradation:

Sieve Size	% Passing by Weight
3/8 inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

The fineness modulus shall fall between 2.70 and 3.00.

(4) Plastersand shall be used for shotcrete finish coat if a smooth finish (as opposed to "natural") is required on the Drawings.

(5) Plastersand shall meet the following gradation:

Sieve Size	% Passing by Weight
3/8 inch	100
No. 4	97-100

No. 8	90-98
No. 16	70-85
No. 30	35-55
No. 50	15-25
No. 100	2-8

The fineness modulus shall fall between 2.40 and 2.75.

B. Rebound

(1) Rebound is defined as aggregate mixed with some cements, which ricochets off the surface during the application of shotcrete because of collision with the harder surface, reinforcement, or with the aggregate particles themselves, the amount produced varies with the position of the work, air pressure, cement content, maximum size and grading of aggregate, amount of reinforcing and thickness of layer.

(2) Rebound materials may not be reused in any form for shotcrete.

C. Water: Water shall meet the requirements set out in Section 303.03A of these Special Provisions.

D. Air-Entrainment & Admixtures: Air-entrainment and admixtures shall meet the requirements set out in Section 303.03A of these Special Provisions.

E. Fibrous Shotcrete Reinforcement

(1) All shotcrete, unless otherwise specified herein, shall be fibrous reinforced. Such material shall consist of 100 percent virgin polypropylene fibrillated **or non-fibrillated** fibers specifically manufactured for use as concrete/shotcrete secondary reinforcement. The required volume of fibers to be added per cubic yard of shotcrete shall be as specified below in Section 303.07(R)(6)a.

(2) Polypropylene fibers will help to provide greater control of cracking from drying shrinkage and thermal expansion/contraction, a reduction of permeability, an increased impact capacity, an improved shatter/abrasion resistance and added toughness of the shotcrete.

(3) The fibers shall be manufactured in accordance with applicable building codes and ASTM C-1116 Type III 4.1.3. and ASTM C-1116 (Ref. ASTM C-1018) Performance Level I_5 outlined in Section 21, Note 17. Fibrous concrete reinforcement shall be as manufactured by the FIBERMESH COMPANY, Chattanooga, TN [phone: (423) 892-7243], or equal.

(4) Acceptable polypropylene fibers shall have the following physical characteristics:

a. Specific gravity = 0.91
b. Fiber length = graded per manufacturer

F. Shotcrete Proportioning

(1) Each cubic yard of mortar in the ready mix truck or mixer shall consist of 0.1% (1.5 lbs. per cubic yards) polypropylene fibers and a mix ratio of 3 lbs. of moist sand to 1 lb. of Portland cement. Up to 50 oz. of PRO-KRETE-R or POZZOLITH 300R may be added at the option of Contractor during warm weather conditions.

(2) Whenever night temperatures are expected to drop below 35F, "high early" Portland cement shall be used in lieu of regular Portland cement. Should "high early" Portland cement not be available, the mix design shall consist of a moist sand-Portland cement mix ratio, by weight, no greater than 2.59.

(3) If the batching procedure requires that smaller volumes of cement and sand be used, the required cement-to-sand ratio shall still be strictly maintained.

(4) Admixture such as MASTERPOZZOLITH R 300 which does not promote corrosion of the prestressing steel.

(5) The total volumetric air content of the shotcrete before placement shall not exceed 7 percent (plus or minus one percent) as determined by ASTM C-173 or ASTM C-231.

(6) Unless otherwise shown on the Drawings, shotcrete cylinder strengths at 28 days shall be no less than 4,000 psi. Higher shotcrete cylinder strengths shall not permit a reduction in the above specified cement contents. The cement content in the above mix designs may be increased should the specified 28-day strength requirement not be met.

(7) The polypropylene fibers and admixtures shall be added to the shotcrete at the time it is batched and in the amounts as required here in. Such additives shall be mixed in strict conformance to the manufacturer's instructions and recommendations for uniform and complete distribution. Each certificate of delivery supplied by the shotcrete supplier shall indicate the additive trade name, manufacturer's name and amount per cubic yard added to each batch of shotcrete.

15.17 CIRCUMFERENTIAL PRESTRESSING EQUIPMENT

A. The circumferential stressing system shall produce a continuously, electronically (or substantial equivalent) monitored permanent stress or force recording along its full length as it is being applied and the stress variation in any strand at any point around the circumference shall not be greater than $\pm$ 1.5 percent of the ultimate strength of the steel. In addition to this recording, any system which deflects the tensioned prestressing material between the tensioning device and the wall after it has left the tensioning device, shall provide a similar continuously monitored stress or force record along its full length as it is being applied to the wall. These recordings shall show that either before or after deflection that the stress variation in the prestressing material at any point around the circumference shall not be greater than $\pm$ 1.5 percent of the ultimate strength of the steel. Due to prior instances of force measurement inaccuracies and the inherent problems associated with hand-held stressometers, no manual recorded force readings will be accepted. This requirement shall be strictly adhered to.

B. Any wrapping that does not meet the stress tolerances specified and/or cannot meet the requirements of Section SP.15.22, will not be accepted and will be removed at Contractor's expense. Contractor shall be responsible for all costs associated with meeting the specified tolerances.

C. Since wrapping systems which utilize single solid prestressing wire will not provide the desired bond between the prestressing wire and the shotcrete and since single solid prestressing wire will not provide an adequate safety factor against failure, only machine wrapping systems which utilize seven-wire prestressing strand wrapping will be allowed.

D. Since intermittent force applications can result in an unequal stress distribution around the wall (due to friction losses), the prestressing system shall be capable of applying a continuous wrapped force at any point around the circumference within the specified tolerances. Circumferential stressing systems based on Jack-operated cable or rod-type tendons will not be allowed.

15.18 CIRCUMFERENTIAL PRESTRESSING APPLICATION

A. Wrapped strand shall be anchored to the wall at least once for every coil or reel.

B. Permanently anchoring one strand to a previously wrapped strand will not be permitted.

C. Wrapped strand ends shall be joined by suitable splicing methods that shall develop 90% of the full strength of the strand.

D. Use of different alloys in the splicing material will not be permitted.

E. The clear vertical spacing between adjacent prestressing strands shall be 1.5 strand diameters or 3/8 inch, whichever is larger.

F. All wrapped strands not meeting the spacing requirements shall be spread by approved methods or shall be removed.

15.19 VERTICAL PRESTRESSING EQUIPMENT

A. The Contractor shall provide a continuously, electronically (or substantial equivalent), monitored force-elongation record of a permanent nature from zero to full force at the final lockoff for all of the vertical prestressing work.

B. The ordinate of the permanent recording shall show the elongation in inches and the abscissa shall show the force in pounds or kips.

C. Recording force and elongation readings manually will not be accepted.

D. The vertical tendon stressing machinery shall have automatic electronic tensioning cut-off devices or equivalent means to ensure that the specified force and elongation is not exceeded at any time during any tendon stressing operation.

E. The force readings at the end of the stressed bar, immediately after lock-off, for any

stressing operation, on any tendon, shall not fluctuate more than ± 1.5% (of the minimum ultimate strength of the steel) from the desired average force setting.

F. The maximum applied force for the final stressing operation, immediately after lock-off on any tendon, shall be no greater than 75% of the minimum ultimate strength of the steel.

15.20 VERTICAL PRESTRESSING INSTALLATION

A. The number and spacing of threadbars, if shown on the Drawings, shall be the minimum number provided and shall not be altered under any condition.

B. High-strength threadbars shall be used for vertical prestressing which meet the requirements of Section SP.15.9 of these Specifications.

C. The anchor hardware shall have a ball-shaped threaded nut that can be screwed down on to a matching cone shaped bearing surface in the bearing plate after the desired tension on the anchor hardware and/or prestressing steel has been applied.

D. Vertical tendon components shall be assembled off the ground and as detailed on the Drawings before they are installed in the forms.

E. Particular attention shall be given to sufficient taping of damaged joint connections and holes in PVC tubing.

F. Vertical prestressing tendons shall be accurately placed at the locations shown on the reservoir design drawings, or as approved by the Engineer, and shall be securely fastened in place to reinforcing steel and form ties to prevent movement during placement of concrete.

G. Placing of vertical tendons shall be done to proper locations, elevations and alignments, with a maximum tolerance of plus or minus 1/4 inch.

H. All vertical tendons shall be securely tied at the anchor plates and shall be tied to #4 circumferential bars at 2 feet intervals between the anchor plates, unless shown otherwise on the Drawings.

I. Anchor plates must be installed at right angles to the tendon alignment near the anchor. Anchor plates must be installed with long sides, if applicable, aligned parallel with the wall forms and secured to prevent rotation while concrete is placed. The maximum permissible misalignment of anchor plate to tendon alignment is plus or minus 2.5 degrees.

J. Unless indicated otherwise on the Drawings, the minimum concrete cover around metal anchor pockets and bearing plates shall be 1.5 inches.

K. The clearance between bottom anchor plate and waterstop in tank walls shall be no less than 2 inches or more than 4 inches.

L. All vertical tendons shall be flushed with water introduced through a taped-off hole in the wooden lids on the anchor pockets from the top immediately upon completion of the wall

concrete vibrating operation.

M. Flushing of ducts shall not be accomplished by introducing water through the bottom connection.

N. Upon completion of the water flushing operation of vertical tendons, the ducts shall be given a short burst of compressed air from the top only to remove any accumulations of water at the bottom of the ducts.

O. Cleaning of tendons with air only, or removal of water with air introduced from the bottom connection, will not be permitted.

P. The vertical tendon shall be stressed to the level and following the procedure described below in the next section.

Q. All ducts shall be clean and free of water and deleterious materials that would impair bonding of the grout or interfere with grouting procedures.

R. Grout injection pipes shall be fitted with positive mechanical shutoff valves, which shall not be removed within the first 24 hours after grouting is complete.

S. Grouting of tendons shall be started at the lowest grout connection.

T. Each vertical tendon duct shall be pumped until the entire nut at the top anchor has been covered. Pea gravel and/or clean sand may be placed (at Prestressing Contractor's option) in the tendon can as a filler material prior to epoxy pumping.

U. In cold weather, and especially during frosts, special precautions must be taken to avoid the freezing of grout. In the event that the grouting procedure cannot be postponed, the wall temperature must be kept above the freezing point with hot blankets or by other approved means.

V. Upon completion of the vertical stressing and grouting operation, all anchor pocket areas above the anchor nuts shall be drypacked with a 1 part cement to 2 parts sand mortar mix immediately after the epoxy coating on the inside can surface has become tacky, or alternately, the metal can may filled with concrete aggregates and epoxy.

W. The drypack surface shall be finished flush with the top of the square tube.

X. The rectangular tube shall be fit over the square tube and the sides of the tubes aligned as detailed. The gaps between the tubes shall be filled with sheets of closed cell neoprene as detailed. A steel cover plate shall be seal welded to the rectangular plate prior to placing the roof slab concrete.

15.21 VERTICAL PRESTRESSING OPERATIONS

A. The maximum initial electronically (or substantial equivalent) recorded steel stress shall not exceed 75 percent of the guaranteed minimum ultimate strength (M.U.S.) of the steel at any time during and after stressing.

B. Each vertical tendon in the wall shall be stressed to the value shown on the reservoir design drawings prior to installation of circumferential prestressing. The stressing of the tendons may be sequential around the tank circumference if a back-up jack is provided on site. In lieu of the Contractor providing a back-up jack, the tendons may be stressed in an every-other pattern around the tank requiring two trips around the tank in order to tension all the tendons.

C. The loss in stress in post-tensioned prestressing steel due to creep and shrinkage of concrete, creep of steel and sequence stressing shall be assumed as 25,000 psi.

D. The final force in the vertical tendon is the steel section multiplied by the final stress.

E. The final force shall be no less than the force shown on the reservoir design drawings.

F. An automatic, continuously electronically (or substantial equivalent) monitored and simultaneously recorded force-elongation reading must be made for each vertical stressing application.

G. The force-elongation reading must represent the true relationship between the elongation at any given point of the vertical stressing operation and the applied force on the prestressing steel at that same point.

H. The force-elongation relationship must be constantly maintained from the beginning, starting with the removal of the slack to the point of lock-off and complete release of the force on the vertical prestressing steel after retraction of the stressing piston or equivalent stressing device.

I. All electronically produced force-elongation readings during the vertical tendon stressing operations become the property of the Owner.

J. The ultimate initial prestressing force for vertical tendons shall not be applied until the concrete compressive strength in the wall shall have reached the specified 28-day strength.

15.22 CIRCUMFERENTIAL PRESTRESSING OPERATIONS

A. The maximum initial electronically (or substantial equivalent) recorded steel stress shall not exceed 70 percent of the guaranteed minimum ultimate strength (M.U.S.) of the steel at any time during or after stressing.

B. An automatic, continuously electronically (or substantial equivalent) monitored permanent recording of the applied force, at any point on the strand, at any point on and around the tank wall, must be made during the entire circumferential prestressing application. All such recordings must be based on a continuous sensing of the applied force on the strand between the tensioning drum and the wall as the strand is being wrapped and laid on the wall.

C. The force setting on wrapping and tendon stressing machinery shall be such that the applied forces fall within the specified minimum or maximum stress or force limitations; the force setting shall be corrected immediately when the applied force falls outside the required force

tolerance limitations.

D. In the event that the stressing machinery is incapable of holding the applied forces within the specified stress or force limitations, the Engineer will order, at Contractor's expense, the removal and replacement of such machinery in favor of a different stressing process capable of maintaining such tolerance requirements.

E. The loss in the post-tensioned prestressing steel due to creep and shrinkage of concrete, creep of steel and sequence stressing shall be assumed as 25,000 psi.

F. The final stress is the average initial stress reduced by the assumed stress loss of 25,000 psi.

G. The final force in the prestressing strand is the steel section multiplied by the final stress.

H. The final force shall be no less than the force shown on the reservoir design drawings.

I. The continuous, electronically produced force application chart during the wrapping application becomes the property of the Owner.

J. Manual, individual or intermittent force readings taken on wrapped strand in full bodily contact with the wall will not be accepted. Force readings based on anything other than instantaneous force readings, as the strand is being tensioned, and wrapped around the tank, will not be accepted.

K. Wrapping may start when the concrete has reached a compressive strength of 3,500 psi; however, under no circumstance shall the compressive stress, under any condition, exceed 55%.

L. In the event that gaps between the corewall and the wrapped strand develop that exceed 3/8 inch, wrapping shall be discontinued and the wall shall be built up with shotcrete to provide the proper curvature. Alternately, if approved by the Engineer, the gaps may be dry-packed after wrapping is completed and before shotcreting is started.

M. Wrapping over intermediate shotcrete coats or built-up shotcrete areas may commence 12 hours after the shotcrete has been applied or when the shotcrete has reached a strength of 250 psi, whichever is later.

N. Because prestressing material exposed to excessive temperatures greatly increases the possibility of irrevocable damage, such as steel embrittlement, stress corrosion, or wire splitting, the temperature of the prestressed material during application shall not be allowed to increase by more than fifty degrees at any time during such application due to the stressing technique. No system which creates a force by pulling prestressing material through a die will be allowed.

15.23 SAFETY PRECAUTIONS

A. Every precaution shall be taken to keep personnel and visitors outside the danger area of breaking strands or bars.

B. At no time shall anyone stand in the line of stressed vertical tendons or stressed strand.

C. No work shall be performed by anyone, other than the prestressing crew, within 100 feet from the wrapping operation or the application of the vertical tendon stressing operation.

D. Where access to the site by unauthorized persons is outside the Contractor's control, while prestressing work is in progress, Contractor shall erect temporary protective fencing to prevent breaking strand from endangering such persons.

E. There shall be no welding to anchor plates after the vertical tendons have been assembled, neither shall prestressing steel be used as a "ground" for welding operations.

15.24 ABRASIVE BLASTING

Exterior surfaces of the concrete corewall to be strandwrapped shall be abrasive blasted by a mechanical etching or shotblast system combined with a vacuum recovery system, or a self-contained waterblasting system. Systems that have not been used successfully in the past to prepare circular tank wall surfaces for shotcreting and strandwrapping or systems relying on abrasive blasting or steel shot without a vacuum system will not be allowed. The surface shall be sufficiently abrasive blasted to remove all laitance, form oil or other type of coatings. The surface shall be cut to a minimum CSP5 profile, as established by the International Concrete Repair Institute (ICRI), over a minimum of 90% of the surface being prepared as measured over any one square foot area. The prestressing subcontractor who is performing the abrasive blasting shall make available to the inspector ICRI sample coupons to assist in evaluating the abrasive cut.

15.25 SHOTCRETE EQUIPMENT

A. Mixing: The mixing of shotcrete material shall be done in conformance with the requirements of Section 303.03A "Concrete Work for Circumferential Wound Prestressed Reservoir."

B. Delivery Equipment

(1) The delivery equipment shall be of an approved design and size with a record of satisfactory results in similar previous work.

(2) The equipment shall be capable of discharging mixed materials into the hose under close control and shall be able to deliver a continuous smooth stream of uniformly mixed material at the proper velocity to the discharge nozzle, free of any kind of slugs.

(3) The equipment shall permit concrete, water and air to be distributed to the automated shotcrete tower through a swivel pin located at the center of the tank.

(4) The nozzle shall be of a design and size that will ensure a smooth and uninterrupted flow of materials.

(5) Delivery equipment shall be thoroughly cleaned at the end of each shift.

(6) Equipment parts shall be regularly inspected and replaced as required.

C. Air Supply: The air capacity of the compressor shall be large enough that the minimum amount of air to be available at the nozzle shall be no less than 400 CFM, irrespective of whether or not air from the same air supply is used for other purposes.

15.26 SHOTCRETE APPLICATION PROCESS

A. Shotcrete shall be applied under the wet mix process only.

B. Nozzles shall be mounted on power driven machinery enabling the nozzle to travel parallel to the surface to be sprayed at a uniform linear or bi-directional speed.

C. The nozzle shall be kept at a uniform constant distance from the surface, always insuring a right angle spray of the material to the surface.

D. Hand operated nozzles and shotcreting operations dependent on the performance of the nozzleman will not be accepted except where additional shotcrete is needed to correct flat areas or for architectural surface treatments.

E. Grout materials shall be delivered to the jobsite in ready-mix trucks from approved batching plants. However, job mixing will be accepted provided automatic weigh batch plants are used.

F. The sand, cement and water shall be premixed before being pumped through a 2" minimum hose by specially designed mortar pumps.

G. The high velocity impact of the shotcrete shall be developed pneumatically by injecting compressed air at the nozzle.

15.27 SHOTCRETE PLACING AND FINISHING

A. General

(1) Shotcrete shall be applied in a steady, uninterrupted flow.

(2) Should the flow become intermittent for any cause, the machine operator shall direct the nozzle away from the work until it again becomes constant, or shut off the flow of materials.

B. Position of Pneumatic Nozzles: The nozzle shall be held at approximately right angles to the surface and shall be kept at a constant and proper distance, as dictated by good practice standards for the type of application, type of nozzle and air pressure employed.

C. Shotcreting More Than One Layer

(1) Sufficient time shall be allowed for each layer of shotcrete to set up to prevent the next layer from sagging.

(2) The shotcrete shall be started at the bottom of the wall and proceed upward until all

wrapped strand has been covered. Subsequent shotcrete layers may be applied from the top down or from the bottom up at the discretion of the Contractor.

(3) While the nozzle travels around the wall, the nozzle shall be raised or lowered at a uniform rate in such a manner that an adequate overlapping of coatings and a uniform finish develops.

(4) The nozzle shall be spiralled up or down around the tank to either the top or the bottom of the wall or to the termination of the strand layer being covered.

D. Application of Shotcrete

(1) To ensure proper penetration around the strand and proper conveyance of the material through the hose, a 5" to 7" slump of the mortar at the pump is recommended.

(2) The application of the shotcrete in the number and thickness of layers specified in design drawings by Contractor is mandatory for proper penetration of shotcrete behind prestressing steel and to reduce shrinkage due to more uniform in-depth drying of the shotcrete. The moisture absorption by earlier applied layers is relied upon to improve the bond and strength of the material and to reduce drying shrinkage of the applied shotcrete.

E. Shotcrete Covercoats Over Wrapped Strand

(1) Each layer of wrapped prestressing steel shall be covered with shotcrete until a minimum cover of 3/8" over the steel has been obtained.

(2) The final covercoat, to make up for the full thickness of shotcrete over the outermost strand layer, shall be applied in at least 3 layers of equal thickness.

(3) Each layer of shotcrete shall be completed for the full circumference of the tank and substantially the full height of that layer before the next layer of shotcrete may be applied.

F. Coating Thickness

(1) All shotcrete coatings shall be built up in layers of approximately 3/8 inch in thickness until the final required thickness has been obtained.

(2) Unless otherwise shown on the Drawings, the minimum shotcrete cover over all wrapped steel shall be 1.5 inch.

G. Finish Coat

(1) After the minimum shotcrete cover specified over the wrapped prestressing strand has been completed by the automated shotcrete procedure, and only if such finish requirements are shown on the Drawings, the exterior surface shall be given an acceptable float finish true to line and curvature and to details shown on the Drawings.

(2) If a float finish is required on the Drawings, plaster or hand-applied shotcrete may be used to build up and level the surface and to obtain the desired surface finish and projections.

(3) The finish coat mix (if a smooth float finish is required on the Drawings), shall consist of a minimum of one sack of cement for every 3-1/2 cubic feet of moist plaster sand.

(4) If no finish requirements are shown on the Drawings, it is intended to have a natural original gun finish of the shotcrete covercoat.

H. Protection of Adjacent Buildings and Surface

(1) Contractor shall take every possible precaution to protect adjacent buildings, concrete surfaces, vehicles, equipment, etc., from being damaged by overshooting shotcrete and by materials carried away by the wind.

(2) Overshot shotcrete and rebound materials deposited on the roof shall be removed before it adheres to the concrete surface.

(3) Contractor shall pay for all damages caused by his operations under this contract.

15.28 SHOTCRETE TESTS: Testing of shotcrete shall conform to Section 303.03L "Field Tests of Concrete" of these Special Provisions.

15.29 NOZZLEMAN REQUIREMENTS FOR HAND PLACED SHOTCRETE

A. To ensure a high quality shotcrete, the Contractor shall satisfy the Engineer that the nozzleman has had sufficient and acceptable experience in the application of structural shotcrete.

B. Experience gained on shotcrete pool and ditch construction will not be considered as experience for qualifying the nozzleman, unless approved by the Engineer.

C. The nozzleman shall be capable of applying thin coats of even and uniform thickness.

D. The nozzleman's skill will be tested and approved by the Engineer before he may start any work.

15.30 RESTRICTIONS ON SHOTCRETE OPERATION

A. Shotcrete shall not be applied under such strong wind conditions that a considerable amount of cement and moisture will be removed by the wind from the mortar spray between the nozzle and the surface intended to have shotcrete applied.

B. The Contractor may apply shotcrete under the conditions specified herein solely at his own risk.

C. Whenever rain or frost has damaged shotcrete that has not had a chance to set up, such shotcrete shall be removed and replaced.

D. Contractor shall consult with the Engineer to determine whether or not the shotcrete damaged by rain or frost will be accepted before applying any additional layers of shotcrete.

15.31 SHOTCRETE WATERCURING

A. Intermediate layers of shotcrete shall be kept damp by hand curing or other means no sooner than 12 hours after the shotcrete has been applied.

B. This watercuring is not required should additional shotcrete be applied on the entire wall surface within the following 12 hours.

C. An indiscriminate use of continuous watercure for intermediate layers shall be avoided.

D. Complete shotcrete surfaces, which do not receive any additional coatings, shall be watercured for a period of at least seven (7) days by encapsulating the shotcrete with plastic sheeting. Such plastic sheeting shall be lapped and sealed as necessary to properly cure the shotcrete. Membrane curing methods utilizing curing compounds or wax-based residuals will not be permitted.

E. Wall coatings, as specified in Section 303.27, shall be applied no later than five (5) days after completion of the watercuring. If conditions make it impossible to apply coatings within the five (5) day period, shotcrete shall be watercured for a period of ten (10) days instead of the seven (7) days specified here-in.

15.32 CLEANING AND WATERPROOFING

A. After construction is completed, the interior of the tank shall be completely hosed out and cleaned of all dirt and loose material.

B. Cracks in the floor slab, wall, footings, columns or roof slab, which may have developed from drying shrinkage, shall not be taped or chipped out and caulked. All cracks shall be pumped and sealed with a two-part water insensitive epoxy as described in SP-11 "EPOXY ADHESIVE INJECTION OF CONCRETE CRACKS".

15.33 LEAK TESTING AND REPAIRS

A. Testing

(1) Leak testing of the tank shall be conducted prior to coating either interior or exterior concrete or shotcrete surface and disinfection and shall follow the procedures described in the Water System Standards, Section 303.10 "Reservoir Leakage Test and Disinfection".

(2) Testing shall be completed before the tank is backfilled, if applicable.

B. Leak Detection Methods

(1) Leaks in floor construction joints may be detected with the aid of a diver.

(2) Mud or cement deposits on the floor, when stirred up, would flow to the leak and may indicate the leak locations.

(3) Honeycomb and cracks around waterstops may be detected through tapping with a hammer along the joint.

(4) The Engineer may require any of these procedures when cement seeding has not stopped the leaks.

(5) Leakage through joints, which may have resulted from bent over waterstops or honeycomb under or around waterstops may require the removal of concrete around the waterstops in suspected areas.

(6) Chipped out concrete areas shall be properly repaired as specified in Section 303.03.T and the amendments contained in these Special Provisions.

C. Acceptance

(1) Any cracks, voids, honeycomb or cold joints showing or causing running leaks of water, shall be epoxy pumped by qualified operators until such cracks and voids have been completely sealed. If requested by the Contractor to stop floor leakage and if allowed by the Engineer, the floor may be covered with a minimum of two inches of water and pure cement shall then be spread evenly over the entire floor area at the rate of one sack of cement to every 1000 square feet of floor area. The floor shall not be allowed to dry after the application of cement. If the tank has been cement seeded and if the tank is drained during the warranty period, Contractor shall be given fourteen (14) days advance notice and Contractor shall promptly remove all cement residue from the tank floor and clean the tank to the Engineer's satisfaction. The DOW shall pay for the subsequent tank disinfection and chlorination.

(2) The tank shall not be backfilled until and unless the Engineer has accepted the tests.

(3) This section shall be applicable during the entire specified warranty period of the tank.

(4) After the completion of the reservoir leakage test, the reservoir shall remain filled until the reservoir is chlorinated and placed in service.

15.34 TANK DISINFECTION

A. Disinfection of the tank shall only proceed after the tank has been leak tested and the interior and exterior coating per the construction documents have been applied and accepted.

B. The disinfection of the tank shall be performed as described in the Water System Standards, Section 303.10 "Reservoir Leakage Test and Disinfection".

15.35 PAYMENT

Payment for the work in this section shall not be made separately, but will be included with the

lump sum amount for the item this is apart as stated in the Proposal.

END OF SECTION

SECTION SP-16 – PROTECTIVE COATINGS

16.01 GENERAL: Work includes the furnishing of all labor, tools, materials, and equipment required for surface preparation, waste disposal, pretreatment, coating application, touch-up, protection of uncoated surfaces, inspection, clean-up and all appurtenant work for protective coating on the interior concrete surfaces and internal piping of the reservoir. The specified coating systems shall be applied only to the surfaces and miscellaneous surfaces as noted in these specifications or shown on the Drawings. This specification modifies and supplements the painting of the interior concrete surfaces and internal piping of the reservoir as specified in "Water System Standards," State of Hawai'i, dated 2002, as amended.

The work shall be as follows:

1. Submit Worker Health and Safety Plan
2. Submit scaffolding plan
3. Pre-construction meeting
4. Install scaffolding
5. Abrasive blast surfaces to be coated per manufacturer's specifications to provide an anchor pattern suitable for coating system components
6. Test for chlorides and pH to confirm levels are within manufacturer's acceptable levels.
7. If chlorides and pH testing results require additional cleaning, the Contractor shall steam clean the area(s) in question using steam at 275 degrees F.
8. Feather all broken edges of concrete to form a smooth transition, by grinding or other mechanical methods.
9. Vacuum concrete surface to remove dust and all loose debris.
10. Apply protective coatings as required per these specifications, and in accordance with manufacturer's recommendations.
11. Provide full time, NACE inspection for dry film thickness, holiday detection, and adhesion testing. Contractor shall furnish all inspection equipment at the request of the Inspector as needed.
12. Remove scaffolding
13. Restore the site to its original condition, or better.

The following surfaces shall not be coated hereunder unless indicated elsewhere in the bid documents:

1. Interior stainless steel ladder
2. Stainless steel items
3. Machined surfaces
4. Nameplates
5. Valve assemblies

16.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 303.03 CONCRETE WORK

B. Section 303.06 REINFORCED CONCRETE RESERVOIR

16.03 REFERENCES:

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In case of conflict between the requirements of this specification and those of the listed documents, the requirements of this specification shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued, or replaced.

A. 29 CFR – Code of Federal Regulations Title 29, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor

B. 29 CFR 1910 – Occupational Safety and Health Standards

C. 29 CFR 1910.146 – Permit Required Confined Space

D. 29 CFR 1910.502 – Fall Protection Systems Criteria and Practices

E. 40 CFR – Code of Federal Regulations Title 40, Environmental Protection Agency

F. 40 CFR 50 – National Primary and Secondary Ambient Air Quality Standards

G. 40 CFR 50.12 – National Primary and Secondary Ambient Air Quality Standards for Lead

H. 40 CFR 60 – Standards of Performance for New Stationary Sources

I. 40 CFR 60.372 – Standards for Lead

J. 40 CFR 302 – Designation, Reportable Quantities, and Notification

K. ASTM – American Society for Testing and Materials International

L. ASTM D4258 – Standard Practice for Surface Cleaning Concrete for Coating

M. ASTM D4259 – Standard Practice for Abrading Concrete

N. ASTM D4262 – Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces

O. ASTM D4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

P. ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness by Notched Gages

Q. ASTM D4417 – Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

R. EPA – Environmental Protection Agency

S. EPA Method 1311 – Toxicity Characteristic Leaching Procedure (TCLP)

T. EPA Method 3050 – Acid Digestion of Sediments, Sludges and Soils

U. EPA SW 846 - Test Method for Evaluating Solid Waste Physical/Chemical Methods

V. ICRI Technical Guideline No. 310.2 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays (formerly No. 03732).

W. NACE – National Association of Corrosion Engineers, the Corrosion Society

X. NACE No. 2 – Near-White Metal Blast Cleaning

Y. NACE No. 3/SSPC-SP6 – Joint Surface Preparation Standard: Commercial Blast Cleaning.

Z. NACE No. 5/SSPC-SP12 – Joint Surface Preparation Standard: Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.

AA. NACE No. 6/SSPC-SP13 – Joint Surface Preparation Standard: Surface Preparation of Concrete

BB. NACE RPO-287 – Field Measurements of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using Replica Tape.

CC. NIOSH – National Institute for Occupational Safety and Health

DD. NSF – National Sanitation Foundation

EE. NSF 61– Drinking Water System Components

FF. SSPC – Steel Structures Painting Council, the Society for Protective Coatings

GG. SSPC Guide 6 – Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations

HH. SSPC Guide 15 – Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates

II. SSPC-SP1 – Solvent Cleaning

JJ. SSPC-SP2 – Hand Tool Cleaning

KK. SSPC-SP3 – Power Tool Cleaning

LL. SSPC-SP5 – White Metal Blast Cleaning

MM. SSPC-SP6 – Commercial Blast Cleaning

NN. SSPC-SP10 – Near-White Metal Blast Cleaning

OO. SSPC-SP11 – Power Tool Cleaning to Bare Metal

PP. SSPC-SP13 – Surface Preparation of Concrete

QQ. SSPC PA 1 – Shop, Field, and Maintenance Painting of Steel

RR. SSPC PA 2 – Measurement of Dry Film Thickness with Magnetic Gauges

SS. SSPC VIS 1 – Guide and Reference Photographs for Steel Surfaces Prepared by Dry Adhesive Blast Cleaning

TT. SSPC VIS 3 – Guide and Reference Photographs for Steel Surfaces Prepared by Hand and Power Tool Cleaning

Whenever the Drawings or these Specifications require a higher degree of workmanship or better quality of material indicated by the above standards, then these Drawings and Specifications shall prevail.

16.04 SUBMITTALS: The Contractor shall submit the following items:

A. Technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.

B. Standard color options. The tank lining shall be white or off-white, unless otherwise directed by the Department of Water.

C. Material Safety Data Sheets (MSDS) for each product used.

D. Guidelines and recommendations for each product used including surface preparation, mixing, application, handling, storage, and cleanup. This shall include minimum time requirements for coating, recoating, and surface patches.

E. Copies of independent testing performed on the protective coating materials indicating that the protective coating materials meet the requirements as specified herein. Material test results and measurements.

F. Shop Drawings: Forced heating, dehumidification, shading, and ventilation equipment specifications as required.

G. Samples

1. Samples of each coating system shall be submitted on a 3-inch by 3-inch by 1-inch thick concrete or mortar block. Each block shall be completely coated at the specified thickness over one 3-inch by 3-inch surface with the applicable coating system. Samples shall be labeled with the coating type, application method, and dry film thickness.

2. Samples shall be provided for each batch of material to be used on the project, and shall be accompanied with certification from the manufacturer that the batches provided as samples match the batches supplied to the job site. Failure to comply may result in rejection of the finished work by the Department of Water.

3. The manufacturer's standard details for coating over joints/cracks, pipe penetrations, edge terminations, plate overlaps, and welds shall be provided.

H. Application Contractor's Qualifications:

1. Manufacturer certification that Applicator has been trained and approved in the handling, mixing, and application of the products to be used.

2. Certification that the equipment to be used for applying the products has been approved by the protective coating manufacturer and Applicator personnel have been trained and certified for proper use of the equipment.

3. Three references which verify that the coating contractor has demonstrated successful application of the specified coating systems in the past three years. Provide the site (area of coating), date of completion, the project owner's name, address and telephone number for each installation referenced.

4. Applicator must provide written documentation of having installed a minimum of 50,000 square feet (sf) of plural component spray applied protective coating the same or similar to that specified herein within the last five (5) years.

5. Proof of any necessary federal, state, or local permits or licenses necessary for the project.

6. The Contractor shall provide SSPC QP 1 Certification for application equipment.

16.05 QUALITY ASSURANCE:

A. The Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE, and SSPC standards and the protective coating manufacturer's recommendations.

B. Protective coating products shall be standard products by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions and have proven reliability of at least five (5) years. If requested, the Contractor shall provide the Department of Water with the names of not less than five (5) successful applications of the proposed manufacturer's products demonstrating compliance with this requirement.

C. Materials have been specified from catalogues of manufacturers in most of the cases, to show the type and quality coatings required. Materials by other manufacturers are acceptable provided they are established as being compatible with and of equivalent quality to the coatings of the companies referenced. The Contractor shall provide satisfactory documentation from the manufacturer of the proposed substitute material that said material meets the requirements and is equivalent to or better than the listed materials in the following properties:

1. Quality
2. Durability
3. Resistance to abrasion and physical damage
4. Life expectancy
5. Ability to recoat in future
6. Solids content by volume
7. Dry film thickness per coat
8. Compatibility with other coatings
9. Suitability for the intended service
10. Resistance to chemical attack
11. Temperature limitations in service and during application
12. Type and quality of recommended undercoats and top coats
13. Ease of application
14. Ease of repairing damaged areas
15. Stability of colors
16. Adhesion strength

Three references which verify that the submitted coating system has been used in similar environments and on similar surfaces in the past five (5) years. Provide the name, the owner's address and telephone number for each installation referenced.

The cost of all testing and analysis of the proposed substitute materials that may be required by the Inspector, shall be paid by the Contractor. If the proposed substitution requires changes in the contract work, the Contractor shall bear all costs involved and the costs of allied trades affected by the substitution.

D. A pre-construction meeting shall be convened three (3) weeks prior to start of coating system application. Meeting attendance is required of all parties directly affecting work of this Section, including Department of Water, General Contractor, application Contractor, Inspector and manufacturer's representative. In the meeting the following shall be discussed/reviewed:

1. Safety
2. Shutdown plan and schedule
3. Environmental requirements
4. Protection of surfaces not scheduled to be coated
5. Field quality control
6. Cleaning
7. Surface Preparation
8. Application
9. Repair of coating
10. Inspection
11. Coordination with other work
12. Required reports
13. Contractor/Inspector/Owner relationship

A. A NACE Certified Coating Inspector shall be provided by the Contractor. The Inspector will observe daily operations, procedures, and final product to ensure adherence to the specifications by Applicator.

B. The Contractor shall provide a list of three (3) potential NACE inspectors in their proposal with qualifications for DOW to select one (1) to provide quality assurance on the project. All costs associated with the inspector chosen shall be borne by the Contractor.

C. The protective coating manufacturer shall provide at least two (2) days of on-site observation and site-specific recommendations relative to surface preparation, handling, application, and curing of the manufacturer's products.6.06.

16.06 HEALTH AND SAFETY

A. In confined space environments, as defined in 29 CFR 1910.146, work shall comply with the requirements set forth by OSHA applicable to the construction industry. The Contractor shall provide the require use of safety and personnel life-saving equipment for persons working in Confined Space areas, including but not limited to the following:

1. Adequate forced ventilation, harnesses, and gas detection meter(s) that continually monitors for oxygen, hydrogen sulfide, carbon monoxide, and low explosive limit (LEL) gas levels.

2. Fall protection shall be in accordance with 29 CFR 1926.502. All temporary ladders and scaffolding shall conform to applicable safety requirements.

3. Contractor shall provide all head and face protection equipment and respiratory devices required to safely perform this work. Equipment shall include any applicable masks recommended by the manufacturer while performing blasting or application of the coating materials.

4. Use of ear protection devices shall be provided and required by the Contractor whenever the occupational noise exposure exceeds OSHA limits.

B. Failure to comply with health and safety laws, regulations, codes, permits, and Standard Operation Procedures will be grounds for shutting down the Work. All costs resulting from a shutdown of the Work that are due to Contractor's negligence or failure to comply with applicable safety requirements shall be borne by the Contractor. After a shutdown of the Work, the Work will not be permitted to begin again until the Inspector is satisfied that all necessary health and safety precautions are provided and implemented.

C. Flammable or volatile solvents in coating system components constitute a hazard with regard to fire and explosions wherever flame or spark exposure is possible. All flames, smoking, and welding, etc., are strictly prohibited in work or storage areas. Fire abatement devices shall be readily available and in operating condition. Necessary precautions shall be taken to keep fire hazard to a minimum; all oily rags, waste, and other combustibles not in covered containers shall be removed from the area daily. All flammable products shall be stored in conformance with applicable State, Owner and local fire codes pertaining to flammable materials.

1. The coating products shall never exceed the current VOC limits set by EPA and the State of Hawaii Clean Air Branch. The Contractor shall be responsible for all fines or

legal costs resulting from any VOC limit violations.

16.07 INSPECTION AND TESTING

A. The Contractor shall give the Department of Water and Inspector 3 days' advance notice of the start of any field surface preparation work or coating application work.

B. The Contractor shall provide a full time NACE Certified Coating Inspector at the work site anytime work is being done on this section of the project. The Inspector shall have the authority to coordinate work and make decisions pertaining to the fulfillment of this phase of the contract. The Inspector shall have a minimum of 5 years of experience in the application of the specified coatings.

C. All work relative to preparation for the application of coatings shall be conducted under the full time Inspector. The Inspector's services shall be provided and paid for by the Contractor. The Inspector shall have the authority to act on behalf of the Department of Water to reject any coating work that does not comply with these specifications or the manufacturer's written specifications.

D. Prior to the start of any work, the Contractor shall establish with the Inspector, schedules and notification procedures to ensure all surface preparation work has been inspected prior to the application of any coating. These procedures shall remain in effect for the duration of the coating project. Under no circumstances shall any surfaces be coated without prior approval of the inspector. Coatings applied without the Inspector's authorization shall be removed and reapplied at the sole expense of the Contractor.

E. The Contractor shall make the following equipment available to the Inspector upon request:

1. Holiday testers

2. Film thickness testers

3. Surface preparation concrete comparators

4. Adhesion testers

16.08 APPLICATION RECORDS

The Contractor shall maintain an accurate, written record of the quantity of coating material applied and the corresponding surface area covered, a description of the area coated, the batch number, surface temperature, ambient temperature, relative humidity, dew point, and applicator on a daily basis. The Contractor shall furnish a signed copy of said record to the Inspector at the beginning of the next working day. These quantities shall be independently verified by the Inspector and reported on the Inspector's log. The Inspector shall immediately investigate and resolve any discrepancies between these reported quantities.

16.09 SERVICES OF MANUFACTURER

The Contractor shall require the coating manufacturers to furnish the following services:

1. The manufacturer's representative shall furnish at least 6 hours of on-site instruction in the proper surface preparation, use, mixing, application, and curing of the coating systems.

2. The manufacturer's representative shall personally observe the start of surface preparation, mixing, and application of coating systems.

3. The manufacturer's representative shall provide technical support to resolve field problems associated with the manufacturer's products furnished under this Contract or the application thereof throughout the duration of the work.

4. The coating manufacturer shall provide written certification that the coating contractor's Supervisor and each applicator performing work on the project has been trained and approved to apply the selected coating system.

16.10 WARRANTY

A. The Contractor and manufacturers shall warrant the coating system applications for a period of 3 years after final acceptance of the work. The contractor shall submit to the Department of Water a 3-year warranty bond for the total value of the complete coating system which shall cover any defects and workmanship repairs completed during the warranty period. The Contractor, at no cost to the Department of Water, shall perform all work and supply all equipment and materials associated with the repair of failures identified in the warranty inspection.

B. The material manufacturer shall warrant, for a period of 5 years, that its products meet published physical properties and that they are free of manufacturing defects. The manufacturer shall replace any defective product.

C. The Contractor shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during the warranty period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Department of Water.

D. In the event of fault disagreement, warranty issues will be resolved through mediation involving the services of a NACE Certified Coating Inspector. Mediation and Inspection costs shall be borne by the party found to be responsible for the coating failure.

16.11 COATING SYSTEM PRODUCTS:

A. Definitions:

The terms "paint," "coatings," and "finishes," as used herein, shall mean surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, except galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

B. Compatibility: In any coating system only compatible materials from a single manufacturer shall be used in the Work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the approval of the Inspector, a barrier coat shall be applied between existing prime coat and subsequent top coats to ensure compatibility.

C. Colors: All colors of all paint coatings shall be as indicated by the Department of Water. If colors are not indicated, then colors other than the final coat shall be selected by the Contractor. Finish colors shall be selected by the Department of Water from the manufacturer's standard color samples.

16.12 PRODUCT DELIVERY AND STORAGE

A. Coating materials shall be delivered to the job site in sealed containers with weather resistant labels that clearly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use. Any products exceeding the manufacturer's recommended shelf life shall not be used.

B. The Contractor shall be responsible for providing temporary storage facilities to protect materials and equipment stored facilities to protect materials and equipment stored on-site from the elements and unauthorized personnel. The storage facility shall be capable of 24-hour climate control to maintain products within the storage temperature and humidity limits recommended by the manufacturer. The location of the storage container shall be approved in advance by the Inspector. If materials delivered to the site are used within 24 hours, the Contractor does not need to provide a storage facility as stated above.

1. The storage facility shall be capable of containing a spill or rupture of the coating system containers within the storage facility.

16.13 ABRASIVES

A. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendations. All abrasives shall be new, clean, and delivered to the project site in unopened, weather resistant containers. Abrasive materials shall not be recycled for further use on this project unless approved by the Inspector.

B. All abrasives shall meet the requirements of the EPA. At no time will silica sand be allowed or used on the job site.

C. All abrasives shall be disposed of in accordance with all federal, state, and local laws at the Contractor's expense with no cost to the Department of Water. Abrasives shall not be disposed of on-site.

16.14 EXISTING PRODUCTS

A. Standard Portland cement or new concrete (not quick setting high strength cement) must be well cured (minimum 28 days) prior to application of the protective coating system components.

B. Cementitious patching and repair materials must be approved prior to use as compatible with the protective coating. The manufacturer of the cementitious material shall provide information as to its suitability as a top coating with the specified protective coating. Project-specific submittals and procedures shall be provided, including application, cure time, and

surface preparation procedures which permit optimum bond strength with the protective coating.

C. Remove existing coatings prior to application of the new protective coating. The Applicator shall maintain strict adherence to applicable NACE and SSPC recommendations with regard to proper surface preparation and compatibility with existing coatings.

16.15 COATING SYSTEMS

A. Coating: One of the following 100 percent solids coating systems, NSF 61 certified, or an approved equal, shall be used to coat the interior surfaces of the tank:

Product:	**Polibrid 705**	**Endura-Flex® 1988 (EF-1988)**	**AquataPoxy A-6**
Type:	100% solids, elastomeric polyurethane	100% solids, elastomeric polyurethane	100% solids, amine cured epoxy
Manufacturer:	Carboline (916) 797-4525	Global Eco Technologies (925) 473-9250	Raven Lining Systems (800) 324-2810
Surface Filler:	Per Manufacturer's Recommendation	Per Manufacturer's recommendation	Per Manufacturer's recommendation
Primer:	Per Manufacturer's recommendation	Per Manufacturer's recommendation	Per Manufacturer's recommendation
Topcoat:	Polibrid 705, @ 80 mils DFT	Endura-Flex® 1988, @ 80 mils DFT	AquataPoxy A-6, @ 40 mils DFT
Joint Sealant:	Per Manufacturer's recommendation	Per Manufacturer's recommendation	Per Manufacturer's recommendation
Total Systems DFT:	80 mils DFT	80 mils DFT	40 mils DFT

B. Surface preparation products for concrete: Biodegradable water-based surface cleaner shall be "Devprep 88" by Devoe or equivalent.

16.16 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on all work.

B. All coatings shall be applied under dry and dust-free conditions. Coatings shall be applied in a workmanlike manner to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to ensure that these areas are thoroughly cleaned and an adequate thickness of coating material is applied. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding.

16.17 PROTECTION OF SURFACES NOT TO BE COATED:

A. Remove, mask, or otherwise protect all surfaces not intended to be coated. Provide drop cloths to prevent coating materials from falling on, marring, or over spraying adjacent surfaces.

B. Surfaces not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations.

16.18 ENVIRONMENTAL CONSIDERATIONS

A. Coating Limitations: No coating work shall be performed under the following conditions:

1. Temperatures exceed the manufacturer's recommended maximum or minimum allowable.

2. Dust or smoke laden atmosphere.

3. Damp or humid conditions, where the relative humidity is above the manufacturer's maximum allowable limit.

4. Substrate or ambient temperatures are less than 5°F above the dew point. Dew point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce, Weather Bureau psychrometric tables.

5. Ambient temperature that is expected to drop below 50°F or less than 5°F above the dew point within 8 hours after application of coating.

6. Concrete surfaces contain a moisture content above that specified by the coating manufacturer.

B. Humidity Control: Desiccant or Direct Expansion Refrigeration dehumidification will be required to control the environment in the space 24 hours a day during blast cleaning, coating application and coating cure. Equipment will conform to the following requirements:

1. Equipment – Desiccant dehumidifiers will be a solid desiccant design having a single rotary desiccant wheel capable of fully automatic continuous operation. No liquid, granular, or loose lithium chloride drying systems will be accepted. The use of direct expansion (DX) refrigeration type dehumidifiers with reheat may be considered if the expected ambient temperature will remain above 60°F. Heating the space changes relative humidity only and does not change the dew point temperature. Heat alone, therefore, is not a substitute for dehumidification, unless substrate temperature is high enough to meet the dew point differential. The dehumidification system may consist of a combination of desiccant and refrigerant equipment.

2. Air Changes – the air change rate for maintaining the required spread of 17°F between inside surface temperature and inside space dew point temperature with a maximum relative humidity of 45% in the space will depend upon the type of equipment to be used and the time of year during the application. There shall be a minimum of 2 air changes to hold the desired degree of cleanliness of the blast.

C. Temperature Control:

1. Auxiliary cooling or insulation may be necessary to maintain the surface temperature at an acceptable level for the coating manufacturer's application parameters. This auxiliary

equipment must be approved for use by the supplier of the dehumidification equipment and will meet the following requirements.

a. Refrigerant type systems must be installed in the process air supply duct and/or blended with the dehumidifier as close to the work space as possible.

b. Only electric, indirect fired combustion, or steam coil auxiliary heaters will be used. No direct – fired space heaters will be allowed during the blasting, coating, or curing phases.

c. The space to be controlled will be sealed off as well as possible, allowing air to escape the workspace away from the point where the dehumidified air is being introduced. If it is necessary to filter the air escaping the space, the filtration system must be designed so that it does not interfere with the dehumidification equipment's ability to control the dew point and relative humidity of the workspace.

D. Atmospheric Conditions: The work and structure are located in an area that may be subject to extended periods of high humidity. The Contractor shall be expected to maintain the established production schedule despite these potentially adverse conditions by providing all labor, equipment and materials necessary to maintain a controlled environment in the area where work is to be performed. The substrate and atmospheric conditions within the controlled environment, with respect to temperature, relative humidity and dew point, shall be maintained within the limits established by the manufacturer pf the selected coating system to ensure proper application and cure of the coating.

E. Dewatering: The Contractor shall dewater and stop any active water flow into areas to be coated.

16.19 SURFACE PREPARATION (CONCRETE SURFACES)

A. All surfaces to be coated and protected shall be inspected as indicated below by the Contractor prior to starting surface preparation. Contractor shall notify the Inspector in writing of any defects or discrepancies that will not allow the coating to be properly installed. Commencement of work shall be construed as acceptance of the surfaces and it shall be the responsibility of the Contractor to correct any defect appearing in the surfaces once the coating preparation work has begun.

B. Concrete repair materials shall be compatible with the specified coating system and shall be thoroughly cured per the coating manufacturer's recommendations prior to the start of installation.

C. The Contractor shall comply with the applicable EPA and State of Hawaii Clean Air Branch regulations for blast cleaning.

D. Abrasive blasting shall be performed only by skilled personnel utilizing appropriate equipment. A pattern shall be followed by the blaster to ensure a uniform surface, free of contaminants and having an open pore structure is produced.

E. Abrasive blasting, water jetting and coating application hoses shall be grounded to prevent accumulation of static electricity.

F. Compressed air for air blast cleaning shall be supplied at adequate pressure from compressors equipped with oil/moisture separators that remove at least 95% of the contaminants. The performance of the oil/moisture separators will be subject to blotter tests for conformance.

G. Surface Preparation shall be as follows:

1. All degraded concrete and loose mortar shall be removed in accordance with SSPC SP2 and SP3.

2. The Contractor shall test the surfaces for soluble salts with the use of Chlor*Test as manufactured by Chlor*Rid International or approved equivalent. The interior surfaces of the tank shall have a maximum concentration of 5 micrograms per square centimeter ($\mu g/cm^2$). A test shall be conducted for every 500 square feet (ft^2) of surface area to be coated at locations determined by the Inspector.

3. If the soluble salt test indicates chloride concentrations greater than the limit outlined in these Specifications, the Contractor shall use Chlor*Rid, as manufactured by Chlor*Rid International, in the water source during water cleaning to remove the salts from the substrate. A substrate's surface preparation will be accepted once the soluble salt concentration is below the limit listed in these Specifications.

4. If there are no soluble salts on the surfaces after removal of the existing coating and damaged concrete, the surfaces shall be cleaned with a detergent in accordance with ASTM D4258. Detergent residue shall be thoroughly removed from the concrete surface with clean water.

5. Abrasive blast cleaning shall be performed using dry abrasive blasting procedures in accordance with ASTM D4259 and SSPC SP 13/NACE No. 6. Abrasive particle size and type shall be sufficient to produce a surface profile conforming to the manufacturer's recommendations for each coating product. Abrasive material in the blast cleaning operation shall be free of contaminants that would interfere with adhesion of the coatings and shall not be reused.

6. The blast pattern shall be by systematic removal from a defined rectangular area. Evidence of random blast patterns or contaminants will result in rejection of the surface and the blasting will be repeated until a suitable surface is obtained. The texture of the concrete surface after blasting shall be similar to that of coarse sandpaper. Any sharp, protruding edges shall be rounded or trimmed by chipping, peening, brushing or other approved methods.

7. During abrasive blast cleaning, prevent damage to adjacent coatings or structures. Blast cleaning and coating shall be scheduled such that dust, dirt, blast, particles, old coatings, or other contaminants, will not damage or fall upon uncured coatings.

8. After abrasive blasting, surfaces shall be cleaned by vacuum, or washed with clean water to remove dust, salts and detergent residue.

9. The finished surface shall consist of sound concrete with exposed aggregate. The Contractor shall not remove more material than necessary from the concrete surface in order to meet these requirements.

10. Concrete surfaces to be coated shall have an even color, gray or gray-white. The surface shall not have pockets, holes, or sharp changes of surface elevation. Scrubbing with a stiff bristle-fiber brush shall produce no dusting or dislodging of cement or sand. Sprinkling water on the surface shall produce no water beads or standing droplets.

11. In accordance with ASTM D4262, test to determine the pH of the concrete surface after the surface has been thoroughly cleaned and washed. If the pH is outside the range recommended by the coating manufacturer, then the surface must be neutralized by removing concrete until the surface pH of 7 or greater is obtained prior to any coating application. One pH test shall be performed every 500 square feet, or less, and at locations determined by the Inspector.

12. The Contractor shall test for capillary moisture in accordance with ASTM D4263. Moisture tests shall be taken every 500 square feet or less and at locations determined by the Inspector. If capillary moisture is present, the coating manufacturer shall be consulted to determine primer requirements and special coating application criteria.

13. All abrasive blasting material and debris generated by the cleaning procedure shall be removed from the site to an appropriate disposal facility at the Contractor's expense.

14. In the event that questions arise concerning the quality of the blast cleaning, the Inspector shall be the sole judge as to whether the level of cleanliness conforms to the standard and specifications.

H. The Contractor shall keep the work area in a clean condition and shall not permit materials to accumulate as to constitute a nuisance or hazard to the work performance or the operation of the existing facilities.

I. Concrete surfaces requiring spot repair shall be rehabilitated following surface cleaning and abrasive blasting. After the applied concrete repair materials have cured per the manufacturer's recommendations, they shall be swept blasted to remove surface residuals and establish an anchor profile equivalent to coarse sandpaper prior to coating application.

J. All prepared surfaces shall be observed and approved by the Inspector prior to subsequent work.

16.20 SURFACE PREPARATION (STEEL SURFACES)

A. All hand tools used for grinding and sanding on or near lead containing paint shall be equipped with High Efficiency Particulate Air (HEPA) filters designed to contain paint chips.

B. Surface preparation shall be performed as follows:

1. Remove all existing debris, dirt, and deteriorated coating by Low Pressure Water Cleaning per SSPC SP 12/NACE No. 5. The minimum pressure of the Water Cleaning shall be 5,000 psi.

2. The Contractor shall test the surfaces for soluble salts with the use of Chlor*Test as manufactured by Chlor*Rid International or approved equivalent. The steel surfaces within the tank shall have a concentration of 0 micrograms per square centimeter ($\mu g/cm^2$). A test shall be conducted for every 500 square feet (ft^2) of steel surface area to be coated at locations determined by the Inspector.

3. If the soluble salt test indicates chloride concentrations greater than those outlined in these Specifications, the Contractor shall use Chlor*Rid, as manufactured by Chlor*Rid International, in the water source during water cleaning to remove the salts from the steel surfaces. A substrate's surface preparation will be accepted once the soluble salt concentration is as outlined in these Specifications.

4. All oil, grease, welding fluxes and other surface contaminants shall be removed by solvent cleaning per SSPC SP1 prior to abrasive blasting.

5. The Contractor shall abrasive blast the surfaces to be coated according to SSPC SP10 and these Specifications.

C. For abrasive blast cleaning, the type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. Abrasives for submerged and severe service coating systems shall be clean, hard, sharp cutting crushed slag.

1. The abrasive shall not be reused unless otherwise approved by the Inspector. For automated shop blasting systems, clean oil-free abrasives shall be maintained.

2. The Contractor shall comply with the applicable federal, state, and regional air pollution control regulations for abrasive blast cleaning.

3. Compressed air for air blast cleaning shall be supplied at adequate pressure from well-maintained compressors equipped with oil/moisture separators which remove at least 95% of the contaminants.

4. Abrasive blasted cleaned surfaces shall match the standard samples shown in SSPC VIS 1 or VIS 3 for each product's recommended profile.

16.21 MIXING, AND THINNING OF MATERIALS

Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, and handling coating materials shall be strictly observed. Prepare multiple component coatings using all of the contents of the container for each component packaged by the manufacturer. Do not use partial batches. Do not use multiple component products that have exceeded their shelf life. Provide 4 touch-up kits for small area work. Mix only the components specified and furnished by the manufacturer. Do not add additional components for color.

16.22 APPLICATION (CONCRETE AND STEEL)

A. All coating applications shall conform to applicable standards of the OSHA, SSPC, NACE, ASTM, and the manufacturer's printed instructions. Material applied prior to approval of the surface preparation by the Inspector shall be removed and reapplied to the satisfaction of the Inspector at the expense of the Contractor.

B. The Contractor's coating equipment shall be designated for application of the materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. The Contractor's equipment shall be subject to approval of the Inspector. All gasoline or diesel powered equipment shall be parked over a lined containment area to minimize environmental impacts due to leaks or spills.

C. Coating application shall be as follows:

1. Remove dust, blast particles, and other debris from blast cleaned or previously coated surfaces by dusting, sweeping, washing, or vacuuming. Allow ventilator fans to clean airborne dust to provide good visibility of working area prior to coating applications.

2. Apply the first coating application within 24 hours after blast cleaning and before any water, dirt, or foreign matter has accumulated on the surface.

3. Keep coating materials at a uniform consistency during application (stir and drain as necessary). Apply each coating evenly, at the specified film thickness, to achieve a finish free of pinholes, drops, brush marks, ridges, waves, sags, runs, and other evidence of poor workmanship. Edges, corners, crevices, and joints shall receive special attention to ensure thorough surface preparation and adequate thickness of coating material are provided.

4. Stripe coat all steel edges, corners, joints and other protrusions. Finished surfaces shall be free from defects, pinholes, holidays or blemishes. Care shall be exercised to prevent coatings from being spattered onto surfaces that are not to be coated.

5. The coating thickness shall be measured at the time of application using a wet film thickness gauge approved and in accordance with ASTM D4414.

6. If minimum/maximum recoat times are not stated in the coating manufacturer's standard product literature, then the Contractor must supply such information to the Inspector for approval, prior to the start of the coating application; or supply a written statement from the coating manufacturer that limitations for recoat times do not apply to the coating specified on the project.

7. When overlapping transitions between sections of coating applied on different days, abrasive blast or mechanically abrade an 18-inch-wide strip of the previously applied coating, measured from the leading edge, to remove all gloss. Vacuum prior to application of fresh topcoat material feathered at least 12 inches into the abraded area. Avoid application onto glossy or untreated areas of the previously installed coating.

8. The finished coating application shall be protected from damage during curing and shall be cured as recommended by the manufacturer, prior to returning the reservoir to service.

9. All concrete coating edges, adjacent to pipe penetrations, vents, access hatches and other coating termination locations shall be terminated by keying into the concrete with a 1/8-inch-wide by 3/8-inch deep saw cut. Prior to coating application, the saw cut shall be dried and vacuumed to remove all dust and residue. During coating application, a liberal amount of material shall be applied to the saw cut area, then pressed with a trowel or putty knife into the saw cut cavity and smoothed level to the adjacent surfaces.

D. The coating manufacturer's standard details, submitted by the Contractor to the Department of Water, shall be used for coating applications over construction and expansion joints.

16.23 CURING OF COATING

A. The Contractor shall provide curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the highest requirement, prior to placing the completed coating system into service.

B. Dehumidification and temperature control in enclosed areas may be required during abrasive blasting and curing of coatings.

16.24 TESTING AND INSPECTION

A. Surfaces prepared as described in this Specification and per the manufacturer's recommendations shall be observed by the Inspector prior to applications of coatings to verify compliance.

B. Scaffolding or ladders to facilitate inspection shall be erected and moved to locations where requested by the Inspector.

C. Whenever required by the Inspector, the Contractor shall provide additional illumination and ventilation required for inspections. Adequate illumination shall consist of explosion-proof lights and electrical equipment required to meet safety standards. The Inspector shall determine the level of illumination for inspection purposes.

D. The inspection devices listed below, or approved equivalents, shall be provided by the Contractor to the Inspector as required in good working condition and with calibration data prior to beginning any Work. These items shall remain available until final acceptance of the coating applications per the parameters listed below:

1. Film Thickness Testing: The dry film coating thickness shall be measured in accordance with the SSPC "Paint Application Specification No. 2".

   a. Wet film gauge: approved by ASTM D4414 (concrete)

   b. Dry film gauge: PosiTector 100C or other approved by ASTM D6132 (steel)

2. Psychrometer: Sling, mechanized or digital.

3. Surface Temperature: Infrared surface temperature gauge.

4. Coating Adhesion Testing: Adhesion tests shall be performed according to ASTM

D4541 for Type II instruments. The Department of Water believes the following manufacturers are capable of producing equipment and/or products that will satisfy the requirements of this Section. This statement, however, shall not be construed as an endorsement of a particular manufacturer's products, nor shall it be construed that named manufacturers' standard equipment or products will comply with the requirements of this section. Candidate manufacturers include Elcometer Model 106, or equal.

5. Coating Thickness Testing: During installation, all coating applications shall be inspected prior to each succeeding application. The procedure for collecting representative thickness data shall be as follows:

    a. No measurements shall be made until at least 8 hours after application of the coating or as otherwise approved by the Inspector.

    b. On concrete, the coating thicknesses shall be measured at the time of application using a wet film gauge.

    c. Inspector shall determine where and how often to test for film thicknesses, and as a minimum, the requirements of SSPC PA 2 will be followed.

    d. Discard any unusually high or low gauge reading that cannot be repeated consistently. Take the average (mean) of the three gauge readings as the spot measurement. The average spot measurement shall meet or exceed the specified dry film thickness for each application.

6. Adhesion Testing on Concrete:

    a. Adhesion tests shall be performed according to ASTM D4541 for Type II instruments for every 500 sq. ft. of coating material applied.

    b. A minimum of three 20mm diameter dollies shall be affixed to the coated surface. Each testing location shall be identified and recorded by the Inspector. The adhesive used to attach the dollies to the liner shall be rapid setting with a tensile strength in excess of the liner material and permitted to cure in accordance with the manufacturer recommendations.

    c. The lining material and dollies shall be adequately prepared to receive the adhesive. Failure of the dolly adhesive shall require retesting.

    d. Two of the three adhesion pulls shall exceed 200 psi or concrete failure with more than 50% of the subsurface adhered to the coating, unless otherwise specified in the Special Provisions.

    e. If one of the three dollies fails, an additional location shall be tested in the same structure. If two of the four dollies tested fail, the liner shall be removed and replaced at the Contractor's expense.

    f. The Inspector shall record the type of adhesive used, the length of time allowed to cure, and the type of failure observed on the dolly.

7. Final Inspection

a. At the completion of all coating work, a final inspection shall be conducted. The Contractor, a coating manufacturer representative, the Inspector, and the Department of Water shall jointly conduct a final inspection to establish that all work is complete per the Contract Documents.

b. Any deficiencies found shall be documented and corrected before granting final work acceptance.

c. The Contractor shall use video and still photography to thoroughly document each work area condition during the final inspection. A copy of all photographs and video shall be provided to the Department of Water, and the Contractor shall keep the originals on file. The photographs and video shall be the basis for condition evaluation of the coating systems at the warranty inspection.

d. Inspection costs in excess of one re-inspection or cancellation of the coating work shall be borne by the Contractor.

16.25 WARRANTY INSPECTION

A. Warranty inspections shall be conducted within the last warranty year following work acceptance. All coating applications found deficient or defective during the warranty period shall be repaired or replaced by the Contractor, to the satisfaction of the Department of Water. These repairs or replacements shall be in accordance with this Specification and the material manufacturer's recommendations at no cost to the Department of Water.

B. Deficient or defective areas in the coatings include blisters, peeling, disbondment or cracking. The final inspection shall be used to assist in determining deficient or defective areas in the coating systems.

C. The Department of Water shall establish a date for the inspection and provide 30 days' advance notification to the Contractor, so the Contractor and a coating manufacturer representative can be present during the inspection.

D. The cost of the warranty inspection shall be borne by each party. The Contractor shall arrange for the presence of the coating manufacturer and bear all associated costs. Inspection costs in excess of one re-inspection or cancellation not attributed to the Department of Water shall be borne by the Contractor. The Contractor shall arrange to cover all costs for repair work under the warranty.

E. If the warranty inspection is not held during, or before, 1 month prior to the end of the warranty period, the Contractor is not relieved of its warranty responsibilities under the contract documents. If the contractor fails to conduct the last-warranty-year inspection for reasons not attributed to the Department of Water, the warranty period shall be extended until the inspection is conducted and defective work is repaired.

16.26 REPAIRS

A. Coating damage due to adhesion testing or if areas found to have an improper finish,

insufficient film thickness or other deficiencies; then the Contractor shall clean, prepare and topcoat the coating surface per the manufacturer's recommendations to obtain the specified finish and coverage. Work shall be free of runs, bridges, shiners, laps, or other imperfections.

B. Damaged or defective coating shall be removed by the Contractor and the surface prepared in accordance with these Specifications before recoating.

16.27 CLEANUP

A. Upon completion of the work, all staging, scaffolding, containers and work related material or debris shall be removed from the site to the satisfaction of the Inspector and Department of Water.

B. Coating overspray and oil spots or stains on all surrounding surfaces shall be removed and the job site cleaned.

C. All Damage to surfaces resulting from the Contractor's work shall be cleaned, repaired or refinished, to the satisfaction of the Inspector at no cost to the Department of Water.

D. Disposal of spent solvents, thinners, coating components and other related materials shall be the Contractor's responsibility and shall meet all federal, state, and regional regulations for safe disposal.

END OF SECTION

SECTION SP-17 - LIQUID-APPLIED ROOFING SYSTEM

17.1 GENERAL DESCRIPTION: This item of work shall include the furnishing of all labor, materials, tools and equipment necessary for the complete installation of a fully reinforced cold fluid-applied polymethyl methacrylate (PMMA) liquid resin roofing membrane and membrane flashing system where indicated on the drawings.

17.2 SECTION INCLUDES:

A. Adhered cold liquid-applied reinforced waterproofing system including, membrane, penetration flashings, base flashings, expansion joints, and non-skid finish.

B. Substrate preparation, cleaning, after leveling and patching.

C. Waterproofing membrane installation.

D. Flashing installation and expansion joint installation.

17.3 REFERENCES

A. American Society for Testing and Materials (ASTM) ASTM C 836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane

B. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual

C. American Concrete Institute (ACI) ACI-308 - Recommended Practice for Curing Concrete

D. ASTM - D638 - Test Methods for Tensile Properties of Plastics

E. ASTM - D4258 - Standard Practice for Surface Cleaning Concrete for Coatings

F. ASTM - D4259 - Standard Practice for Abrading Concrete

G. ASTM - D4541 - Method for Pull-Off Strength of Coatings using Portable Adhesion Tester

H. ASTM - E96(A) - Test Methods of Moisture Transmission of Material

I. ASTM E-108, ANSI/UL 790 for fire resistance

J. Steel Structures Painting Council (SSPC)

K. International Concrete Repair Institute (ICRI)

17.4 SUBMITTALS FOR REVIEW:

A. Roofing System Product Data: Provide current standard printed product literature indicating characteristics of membrane materials, flashing materials, components, and accessories, product specification, and installation.

B. Product Samples: Submit product samples of membrane and flashing materials showing color, texture, thickness and surfacing representative of the proposed system for review and approval by the Officer-in-Charge.

C. Submit sample copies of both the Manufacturer and Applicator warranties for the periods stipulated. Each specimen must be a preprinted representative sample of the issuing company's standard warranty for the system specified.

D. Submit copies of current Material Safety Data Sheets (MSDS) for all components of the work.

E. Submit documentation from the roofing system manufacturer to verify contractor's status as an approved applicator for warranted installations.

F. Roofing System Shop Drawings: Submit shop drawings of cold liquid-applied reinforced unsaturated polyester showing a project plan, size, flashing details, and attachment for review and approval by the Officer-in-Charge and roofing system manufacturer.

G. Provide certificates for the following;

1. Roofing System Manufacturer: Manufacturer has been manufacturing product specified for the past 20-Years.

2. Roofing Contractor: Provide a list of projects, including address, contact information, type of products installed and square footage.

17.5 QUALITY ASSURANCE:

A. Roofing System Manufacturer: Company specializing in manufacturing the products specified in this section with ten (10) years documented experience. Submit the following certificate when making a substitution request. The roofing system manufacturer has been manufacturing proposed product for the past 10-Years.

B. Applicator: Company specifically trained in performing the work of this section with (3) years documented experience and approved by system manufacturer for warranted membrane installation. Applicator shall submit the following certification for review:

1. Applicator shall submit documentation from the roofing system manufacturer to verify contractor's status as an approved applicator for warranted installations.

C. Calculate moisture content of substrate materials. Contractor shall determine substrate moisture content through-out the work and record with Daily Inspection Reports or other form of reporting acceptable to the Officer-in-Charge or designated representative, and roofing system manufacturer representative.

D. Random tests to determine tensile bond strength of membrane to substrate shall be conducted by the Contractor at the job site using an Elcometer Adhesion Tester Model 106 or similar device, or by the performance of a manual pull test. Contractor shall perform tests at the beginning of the Work, and at intervals as required to assure specified adhesion with a minimum of three (3) tests per 5000 square feet. Smaller areas shall receive a minimum of

three (3) tests. Test results shall be submitted to the Officer-in-Charge and the roofing system manufacturer representative. Contractor shall immediately notify the Officer-in-Charge and roofing system manufacturer in the event tensile bond test results are below specified values.

1. Adequate surface preparation will be indicated by tensile bond strength of membrane to substrate greater than or equal to 116 psi.

2. Adequate surface preparation will be indicated by 135° peel bond strength of membrane to substrate such that cohesive failure of substrate or membrane occurs before adhesive failure of membrane / substrate interface.

3. In the event the tensile bond strengths are lower than the minimum specified, additional substrate preparation is required. Repeat testing to verify suitability of substrate preparation.

4. Contractor to monitor quantities of installed materials such as application of resin mixture, reinforcing fleece and flashing. Perform Work in accordance with manufacturer's instructions.

17.6 MOCK-UP:

Mock-up areas shall be used to determine required methods and tools to obtain degree of substrate preparation required by the roofing system manufacturer. Conduct tests as required above to verify that substrate preparation meets specified requirements. Tests shall include, but are not limited to, tensile bond strength and moisture content of substrate.

A. Prepare and clean a three (3) foot by three (3) foot area of each substrate material type.

B. Submit findings in writing to Officer-in-Charge and roofing system manufacturer.

C. Mock-up areas shall be maintained for quality control for the entire project.

17.7 REGULATORY REQUIREMENTS:

A. Conform to applicable building and jurisdictional codes for roofing/waterproofing assembly and fire resistance requirements.

B. Comply with requirements of OSHA, NIOSH or local governing authority for workplace safety.

17.8 PRE-INSTALLATION MEETING: Convene a pre-installation meeting at the job site one (1) week before starting work of this section. Require attendance of parties directly affecting work of this section, including but not limited to, Officer-in-Charge, Roofing Contractor, and Roofing system Manufacturer's Representative. Review roofing/waterproofing preparation and installation procedures, mock-up installation location, coordination and scheduling required with related work, and condition and structural loading limitations of deck/substrate.

17.9 DELIVERY, STORAGE, AND PROTECTION:

A. The Contractor, together with the Officer-in-Charge, shall define a storage area for all components. The area shall be cool, dry, out of direct sunlight, and in accordance with manufacturer‘s recommendations and relevant regulatory agencies. Materials shall not be stored in quantities that will exceed design loads, damage substrate materials, or hinder installation or drainage.

B. Store solvent-bearing solutions, resins, additives, inhibitors or adhesives in accordance with the MSDS and/or local fire authority. After partial use of materials replace lids promptly and tightly to prevent contamination.

C. Roll goods shall be stored horizontally on platforms sufficiently elevated to prevent contact with water and other contaminants. DO NOT use rolls which are wet, dirty or have damaged ends.

D. Roofing materials must be kept dry at all times. If stored outside, raise materials above ground or roof level on pallets and cover with a tarpaulin or other waterproof material. Plastic wrapping installed at the factory should not be used as outside storage covers.

E. Follow manufacturer's directions for protection of materials prior to and during installation. Do not use materials which have been damaged to the point that they will not perform as specified. Fleece reinforcing materials must be clean, dry and free of all contaminants.

F. Copies of all current MSDS for all components shall be kept on site. Provide any and all crew members with appropriate safety data information and training as it relates to the specific chemical compound he or she may be expected to deal with. Each crew member shall be fully aware of first-aid measures to be undertaken in case of incidents. Comply with requirements of OSHA, NIOSH or local governing authority for workplace safety.

17.10 ENVIRONMENTAL REQUIREMENTS:

A. Do not apply roofing membrane during or with the threat of inclement weather.

B. Application of cold liquid-applied reinforced unsaturated polyester roofing membrane may proceed while air temperature is lower than 95°F providing the substrate is a minimum of 5°F above the dew point.

C. Ensure that substrate materials are dry and free of contaminants. DO NOT commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials, including the vapor drive pressure at the time of installation.

1. If the Contractor believes dropping the water level of the reservoir at the time of the installation will aid in reducing the vapor drive pressure, the Contractor is to make their request to the Officer-In-Charge to verify if the reservoir water level can allow the water level to be dropped and coordinate the lowing of the reservoir water level, if it is acceptable to Board of Water Supply Water System Operations.

17.11 COORDINATION & PROTECTION:

A. Coordinate the work with the installation of associated metal flashings, accessories, appurtenances, etc. as the work of this section proceeds.

B. Building components shall be protected adequately (with tarp or other suitable material) from soil, stains, or spills at all hoisting points and areas of application. Contractor shall be responsible for preventing damage from any operation under its Contract. Any such damage shall be repaired at Contractor's expense to DOW satisfaction or be restored to original condition.

C. Provide barricades, retaining ropes, safety elements (active/passive) and any appropriate signage required by OSHA, NIOSH, and NSC and/or the Officer-in-Charge.

D. Protect finished roofing membrane from damage by other trades. Do not allow waste products containing petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, animal fat, etc. or come into direct contact with the membrane.

17.12 WARRANTY:

A. Manufacturer's Premier Warranty: Provide (20) year manufacturer's premier warranty under provisions of this section. This warranty provides for cost of labor and materials for loss of water tightness, limited to amounts necessary to effect repairs necessitated by either defective material or defects in related installation workmanship, with no dollar limitation ("NDL").

B. Waterproofing Contractor's Warranty: Provide 2 year "Applicator Maintenance Warranty" covering workmanship for all work of this section including installation of membrane, flashings, metal work, and waterproofing accessories.

C. Submit two (2) executed copies of both the manufacturer and applicator warranties for the periods stipulated, starting from the date of substantial completion. Each warranty must be signed by an authorized representative of the issuing company.

17.13 PRODUCTS:

A. General: The products herein specified are totally pre-engineered products of the listed manufacturer and establish criteria for the approval of substitutions. Products must be part of a pre-engineered, reinforced liquid-applied roofing system, equivalent in function, quality, composition and method of application to be considered for approval as an "Approved Substitute".

B. Roofing System: Cold fluid-applied reinforced polymethyl methacrylate waterproofing membrane. Products manufactured and supplied by the following:

1. Kemper System's "Kemperol AC" is a two-component, rapid curing PMMA-based waterproofing system.

2. Soprema "Alsan RS" PMMA Liquid Applied Solutions, 310 Quadral Drive, Wadsworth, OH 44281; Tel: 800-356-3521; Tel: 330-334-0066; Website: www.soprema.us.

3. Approved equal

C. Membrane Flashings: A composite of the same resin material as field membrane with fleece reinforcement; colored aggregate topcoat surfacing or aliphatic polyester polyurethane coating to match field membrane.

D. Accessories:

1. PMMA Primer: Polymethyl methacrylate liquid resin for use in improving adhesion of membrane to wood, metal, and cementitious/masonry substrate surfaces, as provided by the following manufacturers:

   a. Kemper System's Kempertec AC primer.
   b. Soprema Alsan RS 276 Primer
   c. Approved equal

2. PMMA Field Membrane: High performance, rapid-setting polymethyl methacrylate liquid resin, as provided by the following manufacturers:

   a. Kemper System, Inc.'s Kemperol Membrane
   b. Soprema Alsan RS 230 Field
   c. Approved equal

3. PMMA Reinforcing Fabric: Non-woven polyester reinforcement, 30 mil thickness

   a. Kemper System, Inc.'s Kemperol Fleece
   b. Soprema Alsan RS Fleece
   c. Approved equal

4. Anti-Skid Aggregate Surfacing Finish Coating Resin: Two-component polymethyl methacrylate-based coating suitable for use to both bond and seal aggregate, as provided by the following Manufacturer:

   a. Kemper System, Inc.'s Kemperdur AC Finish.
   b. Soprema Alsan RS 289 Textured Base and Alsan RS Color Additive
   c. Approved equal

5. Tools, Accessories, and Cleaners: Supplied and/or approved by roofing system manufacturer for product installation.

6. Topcoat Surfacing Aggregate: Kiln-dried Surfacing Silica Sand shall be washed, kiln-dried, and dust-free with a size specification of 16 Grit for the entire surface.

7. Leveling and Patching Aggregate: Silica sand shall be washed, kiln-dried, and dust-free, suitable for troweling or pourable self-leveling, round grain or angular with the following size specification:

a. For voids less than ¼" in depth: 20 Grit
b. For voids ¼" to 2" in depth: 20 Grit
c. Mixing Proportions shall be a ratio of resin to sand at 1:2 by volume for leveling, 1:4 by volume for patching, volume or as approved by roofing system manufacturer.

8. Backer Rod: Expanded, closed-cell polyethylene foam designed for use with cold-applied joint sealant.

9. Miscellaneous Fasteners: Appropriate for purpose intended and approved by roofing system manufacturer; length required for thickness of material; as supplied by roofing system manufacturer.

10. Caulking: Single component, non-sag elastomeric polyurethane sealant, as recommended or supplied by roofing system manufacturer for use in making airtight and watertight seals where required.

11. Temporary and Night Sealant: As recommended or required by roofing system manufacturer.

17.14 EXECUTION:

A. Examination:

1. Verify that surfaces and site conditions are ready to receive work.

2. Verify deck/substrate openings, curbs, and protrusions through deck/substrate, and reglets are in place and solidly set.

3. Verify deck/substrate is structurally supported, secure and sound.

B. Preparation of Substrate:

1. General: Surfaces to be prepared as a substrate for the new waterproofing system as follows:

a. The contractor shall determine the condition of the existing structural deck/substrate. All defects in the deck or substrate shall be corrected before new waterproofing work commences. Areas of deteriorated deck/substrate,

porous or other affected materials must be removed and replaced with new to match existing.

b. Existing slab joints shall be prepared and covered as recommended by manufacturer prior to installation of roofing system.

c. Prepare flashing substrates as required for application of roofing system flashings.

d. Inspect substrates, and correct defects before application of roofing system. Fill all surface voids greater than 1/16 inch wide and/or deep with an acceptable fill material.

e. Remove all ponded water from the work substrate prior to installing roofing system materials.

f. The final substrate for roofing system shall be clean, dry, free of loose, spalled or weak material including coatings, mineral aggregate, and flood coat/gravel surfacing, oil, grease, contaminants, abrupt changes in level, waterproofing agents, curing compounds, and free of projections which could damage membrane materials.

2. Concrete:

a. Concrete shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, bituminous products and previous waterproofing materials.

b. Concrete shall be dry with a maximum moisture content of five (5) percent. Determinations of moisture content shall be performed by the Contractor. Contractor shall be responsible to perform periodic evaluations of moisture content during the work. Moisture evaluation results shall be submitted in writing to the Officer-in-Charge and the roofing system manufacturer representative.

c. Where required, concrete shall be abrasively cleaned in accordance with ASTM D4259 to provide a sound substrate free from laitance with an open concrete surface. When using mechanical methods to remove existing waterproofing products or surface deterioration, the surface profile is not to exceed 1/8 inch (peak to valley).

d. The substrate shall be sound and all spalls, voids and blow holes on vertical or horizontal surfaces must be repaired prior to placement of the primer coat. Spalls and other deterioration shall be repaired in accordance with the requirements of Section 9.1.15 Concrete Repair of the Special Provisions.

e. Areas of minor surface deterioration of 0.50-inch or greater in depth shall be repaired in accordance with the requirements of Section 30.1 Concrete Repair to prevent possible ponding of the system, leading to excessive usage of primer and resin.

f. Extent and location of thin surface patching shall require approval of the Officer-in-Charge and roofing system manufacturer representative prior to the application of any system component.

3. Steel/Metal:

a. Clean and prepare metal surfaces to near white metal in accordance with SSPC - SP3 (power tool clean) or as required by roofing system manufacturer.

Extend preparation a minimum of three (3) inches beyond the termination of the membrane flashing materials. Notch steel surfaces to provide a rust-stop.

b. Stainless steel (series 400, 300) shall be abraded to provide a rough open surface.

4. Other Surfaces: Remove all contaminants as required by the roofing system manufacturer. Surface preparation shall be performed by means approved by Officer-in-Charge.

5. Finish Leveling, Patching and Crack Preparation:

   a. General: polymethyl methacrylate primer/sand mix is the preferred material for all substrate finish leveling, crack and wall/deck preparation and patching. Resin/sand patching mix provides a fast-set time of approximately 12 hours and does not require surface grinding.
   b. Substrate Leveling & Patching: The work described in the subsection is in addition and unrelated to the filling of low spots in the roof as specified in Section 30.1. Substrate conditions are to be evaluated by the Contractor, Officer-in-Charge, and roofing system manufacturer. Perform leveling and patching operations as follows:
      1) Level uneven surfaces with a leveling mixture of unsaturated polyester resin/primer and approved kiln-dried silica sand in a 1:2 primer to sand ratio by volume. Spread and plane this compound with a squeegee and trowel to achieve a flat surface.
      2) Fill cavities with a patching mixture of primer and approved kiln-dried sand in a 1:4 primer to sand ratio by volume.
      3) Silica sand must be kept absolutely dry during storage and handling.
      4) Any surface to be leveled or filled must first be primed with an appropriate primer.

   c. Joint and Crack Preparation:
      1) Joints, cracks and fractures in the structural deck/substrate shall be prepared as defined below prior to installation of the Roofing system.
      2) Non-Moving Cracks: Determine that crack is non-moving. Clean out crack by brushing and oil-free compressed air. Fill crack with polyurethane sealant. Allow for a minimum of twelve (12) hours cure or as required by sealant Manufacturer.
      3) Moving Cracks: Determine that crack is moving. Clean out crack by brushing and oil-free compressed air. Fill crack with polyurethane sealant. Allow for a minimum of twelve (12) hours cure or as required by sealant Manufacturer. Following full cure of primer, apply resin and 4 inch wide strip of membrane (resin and fleece) in strict accordance with roofing system manufacturer's written instructions.

C. Primer Application:

1. General:

   a. Mix and apply primer in strict accordance with written instructions of roofing system manufacturer. Use only proprietary materials, as supplied by the roofing system manufacturer.
   b. The substrate surface must be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth wipe or a combination of methods.

c. Do not install primer on any substrate containing newly applied and/or active asphalt, coal-tar pitch, creosote or penta-based materials unless approved in writing by roofing system manufacturer. Some substrates may require additional preparation before applying primer.

D. Roofing System Application:

1. General:

a. It is recommended to apply the waterproofing membrane immediately following full curing of the primer in order to obtain the best bond between primer and membrane.
b. Mix and apply cold fluid-applied reinforced polymethyl methacrylate waterproofing membrane in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary membrane resins and materials, as supplied by the membrane manufacturer.
c. The primed substrate surface shall be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth-wipe or a combination.
d. Protect all areas where membrane has been installed. Do not work off installed membrane during application of remaining work before twenty-four (24) hours of curing. Movement of materials and equipment across installed membrane is not acceptable. If movement is necessary, provide complete protection of affected areas.
e. Closely follow the Membrane Manufacturer's recommendation for hot and cold weather application. Monitor surface and ambient temperatures, including the effects of wind chill.

E. Flashing Application:

1. General:

a. Install flashing system in accordance with the requirements/recommendations of the roofing system manufacturer and as depicted on standard drawings and details. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system. Wherever possible, install the flashings before installing the field membrane to minimize foot traffic over newly installed field membrane.
b. All membrane flashings shall be installed concurrently with the roofing system as the job progresses. Temporary flashings are not allowed without prior written approval from the roofing system manufacturer. Should any water penetrate the roofing system membrane because of incomplete flashings, the affected area shall be removed and replaced at the Contractor's expense.
c. Provide a minimum vertical height of 8" for all flashing terminations, unless specifically detailed otherwise. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope. Do not flash over existing through-wall flashings or weep holes.
d. All flashings shall be terminated as required by the roofing system manufacturer.

2. Membrane Flashing – General:

a. Membrane flashings shall be fabricated with primer appropriate for the substrate surface, resin of the same base chemical type as the field membrane, and fleece of the same weight as the field membrane unless specified otherwise.
b. Primer, resin, and fleece mixing and application methods as specified for field membranes are also suitable for membrane flashing.
c. Fleece shall overlap 2 inches minimum for all joints. Fleece shall be cut neatly to fit all flashing conditions without a buildup of multiple fleece layers. Work wet membrane with a brush or roller to eliminate blisters, openings, or lifting at corners, junctions, and transitions.

3. Pipes, Conduits, and Unusually Shaped Penetrations:

a. Flash all penetrations using cold liquid-applied reinforced unsaturated polyester roof membrane with approved broadcast mineral aggregate surfacing or aliphatic polyester polyurethane coating. Flashing material shall be the same resin used in the field membrane with 165 fleece reinforcement.
b. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. There must be a minimum of a two (2) inch overlap between vertical and horizontal flashing components.

4. Curb and Base Flashings:

a. Wall, curb and base flashings shall be installed to solid substrate surfaces only. Adhering to gypsum-based panels, cementitious stucco, synthetic stucco, wood or metal siding, and other similar materials is not acceptable.
b. Reinforce all transition locations and other potential wear areas with a four (4) inch wide membrane strip evenly positioned over the transition prior to installing the exposed flashing layer.
c. Reinforce all inside and outside corners with a four (4) inch diameter conical piece of membrane prior to installing the exposed flashing layer.
d. All pins, dowels and other fixation elements shall be flashed separately with a vertical flashing component prior to installing the exposed flashing layer.
e. Extend flashing a minimum of four (4) inches onto the field substrate surface.

F. Surfacing and Finishes:

1. Provide and install approved kiln-dried mineral surfacing with dry roller to achieve non-skid surface. Note: surfacing is considered a non-warranty maintenance item and will require re-application periodically.

2. Broadcast specified and approved sand or aggregate in excess into a bonding coat application of Membrane Manufacturer's approved methyl methacrylate-based aggregate coating system applied over clean, cured membrane at the manufacturer's recommended application rate. Aggregate shall be applied to excess to obtain uniform and full coverage.

3. Following minimum 2 hour cure time remove loose/un-embedded mineral aggregate by blowing with oil-free compressed air or with a vacuum. Re-broadcast clean mineral aggregate as required to provide full embedment and coverage of membrane.

4. Seal aggregate surface with a sealing coat application of Membrane Manufacturer's

approved aggregate coating, applied at the manufacturer's recommended application rate. After completion of surfacing, avoid any traffic for a minimum of three (3) hours to allow for surfacing to cure.

G. Temporary Closures & Waterstops: Contractor shall be responsible to ensure that moisture does not damage any completed section of the new waterproofing system. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition. All temporary closures shall be made as recommended or required by the roofing system manufacturer.

H. Protection: Upon completion of roofing and flashings (including all associated work), institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. Protect all areas where roofing has been installed.

I. Closeout:

1. Correction of Work: Work that does not conform to specified requirements including tolerances, slopes, and finishes shall be corrected and/or replaced. Any deficiencies of roofing system application, termination and/or protection as noted during the roofing system manufacturer's inspections shall be corrected and/or replaced at Contractor's expense.

2. Clean-Up: Site clean-up, including both interior and exterior building areas that have been affected by construction, shall be restored to pre-construction condition.

17.15 PAYMENT: Payment for liquid-applied roofing system shall be made at the respective Lump Sum Bids as specified in the proposal. Payment shall represent full compensation for furnishing all labor, tools, equipment, material and incidentals necessary to complete the liquid-applied roofing in place complete, in accordance with the plans and specifications.

END OF SECTION

SECTION SP-18 – EXTERIOR COATINGS

18.01 GENERAL

A. This section covers furnishing of labor, tools, equipment, materials and applying paint to the exterior reservoir wall, bottom of roof overhang, exterior steel ladder and platform, and other elements of the reservoir specified to have a paint finish in place complete, as shown on the plans and as specified in DIVISION 300 - CONSTUCTION, Section 303.27 PAINTING of the Water System Standards, 2002, and as amended hereinafter as they apply to this project.

B. Protection of Materials: All material shall be delivered to the jobsite in their original unopened containers bearing the manufacturer's name, brand and batch number. All coatings and paints shall be stored in enclosed structures to protect them from weather and excessive heat and cold. Flammable coatings or paints must be stored in conformance with city, county and state safety codes for flammable coating or paint materials.

C. Substitutions: Requests for material substitutions must be made and approved in writing by Department of Water.

18.02 SUBMITTALS

A. Submit product data in accordance with these Specifications. Unless otherwise specified here-in, submit manufacturer's data sheets showing the following information:

1. Percent solids by volume.
2. Minimum recommended dry-film thickness per coat for prime, intermediate and finish coats.
3. Recommended surface preparation.
4. Recommended thinners.
5. Statement verifying that the specified prime coat is recommended by the manufacturer for use with the specified intermediate and finish coats.
6. Application instructions including recommended equipment and temperature limitations.
7. Verification from the manufacturer that the product meets current California VOC requirements.
8. Color chips for alkyd enamel and exterior tank coatings.

B. Painting Contractor experience documentation as described in Section 7.03 below.

18.03 PAINTING CONTRACTOR QUALIFICATIONS

A. The Painting Contractor must be capable of performing the various items of work as specified. If required by the Manager, the Painting Contractor shall furnish a statement covering experience on similar work, a list of machinery and other equipment available for the proposed work, and a financial statement, including a complete statement of the Paint Contractor's financial ability and experience in performing similar painting and coating work.

B. The Painting Contractor shall have a minimum of five (5) years practical experience and a successful history in the application of the specified products to concrete surfaces.

C. Upon request, the Painting Contractor shall substantiate this requirement by furnishing a list of references, which shall include jobs of similar nature, listing name of project, year completed, owner, name and contact telephone number for reference for each project listed.

18.04 MATERIALS

A. Aboveground Exterior Wall and Roof Overhang Areas:

1. Prime Coat - (1) coat, ICI Devoe Coatings 4030 TRU-GLAZE-WB Waterborne Epoxy Primer at 4.0 - 8.0 mils wet; 2.0 - 4.0 mils DFT. (200-270 sf/gal.) or approved equal.

2. Finish Coat- (2) coats, Glidden Fortis 350 (formerly ICI Devoe Coatings 2406 Dulux Professional) Waterborne Acrylic Latex Semi-Gloss at 4.0–4.6 mils wet; 1.4-1.6 mils DFT. (350-400 sf/gal) or approved equal.

3. The finish coat color shall be "Kauai Green"

B. Metal Substrate:

1. Surface Preparation: ICI Devoe Devprep 88 Heavy Duty Cleaner

2. Prime Coat - (1) coat, ICI Devoe Bar-Rust 235 Multi-Purpose Epoxy Coating at 5.9 - 11.7 mils wet; 4.0 - 8.0 mils DFT. or approved equal.

3. Finish Coat- (2) coats, ICI Devoe Devthane 359 Aliphatic Urethane Gloss Enamel at 6.7–10.0. mils wet; 4.0-6.0 mils DFT. or approved equal.

4. The finish coat color shall be "Kauai Green"

C. Below Grade Waterproofing: Two-component liquid-applied urethane coating that forms an elastomeric waterproof membrane after curing, such as "CIM 1000" by C.I.M. Industries, Inc. (www.cimindustries.com) or approved equal.

18.05 EXECUTION

A. Equipment: The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. Contractor's equipment shall be subject to approval of the Engineer.

B. Surface Preparation

1. All concrete surfaces shall be prepared in accordance with the recommendations of the coating manufacturer.

2. The surfaces shall be thoroughly cleaned, if they are not free of grease, curing compounds or other deleterious matter, as recommended by the coating manufacturer.

C. Application

1. Contractor shall comply with manufacturer's recommended application rates, methods, and instructions.

2. Each coat shall be free of runs, skips or "holidays".

3. All work shall be done in accordance with the manufacturer's safety recommendations, adequate ventilation shall be provided within the tank by the contractor during the course of interior painting work.

D. Surfaces Not To Be Coated

The following surfaces shall not be painted and shall be protected during the surface preparation and painting of adjacent areas:

1. Mortar-coated pipe and fittings.
2. Stainless steel, aluminum, brass or copper.
3. Metal letters.
4. Nameplates.
5. Grease fittings.
6. Buried pipe, unless specifically required in the piping specifications.

18.06 PROTECTION OF SURFACES NOT TO BE PAINTED

A. Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted.

B. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.

C. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process.

D. Mask openings in motors to prevent paint and other materials from entering the motors.

18.07 THINNING

The Contractor shall not add thinner to any paint product without prior approval of the Engineer and the paint manufacturer. Only thinner manufactured by the paint manufacturer will be allowed if thinning is approved.

18.08 WEATHER CONDITIONS

A. No painting shall be done under unfavorable weather conditions unless the work is well-protected from such conditions, and then only with the specific approval of the Engineer.

B. No painting shall be done when the air temperature is less than 50 degrees Fahrenheit (F), when the relative humidity is greater than 70 percent, or when the surface temperature is less than 5 degrees F above the dew-point, unless otherwise approved by the Engineer. If dew or moisture condensation should be anticipated and if such conditions are prevalent, painting should be delayed until surfaces are dry. Further, the day's painting should be completed in advance of the problem time when condensation will occur, in order to permit the film sufficient drying time prior to the formation of moisture.

C. No painting shall be applied on any surface whose temperature is less than 50 degrees F or more than 120 degrees F or in conflict with the manufacturer's recommendations, unless otherwise approved by the Engineer.

18.09 SAFETY

A. In accordance with requirements of the latest revision of the OSHA Regulations for Construction, the Contractor shall provide and require use of personal protective life-saving equipment for persons working in or about the project site.

B. Head and Face Protection and Respiratory Devices: Equipment shall include protective helmets conforming to the requirements of ANSI Standard Z89.2, and shall be worn by all persons while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices meeting the requirements of ANSI Standard Z87.1 and OSHA Regulations for Sandblasting Operations, and air-purifying half-mask or mouthpiece respirator with appropriate filter.

C. Ventilation: Where ventilation is used to control potential exposure as set forth in section 1910.924 of the OSHA Regulations for Construction, ventilation shall reduce the concentration of air contaminant to the degree a hazard does not exist.

D. Sound Levels: Whenever the occupational noise exposure exceeds the maximum allowable sound levels as set forth in Table D-2 of Subpart C, Section 1926.52 of the OSHA Regulations for Construction, the Contractor shall provide and require the use of approved ear protection devices.

E. Illumination: Adequate illumination shall be provided while work is in progress. Whenever required by the Engineer, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the Engineer.

F. Temporary Ladders and Scaffolding: All temporary ladders and scaffolding shall conform to the applicable requirements of Subpart L, Sections 1926.45 and 1926.451 of the OSHA Regulations for Construction. They shall be erected where requested by the Engineer to facilitate inspection and be removed by the Contractor to locations requested by the Engineer.

18.10. PAYMENT

Payment for the application and furnishing of the Exterior Coatings in this section will not be made directly but shall be included in the payment items of which they are a part. Such payment shall represent full compensation for furnishing all materials, labor, tools, equipment and incidentals to complete the work.

END OF SECTION

SP-19 – SPECIAL INSPECTION

19.01 GENERAL:

Special inspections are required for this project. Special inspection, as delineated in the 2018 International Building Code Chapter 17, is required for the following:

A. Concrete (by special inspector).

B. Reinforcing Steel (by special inspector).

C. Post-installed anchors if required by product's ICC Report (by special inspector).

The Contractor shall hire an independent qualified person who is approved by the Kaua'i Department of Water for the listed types of special inspectors. The geotechnical special inspector shall be a geotechnical engineer licensed in the State of Hawai'i to do special inspections for the geotechnical items as stated in the Foundation Notes (located in the construction drawings). The general construction inspector shall do inspections listed above.

The Contractor shall coordinate and be responsible for contacting the special inspector(s) in a timely manner such that all special inspections are executed. The special inspector shall submit a report for each day's inspections per IBC requirements.

19.02 PAYMENT:

Payment for SPECIAL INSPECTION shall not be measured nor paid for directly, but shall be considered incidental to the total Offer price.

END OF SECTION

SECTION SP-20 – ELECTRICAL

The following shall supplement the applicable electrical subsections of the "Water System Standards", State of Hawai'i, dated 2002, as amended.

ELECTRICAL WORK

20.01 SCOPE OF WORK. The following shall be ADDED to and be made a part of this subsection.

A. Provide all articles, materials, equipment, operations, and services herein or on Drawings, including all labor, materials, taxes, fees, insurance, and incidentals required to insure completion.

B. TEST COMPLETE INSTALLATION. Installation shall be complete in every detail as specified and ready for use. Any item supplied by Contractor developing defects within one year of final acceptance by KDOW shall be replaced by such materials, apparatus, or parts to make such defective portion of complete system conform to true intent and meaning of these Drawings and Specifications, at no cost to KDOW.

C. WORK SHALL INCLUDE:

1. Installation of KDOW electrical secondary service pedestal and SCADA cabinet.

2. Complete instrumentation conduit, wiring and connection system at new and temporary tanks, including all appurtenances for a complete system.

3. Complete new gate and hatch security alarm switch system, including underground ducts, conduits and cables.

4. Final adjustment and testing of various instruments and controls.

D. During bidding and construction, Contractor shall coordinate his work with utilities and other trades to avoid omissions and overlapping responsibilities. Electrical Contractor shall notify other trades and suppliers of project voltages and of existing equipment when new work must be compatible with existing conditions.

20.02 WORK BY OTHERS. The following shall be ADDED to and be made a part of this subsection.

1. Concrete, forming, excavation, backfilling and painting provided by respective sections of this contract.

2. Equipment utilizing electricity shall be provided by respective sections of this contract. Installation of equipment complete with power wiring and electric controls and interlock wiring shall be part of Electrical Work.

3. During bidding and construction, Contractor shall coordinate his work with utilities and other trades to avoid omissions and overlapping responsibilities. Electrical Contractor shall notify other trades and suppliers of project voltages and of existing

equipment when new work must be compatible with existing conditions.

20.03 MATERIALS AND WORKMANSHIP. The following shall be ADDED to and be made a part of this subsection.

A. DRAWINGS:

1. These specifications are accompanied by architectural plans of buildings, site plans and diagrammatic electrical plans showing locations of service runs, feeder runs, devices, and other electrical equipment. Locations are approximate. Before installing, Contractor shall study adjacent construction details and make installation in most logical manner.

2. Any device may be relocated within 10 feet before installation at direction of KDOW without additional cost to Owner.

3. Before installing, verify all dimensions and sizes of equipment at job site. Circuit and conduit routing is typical and may be altered in any logical manner; however, all changes shall be approved by KDOW and shown on "as built" drawings.

B. DEPARTURES FROM DRAWINGS AND SPECIFICATIONS:

1. Departures resulting from substitution of materials or system shall be accompanied by appropriate changes in all affected work of every trade. Such changes shall be at no increase in the contract amount and shall be the responsibility of the subcontractor or supplier responsible for the departures. Changes proposed by the Contractor shall be based on a system approach and shall be allowed if implemented without decrease in quality in performance or operations, increase in utility space to install the equipment. Such departures shall be submitted and noted in shop drawings for approval by KDOW. Departures initiated by other trades, requiring changes in the electrical system as well as other systems, shall be accompanied by appropriate changes to all affected work of every trade, at no increase in contract amount, by the trade responsible for the departures.

2. The General Contractor shall be responsible to coordinate, approve, and select systems that do not impose unaccounted for impact on the electrical work. It shall be understood that after the award of contract, all departures having electrical impact, shall make appropriate changes to the electrical system required to accommodate the departures and shall be at no additional cost to KDOW.

C. CONSTRUCTION METHODS:

1. Construction shall conform to construction practices as recommended by the American Electricians Handbook by Croft (latest edition), Edison Electrical Institute, National Electric Safety Code and Applicable Instructions of manufacturers of equipment and material supplied for this project.

2. Grounding:

   a. All services, motors, metallic enclosures, raceways, and electrical equipment shall be grounded according to requirements of National Electric Code. At buildings, 5/8" x 10' copperweld ground rods, Copperweld Steel Company, shall be driven with top 12" below finished grade and shall be connected together with bare copper wire buried 12" below finished grade to obtain a ground of 25 ohms or less as measured by three point potential method with an electric ground megger. At each building, connect ground to nearest cold water pipe and to building entrance equipment, raceways, motors, ground type receptacles, and other metallic parts directly exposed to ungrounded electric conductors. Connection shall be made by continuous metal raceways or with conductors.

   b. All grounding wire runs within buildings shall be copper conductors. Where applicable, all ground wires shall be run together with circuit conductors.

3. Testing:

   a. All wiring shall be tested to insure proper operation according to functions specified herein on drawings and other sections of these Specifications.

   b. Insulation resistance of wires shall be according to requirements of the National Electric Code. All feeder cables, #4 or larger, shall have insulation resistance of 1.5 megohms or higher. Insulation resistance shall be measured by a 500 volts megger, Biddle Company or equal. Resistance of feeder cables shall be recorded and turned over in 4 copies to Engineer during final inspection. Proper operation of all electrical devices shall be demonstrated at request of KDOW during final inspection.

4. Conduits:

   a. All conduits within building line shall be hot dipped galvanized, rigid steel. Conduits below floor slab encased in concrete jacket, minimum 2" thick. Conduits in or under floor slabs shall be painted with asphaltic corrosion resistance base paint or compound after installation in place. Provide galvanized steel pull-wire in all empty conduits as noted on the drawings.

   b. Below grade, within concrete floor slabs or within concrete walls use Schedule 40 PVC. Provide separate ground wire and rise out of ground or concrete slab with PVC and transition to PVC coated rigid steel conduit within 6” of finished grade. For conduits rising out of walls, transition to EMT and galvanized rigid steel conduit as required below within 6” of emerging from the wall.

c. Above finished ground floor where exposed below 7'- 0" above finished floor use rigid steel conduit; in non-air conditioned locations use rigid steel conduit; exposed on the exterior of the building use PVC coated rigid steel conduit; where exposed on exterior of the building and exposed to sunlight use PVC coated rigid steel conduit. Where exposed to corrosive atmospheres and near shorelines use PVC coated rigid steel conduit. Where exposed to damage use PVC coated rigid steel conduit.

d. Conduits cut square and inner edges reamed. Butt together evenly in couplings.

e. Bends and offsets made with hickey or conduit-bending machine. Do not use vice or pipe tee. Bends made so that interior cross-sectional area will not be reduced. Radius of curve of inner edge of field bend shall not be less than ten times the internal diameter of conduit.

f. Use of running threads not permitted. Where conduits cannot be jointed by standard threaded couplings, approved water-tight conduit unions shall be used.

g. Cap conduits during construction with plastic or metal-capped bushings to prevent entrance of dirt or moisture. All conduits shall be swabbed out and dried before wires or cables are pulled in.

h. Conduit shall be free from other piping, valves, or mechanical equipment.

i. Fish wires, cords, strings, chains, or the like shall not be placed or inserted in the conduit system during installation.

j. Insulating bushings and two locknuts installed on each end of every run of conduit at enclosures and boxes. Provide grounding bushings as required for grounding receptacles and to connect conduits to switchboard with #10 bare copper.

k. Securely fastened in place to all outlet boxes and to structure or support. Project adequate number of conduit threads through box for bushings. Anchorage for 1-1/2 inches and smaller conduit shall be made with one-hole galvanized conduit straps or clamps; 2 inches or larger conduit shall be anchored with galvanized wrought iron "U" clamps or equal fittings.

l. Exposed conduit parallel with or at right angles to structural or architectural elements. Securely fastened in place with one-hole galvanized pipe strands with screws or bolts and spaced not more than 5 feet apart; or with approved beam clamps or approved single or gang pipe hangers spaced not more than 5 feet apart as the conditions require. Vertical runs supported at intervals not exceeding 5 feet by approved clamp hangers.

m. Conduit runs with one 90º bend or equivalent, 150 feet maximum without pull box.

n. Conduit runs with two 90º bends or equivalent, 100 feet maximum without pull box.

5. Boxes and Enclosures:

a. Provide outlet boxes in hollow tiles or concealed in other spaces with extensions or raised rings of such depth that metal will be flush with surrounding surfaces of opening.

b. Use gang boxes wherever 3 or more switches are installed at one location. Concealed boxes installed with edges flush with surrounding wall surface.

c. Boxes plumb and exactly flush.

6. Conductors:

a. Mechanical means for pulling shall be torque-limiting type and not used for #2 AWG and smaller wires.

b. Pulling tensions shall not exceed wire manufacturer's recommendation.

c. Where necessary, powdered soapstone used as lubricant for drawing wires through conduit. No other means of lubricating allowed. Conduit fittings shall not be used with conductors larger than #2 AWG.

7. Splicing:

a. Wires shall be formed neatly in enclosures and boxes.

b. Splices made according to NEC. Conductors #10 and smaller twisted and secured with twist on wire connectors. Conductors #8 through #4/0 spliced with solderless clamp or compression (indent) connectors.

c. Splices reinsulated according to wire manufacturer's instructions. Splice insulation shall be 150% in thickness of original wire insulation and of the same electrical and mechanical characteristics. Insulating type (600V use) shall be neoprene, Okoprene by Okonite Company or approved equal. Jacketing and insulating tape shall be high density cold setting polyethylene adhesive tape, Scotch No. 33 by Minnesota Mining and Manufacturing Company or approved equal.

8. Finishing:

a. Structural and architectural elements cut or drilled for installation of electrical system then patched, repaired, and restored. Drilling, cutting, patching, repairing, and restoring subject to approval of KDOW.

b. Attachment of electrical equipment to wood by wood screws. Attachment to concrete by embedded or expansion inserts and bolts. Powder charge driven with approval only. Close unused knockouts on boxes or expansion with metal cap.

c. Wipe clean all exposed raceways and enclosures with rag and solvent. Unfinished raceways and enclosures prime painted and finished by Painting Section. Factory finished enclosures shall be painted. Panelboards identified by stenciling with paint on back of doors the voltage and designation. Voltage ratings stenciled on the front of disconnect switches and junction boxes where wires are terminated for connection to equipment that are not part of this contract.

9. Service Entrance Equipment: Install secondary service and service pedestal in accordance with requirements of KIUC.

D. EXTERIOR WORK: Materials, equipment, and construction methods specified in other paragraphs of the specifications for Electrical Work shall apply to the exterior work.

1. Exterior underground cables and wires shall be NEC type THW or THWN insulated. Insulation and sheath conforming respectively to ASTM 0 1352-60 and ASTM 9 752-60. Splices shall be made with half lapped layers of insulation-jacketing neoprene tape, Minnesota Mining and Manufacturing Scotch No. 23 or equal and jacketed with high density polyethylene plastic tape, Minnesota Mining and Manufacturing Company Scotch No. 33 or equal. Thickness of insulation and jacketing shall be equal to 200% of original cable. Splicing of conductors shall be made with sleeve compression type fittings. Entire splice, after reinsulating, shall be painted with black tape compound. Minnesota Mining and Manufacturing Company "Scotchcast" may be used.

2. Ductlines:

a. Ductlines shall consist of polyvinyl chloride (PVC) Schedule 40 duct in concrete jacket unless noted otherwise.

b. Ducts and fittings shall be round bore, for use with tapered fittings and manufactured from polyvinyl chloride (PVC). Kraloy/Chemtrol Co. PVC, Johns-Manville and Orangeburg Manufacturing Co., Schedule 40.

c. Concrete for ductlines shall be according to the "Concrete Section". Concrete for ductline jackets shall be 2500 psi compressive strength

in 28 days with aggregates of #3 fine size.

3. Trenching and backfilling for ductlines and handholes shall be according to the "Trenching and Backfilling Section". Depths of trenches on slope shall be measured from finished grade of lower edge.

   a. Backfill Material, Type A: Backfill material shall consist of earth and gravel mix with gravel content consisting of 1 inch diameter maximum and not exceeding fifty percent (50%) by volume of the mix.

   b. Backfill Material, Type B: Backfill material shall consist of earth and gravel mix with gravel content consisting of 1/2-inch diameter maximum and not exceeding twenty percent (20%) by volume of the mix.

   c. Any existing underground piping or conduit that is encountered shall be properly shored and protected from damage. Any damage to existing utilities resulting from the Contractor's operations shall be repaired by him at his own expense.

4. Identification Tags: Each set of cables in handholes shall be identified by a noncorrosive metal tag. Letters shall be minimum 1/4 inch high identifying the cable as to use and/or voltage. Tags shall be wrapped around the cables and taped. Power tags shall be red.

5. Ductlines:

   a. Ducts and/or conduits shall be laid in the trenches on plastic treated against termite or concrete spacers. Spacing between ducts shall be as follows:

      1) Control/Instrumentation and control/instrumentation ducts - 1-1/2 inches of concrete.

      2) Electric power and electric power ducts - 1-1/2 inches of concrete

      3) Electric power and control/instrumentation ducts - 3 inches of concrete

   b. After all ducts are installed, duct bank shall be securely bound with #12 steel tie wire and anchored to prevent movement during concrete pouring. Tapered ends of ducts or conduits shall be coated with sealing compound before coupling is applied to insure a water-tight joint. Reinforcing steel, shoring and forming, where required, shall be installed according to Concrete Section of this Specification. Concrete shall be poured on ducts without the use of mechanical vibrators. Concrete shall be tampered manually with wooden rods.

c. Ducts shall be completely encased in concrete. The thickness of concrete encasement is minimum and may be increased to fit the actual shape of the trench. Changes in direction of runs exceeding 5 degrees shall be accomplished by using special couplings or bends manufactured for this purpose. Where conduit lines enter handholes, the conduits shall terminate in end bells. Conduit shall be thoroughly cleaned before laying. When it is necessary to cut a tapered end on a piece of conduit at the site, the cut shall be made with saw and tapered with a lathe designed to match the original taper.

d. After the conduit line has been completed, a mandrel not less than 12 inches long having a diameter 1/4 inch less than the inside diameter of the conduit, shall be pulled through each conduit after which a brush with stiff bristles shall be pulled through to make certain that no particles of earth and/or gravel have been left in the line.

6. Cables shall be thoroughly lubricated with soapstone before drawn into ducts.

E. DEVICES AND EQUIPMENT: All devices, materials, and equipment specified herein shall be manufactured and installed in accordance with the appropriate articles in the NEC except as noted.

1. Wiring Materials:

a. Conduits: Hot dip galvanized, rigid steel, round bore electrical conduit and for use with threaded fittings. 3/4" minimum diameter unless otherwise specified on the drawings. Aluminum conduits shall not be used.

b. Flexible Conduit: Liquid-tight flexible steel, zinc-coated, jacketed with high density polyethylene and with factory approved fittings. Liquid-tight with factory fittings for wet or moist areas.

c. Stainless Steel Materials: All stainless steel materials shall be Type 316 Stainless Steel.

d. Enclosures and Cabinets: Enclosures and cabinets for panelboards, breakers, and switches shall be NEMA type, fabricated from galvanized steel, prime painted and enamel finished according to NEMA specifications. For exterior locations, provide factory finished NEMA 4X 316 stainless steel.

e. Large Junction Boxes: For dry interior location, the box shall be fabricated from NEC gauge galvanized steel with matching screw-on type cover, field punched knockouts. For exterior and wet locations, the box shall be NEMA 4X 316 stainless steel, with matching gasketed cover and threaded Myers type hubs for conduit connection. Screws shall be stainless steel.

f. Outlet and Small Junction Boxes: Concealed boxes shall be pressed

from NEC code gauge steel, galvanized 4" square x 1-1/2" deep minimum or as specified on drawings.

1) Exposed boxes and weather exposed recessed boxes shall be galvanizes cast iron or NEMA 4X 316 stainless steel, prime painted, enamel finished, threaded Myers type hubs for conduit connection.

2) Extension or raised rings for pressed boxes pressed from NEC code gauge steel and galvanized. Use as required at device outlets and make box opening flush with finished surface.

g. Wires and Cables: Conductors shall be copper No. 12 AWG minimum. Conductors No. 10 and smaller, solid and round **except for control type conductors which shall be stranded**. Conductors No. 8 and larger, 7 or 19 strands, concentric. All conductors No. 6 and smaller shall be NEC type THW insulated. All conductors No. 4 and larger shall be NEC type THWN insulated. Manufacture and install according to NEC Articles 310 and 402. Wiring for all controls shall be extra flexible machine tool, color coded, THHN/THWN, #12 AWG machine wire.

1) Provide color coding for all service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors, and white for neutrals, except where neutrals of more than one system are installed in same raceway or box, the other neutral shall be white with a colored (not green) stripe. The color of the ungrounded conductors in different voltage systems shall be as follows:

a) 120/240 volt, single phase:

Red and black

2) Color coding shall be maintained throughout entire system. Use other colors when more wires than above are contained in one raceway. Engineer shall determine whether deviation from color coding will be permitted.

3) Wire Markers: All wires shall be tagged with circuit identifying markers at both ends of termination. Markers shall be cloth with plastic letters covered with mylar film. Markers shall have high strength adhesive bond, be able to withstand abrasion, shall be oil and water resistant, and shall be taped around cable near termination.

2. Devices:

a. Duplex Receptacle: Duplex 20 ampere, 125 volts, 3 wires, side and

back wired, grounding type in plastic body with parallel and ground U-shaped slots.

b. Device and Cover Plates:

1) Plates for interior flush construction shall be satin finished 302 high nickel stainless steel, 18% chrome, 8% nickel with suitable holes for device.

2) Plates for exposed and weather exposed boxes (indicate WP on drawings) shall be cast metal with neoprene gasket for sealing against entry of water or moisture into box. Switch plates provide with neoprene cover over handle or raintight level mechanism. Receptacle plates shall be provided with weatherproof cover as indicated on drawings. Covers shall permit plugs to be connected without compromising the integrity of the protective nature of the cover.

c. Hardware, Supports, Backings, etc.: All hardware, supports, backings, and other equipment shall be provided. Wood materials shall be "wolmanize" treated against termite; iron or steel materials shall be galvanized for corrosion protection and nonferrous materials shall be brass or bronze.

3. Security Alarm System:

a. Security Alarm Switch: Wide gap magnetic contact type switch consisting of switch component with normally closed contacts when the enclosure door to which it is mounted is closed. Unit shall be completely sealed housing and for application adjacent to metal doors or as shown on the drawings.

1) Magnetic switch contacts shall have 2” to 3” gap distance and normally open. Switch shall be Sentrol 1045T series, AMSECO AMS-37, or approved equal

4. 120/240 Volt Electrical Secondary Service Pedestal

a. Description:

1) 100 amp meter socket in accordance with electric metering requirements of KIUC.

2) Cabinet Fabrication:

a) Service Enclosure shall be 13” W X 50” H X 8" D.

b) Material: 316 stainless steel, 14 gauge. Fabricate internal parts from 14 gauge cold rolled steel.

c) Hardware: 316 Stainless steel with continuous welded seams.

d) Construction shall be NEMA 3R.

3) Deadfront Safety Door:

a) Mount removable backspan on 4 welded ¼" studs.

b) Hinge on the same side as the front door and open a minimum of 100 degrees.

c) Hinged with ¼ turn latch and knurled knobs.

d) Stainless steel hinges.

4) Power Distribution Section:

a) Double pole main breaker.

b) Circuit breakers: Industrial grade, Westinghouse Quicklag C or equal. Plug in circuit breakers are not acceptable. Individual circuit breaker shall consist of molded plastic case circuit breaker with toggle operated mechanism and thermal-magnetic overload trips. Interchangeable trip shall be provided when available. Toggle positions "ON" and "OFF", engraved or embossed on body. Breakers shall have 10,000 ampere minimum interrupting capacity unless indicated otherwise.

c) Circuit breakers, switches and other components as required shall be identified by laminated engraved plastic nameplate with minimum 1/4" letters fastened with minimum of two #4-40 stainless steel machine screws.

d) UL approved copper THHN cable bussing, fully rated.

5) Certification: Independent laboratory certification of metal preparation and finish provided by manufacturer.

b. Listing: UL 508A standards for industrial control panels and labeled for service entrance equipment.

c. Service enclosure shall be Tesco EN-26-000-S/EN-060-S or approved equal.

F. EQUIPMENT SHOP DRAWINGS. The following shall be ADDED to and made a part of

this subsection.

Security Alarm Switches
Service Equipment
Control Equipment
Equipment Cabinets
Pullboxes

1. Shop Drawings: Prior to fabrication, the Contractor shall submit for written approval of KDOW six (6) copies of complete installation drawings and manufacturer's wiring diagrams for the control and connection diagrams, connection diagrams, installation details, and any built-to-order equipment.

2. As-Built Drawings: Upon completion of the final inspection and testing, the Contractor shall provide, for the use of KDOW six (6) copies of as-built installation drawings and manufacturer's wiring diagrams and any built-to-order equipment.

3. Training for all electrical and electronic equipment SHALL BE CONDUCTED BY ITS RESPECTIVE FACTORY PERSONNEL; A FACTORY CERTIFIED REPRESENTATIVE IS NOT ACCEPTABLE AND WILL NOT BE APPROVED.

The following subsection shall be ADDED to and be made a part of subsection SP-20p.

G. PAYMENT FOR SECTION SP-20.

1. General: No separate payments will be made for the work covered by the separate sections of the SP-20 series of these specifications. With the exception of the nonrecurring utility installation costs, all costs in connection with furnishing and installing of the various items in accordance with standard practice, the details shown on the drawings and in accordance with these specifications, shall be included in the lump sum price of which the item is a part.

2. Compensation: Payment of the furnishing and installing of equipment (exclusive of nonrecurring utility installation costs) will be made at the lump sum price bid of which the item is a part and shall be full compensation for all work in accordance therewith, complete and finished in accordance with the drawings and specifications.

END OF SECTION

SECTION SP-21 – ELECTRICAL (SCADA)

The following shall supplement the applicable electrical subsections of the "Water System Standards", State of Hawai'i, dated 2002, as amended.

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

21.1. GENERAL

A. General Conditions: This section covers the supervisory control and data acquisition (SCADA) system including equipment, wiring, adjustment and testing as indicated on the plans and specified herein.

1. As specified in Section SP-20 Electrical Work. The provisions of these related sections apply to this section and work described in this section shall comply with them.

B. Scope of Work: Provide all articles, materials, equipment, operations, and services herein or on Drawings, including all labor, materials, taxes, fees, insurance, and incidentals required to insure completion.

1. Test Complete Installation: Installation shall be complete in every detail as specified and ready for use. Any item supplied by Contractor developing defects within one year of final acceptance by DOW shall be replaced by such materials, apparatus, or parts to make such defective portion of complete system conform to true intent and meaning of these Drawings and Specifications, at no cost to DOW.

2. System shall be comprised of two (2) RTU panels at the Kilauea-Puu Pane tank site; and modifications to the existing Master SCADA RTU system. Both new RTU systems shall be compatible to communicate, via radio link to the existing Master SCADA Station Unit. Basic function of the system shall be to monitor on site conditions at the Kilauea-Puu Pane tank site and Kilauea Boosters site, receive tank level and pump operation data and/or supervisory signals from the existing Master SCADA Station, via radio telemetry. Contractor shall verify conditions of existing SCADA equipment prior to bidding.

a. The Contractor shall furnish all RTU and hardware as required at the Kilauea-Puu Pane Tank site with all appurtenances, whether specifically referenced herein or not, but which may be required for operation.

3. This system shall be an integrated system of hardware and firmware totally engineered, programmed, assembled and tested. System shall be complete with all appurtenances, whether specifically referenced herein or not, but which may be required for operation.

4. During bidding and construction, Contractor shall coordinate his work with

other trades to avoid omissions and overlapping responsibilities. Electrical contractor shall notify other trades and suppliers of project voltages, including control voltages.

5. Work by Others: Instrument transmitters shall be provided by respective sections of this contract. Installation of equipment complete with power wiring and electric controls and interlock wiring shall be part of Electrical Work.

C. Submittals: Submittals shall be made for approval and resubmitted until approval is received for the following:

1. Catalog Cuts: Submit for approval one (1) hard copy and one (1) electronic copy of catalog cuts of following equipment:

a. SCADA system components and equipment.
b. Conductors and Wiring.
c. Wiring and functional or block diagrams.
d. Manufacturer's recommendations for installation.
e. Logic diagrams and ladder diagrams.
f. Manufacturer's recommended list of spare parts for a one-year period of operation.

2. Electrical Installation Drawings: At least 10 days prior to any testing the Contractor shall submit three (3) sets of KDOW approved complete electrical installation drawings. The installation drawings shall include the manufacturer's wiring diagrams for the SCADA system and any built-to-order equipment.

3. As-Built Drawings: Upon completion of the final inspection and testing, the Contractor shall provide one (1) hard copy and one (1) electronic copy of as-built installation drawings and manufacturer's wiring diagrams for the SCADA system and any built-to-order equipment. Contractor shall also provide copies of the SCADA system wiring diagram: one (1) laminated copy in the SCADA cabinet, one (1) hard copy and one (1) electronic copy to KDOW.

D. Local Support: The manufacturer of the SCADA system supplied shall be represented by a company with offices in the State of Hawaii. This local office shall be capable of responding to requests for maintenance and repair to the system by having a technician skilled in the repair, maintenance and operation of the system at the job site within 24 hours of being notified. This local representative shall carry all spare parts which are recommended by the manufacturer.

21.2. PRODUCTS

A. General: Unless otherwise indicated, provide all first quality, new materials, free from any defects, in first class condition, and suitable for the space provided. Provide materials approved by UL wherever standards have been established by that agency. Where two or more units of the same class of material or equipment are

required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

B. Standard Products: Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design which conforms to these specifications.

C. Equipment Finish: Electrical equipment may be installed with manufacturer's standard finish and color, except where specific color, finish, or choice is indicated. If the manufacturer has no standard color, equipment shall be painted ANSI G1, Light Gray.

D. Type "PS" RTU Enclosure:

1. Description: Pad mount single door.

2. Construction: NEMA 4X: Type 316 #12 gauge stainless steel.

3. Size: Minimum size as indicated on drawings. Increase enclosure dimensions as necessary, within the maximum dimensions indicated on the drawings, to accommodate enclosed equipment and in order to meet other requirements of these Specifications.

4. Cabinet:

a. Sloped roof with overhang at door.

b. Mounting channels on side and rear walls.

c. Subpanel for rear wall mounting.

d. Continuous double flanged doorframe.

e. Screened air exhaust opening under roof overhang with filter held in place with retainer bracket. Provide gasket between filter and enclosure.

f. Open bottom with flange for bolting enclosure to concrete pad.

g. One inch diameter cable loop welded to interior of enclosure near door hinge for attachment of cable from door to enclosure.

h. Ground stud welded to interior sidewall of enclosure near door hinge.

i. For enclosures that house batteries, non-conductive battery shelf and battery hold-down brackets. Batteries shall not be installed on the ground.

5. Main Door:

   a. Hinged with three stainless steel hinges with ¼ inch diameter stainless steel pins, secured with ¼”-20 stainless steel carriage bolts and stainless steel nylock nuts.

   b. Equipped with 3-points latch and handle mechanism with nylon rollers at top and bottom.

   c. Stainless steel door handle with provisions for padlocking. Shall be compatible with Cyberlock Padlock that shall be provided by the Contractor.

   d. Screened, louvered air vent with filter held in place with filter retainer bracket. Provide gasket between filter and enclosure.

   e. Continuous door gasket made of closed cell neoprene.

   f. One inch diameter cable loop welded to interior of door near door hinge for attachment of cable from door to enclosure.

   g. Ground stud welded to interior of door near door hinge. Install bonding strap from ground stud of door to ground stud on enclosure.

   h. Print pocket.

   i. Holes for enclosure exterior nameplate. Drill holes prior to application of enclosure coating.

6. Operator Access Door:

   a. Mounted on main door for access to door-mounted switches or operator equipment including operator interface units.

   b. Hinged with continuous stainless steel hinge with 0.120-inch diameter stainless steel pin.

   c. Provisions for padlocking. Provide with Cyberlock padlock.

   d. Continuous door gasket made of closed cell neoprene.

7. Insulation System:

   a. Factory weld mounting studs for installation panels described in next Article prior to application of factory coating. Provide number of studs required to hold insulation in place without drooping, minimum of four studs per wall, roof, and door.

   b. Install insulated hardboard to walls, roof, and door of enclosure. Hold in place with mounting studs described in previous Article.

Provide openings for vents and operator access door.

8. Enclosure Coating:

   a. Cover and enclosure are finished with a white powder coat.

   b. Inner panels are finished in white powder paint.

9. Hammond Manufacturing HN4 FS SS Series or approved equal.

E. Remote Telemetry Unit:

1. The Remote Telemetry Unit (RTU) shall have a serial port and Ethernet port and be able to communicate using Ethernet/IP protocols. Each RTU shall be supplied with the number and types of I/O points as indicated elsewhere in the plans and specifications. Future expansion shall be possible by simply plugging in additional I/O modules to the rack-less I/O bus. Additional I/O modules shall connect next to each other without requiring a fixed size rack. RTU, I/O, and Ethernet switch components shall use 24VDC and shall be powered through a UPS backup with a minimum 30 minutes of backup time. Digital Outputs shall utilize transistor outputs and use auxiliary relays for controls, and Analog signals shall utilize 4-20maDC based signals. All downloading to the RTU controller shall be over Ethernet. All programming shall utilize ladder logic. Parts shall be off the shelf design and common throughout so as to minimize spare parts requirements. RTU shall be housed in the SCADA cabinet.

F. Radio Equipment and Communications:

1. Communications: The Contractor shall take complete responsibility for the system communication. The radio frequency shall match the existing and shall transmit to the existing site. The Contractor shall take the responsibility of checking out and verifying this mode of communication.

   a. Communication Path Survey: Based on the coordinates and elevations of the various remote sites, the Contractor shall perform and furnish a computerized paper path survey to determine the gain margin for each proposed transmission path. The survey should simulate use of actual frequency and proposed equipment.

      1) The survey shall include but not be limited to: a printout graph for each communication path which shall show the path profile, site elevations, site name, frequency, ERP, antenna type, distance between sites and predicted losses versus desired losses. The Contractor shall design the radio and communication system for at least 99.9% reliability.

   b. Licensing: The Contractor shall prepare all paperwork required for FCC coordination and FCC licensing in accordance with the FCC Rules and Regulations governing the licensing of the proposed

channels. One UHF frequency shall be required to accommodate the RTU reception and transmission. The Contractor shall submit all FCC coordination requirements to the FCC for frequency approval. The Contractor shall be responsible for the payment of FCC license fee.

c. FCC Type Acceptance: All equipment related to the radio communication shall be FCC type accepted, indication authorization by the FCC to allow the equipment to be used by the licensee.

2. Radio Equipment: The radio shall be a GE MDS TransNET 900 Spread Spectrum Transceiver, 902-928 MHz operation, or approved equal. The Contractor shall be completely responsible for interfacing the radio system into the remote station modem.

3. Antenna and Accessories: All antenna hardware shall comply with FCC rules and governing the design characteristics and mounting requirements for licensed frequencies used in the SCADA system. In general, the remote station shall employ directional gain antennas. Exact antenna requirements shall be determined after a communication path survey is completed. Feedlines between antenna and radio enclosures shall be solid, shielded coax (minimum 7/8" in diameter), low density, foam heliax. Each coax run shall be continuous and shall terminate with factory-installed connectors which are specifically designed for use with the above-described cable. The coax shall be run through conduit between the enclosure and the antenna. The conduit shall be a minimum of 3" nominal diameter, with no more than two (2) 90 degree bends with a minimum bend radius of 36 inches. Each enclosure containing a radio shall be equipped with a combination lightning arrestor and bulkhead fitting to allow coax termination through the enclosure. The feedline signal loss shall not exceed 1.55 db (UHF) for each one hundred feet of run. The total connector loss at each site shall not exceed 1.0 db.

a. Grounding hardware kits specifically designed for use with the cable selected shall be furnished and installed by the Contractor.

(a) Antenna Specifications:

Frequency Range	Match licensed channels
Nominal Impedance	50 ohms
Forward Gain	6 -10 db
Polarization	Vertical
Power Rating (min)	200 Watts
Materials	Aluminum/Stainless Steel
Mounting Clamps	3" O.D. galvanized pipe
Wind Rating	125 mph, 90 mph w/1/2" ice
Termination	Captive Type N
Lightning Protection	Direct ground connection

4. Remote Station Radio: MDS TransNET 900 Transceiver, 24 VDC.

G. Instrumentation System Transmitter Power Supply: The power supply shall be mounted in the SCADA cabinet and deliver regulated 24-36 volts DC power at a maximum current recommended by the analog transmitter supplier. The unit shall operate on 117 volts AC at 50-70 Hz. Load regulation shall be 150 mV maximum from no-load to full-load current. Line regulation shall be 150 mV from 105 to 135 volts AC.

H. See Drawings for additional information on the recommended materials and equipment for the SCADA system.

21.3. EXECUTION

A. Construction Methods:

1. Flush mount gauges, indicators, selector switches, pushbutton switches, and pilot lights in a logical arrangement.

2. Mount devices listed, shown, or required for a complete and operable system in accordance with device manufacturer's instructions, these specifications, and as recommended in NEMA PB1.1.

3. Ground control panel to safety ground of power source.

4. For exterior RTUs, mount operator in a separate NEMA 3R/12 stainless steel hinged cover enclosure, with door-in-door construction. Operator interface to be mounted on interior door.

B. Programming. The RTU supplier and Contractor shall provide the complete programming and documentation for the RTU to comply with the requirements set forth herein.

C. Commissioning. Instruments are to be commissioned under the direct supervision of a qualified representative of the instrument manufacturer. DOW shall have the right to witness any test, inspection, or calibration or start-up activity.

1. Test and exercise each device to demonstrate correct operation, first individually, then collectively as a functional network. Apply continuously variable analog inputs to verify proper operation and setting of analog devices and discrete devices (i.e. switches, etc.). Make provisional settings on relays and pressure switches.

2. Unless otherwise specified, tests shall be made to cover at least five points: approximately 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent of range. Individual device accuracy requirements shall be as specified by contract requirements or by published manufacturer accuracy specifications whenever contract requirements are not specified.

3. If test results conflict with calibration, the Contractor shall recalibrate and

repeat test until test results prove calibration to be correct.

D. Additional Start-Up Services: The Contractor shall include an additional two days of programming time and the cost for the RTUs programmer to visit the site for one of the days in the bid. This time may be used at the discretion of DOW for additional programming, changes, and/or training. This time is over and above the work necessary to provide a complete and operable system.

E. Guarantee: The SCADA system, terminal points, equipment, materials, and associated items shall be guaranteed against defective parts and operation due to faulty material or workmanship during the period of one year following acceptance and final payment by DOW. The Contractor shall make all repairs or replacements necessary to accomplish the required performance within the time specified by DOW and agreed to by the Contractor.

F. Payment for Section SP-21.

1. General: No separate payments will be made for the work covered by the separate sections of the SP-21 series of these specifications. All costs in connection with furnishing and installing of the various items in accordance with standard practice, the details shown on the drawings and in accordance with these specifications, shall be included in the lump sum price of which the item is a part.

2. Compensation: Payment of the furnishing and installing of equipment will be made at the lump sum price bid of which the item is a part and shall be full compensation for all work in accordance therewith, complete and finished in accordance with the drawings and specifications.

3. Payment to the Contractor will be made in two (2) parts once all work is in place, complete, and the SCADA System is operational.

   a. The first part will be fifty percent (50%) of the contract lump sum price of which the item is a part, when all original manufacturer's software and licenses, all programming software, all operational manuals, written procedures, and all other related documents for the operation of the SCADA system are submitted to the DOW.

   b. The second part will be fifty percent (50%) of the same Lump Sum price when the SCADA System is operating satisfactorily for 60 days continuously after the project is officially accepted by the DOW.

END OF SECTION

SECTION SP-22 – TEMPORARY WATER STORAGE TANKS

22.1. GENERAL: The Contractor shall furnish and install the temporary water storage tanks in accordance with "Water System Standards," State of Hawai'i, dated 2002, as amended and the construction drawings.

22.2. SUBMITTALS: The Contractor shall submit shop drawings and manufacturer's data on the temporary water storage tanks, fittings, piping, joints, etc. and certify that the product provided meets the specified item.

22.3. DELIVERY, STORAGE, AND HANDLING

22.3.1 Deliver all materials to job site properly marked to identify the structure for which they are intended and at such intervals to ensure uninterrupted progress of the work. Markings shall correspond to markings indicated on the shop drawings.

22.3.2 Store all members and materials off the ground using pallets, platforms, or other supports, but does not result in twisting or distorting the members.

22.3.3 Do not store materials on the structure in a manner that might cause distortion or damage to the members of the supporting structure.

22.4. SPECIFICATIONS

22.4.1 Tanks shall be polyethylene flat bottom, upright, opaque dark green colored cylindrical tanks molded in one-piece seamless construction for above ground vertical installation.

22.4.2 Tanks shall be NSF/ANSI 61: Drinking Water System Components – Health Effects certified.

22.4.3 Tanks shall have a storage capacity of at least 10,000 gallons.

22.4.4 Tanks shall have approximate dimensions of 142" diameter and 162" high.

22.4.5 Tank roof shall be domed and have a raised manway with approximate 24" diameter opening dimension. Tank roof shall have a 4" vent in accordance the construction drawings.

22.4.6 Tanks shall have 4" diameter pipe penetrations per the construction drawings. The penetrations shall have bulkhead fittings for water-tight seal and support. Tank connections must have adequate provisions for tank expansion/contraction due to temperature and load changes.

22.4.7 Tanks shall be equipped with a wind/seismic tank restraint system made of galvanized steel materials.

22.5. WARRANTY:

22.5.1 Provide three (3) year manufacturers' warranty under provisions of this section. This warranty provides for cost of labor and materials for loss of water tightness, limited to

amounts necessary to effect repairs necessitated by either defective material or workmanship, with no dollar limitation.

22.5.2 Submit two (2) executed copies of the manufacturer warranties for the periods stipulated, starting from the date of substantial completion. Each warranty must be signed by an authorized representative of the issuing company.

22.6. PRODUCTS:

22.6.1 Temporary tanks shall be Part No. 32036, as manufactured by Snyder Industries, 6940 O Street, Suite 200, Lincoln, Nebraska or approved equal.

22.6.2 Bulkhead Fittings, as manufactured by Snyder Industries, 6940 O Street, Suite 200, Lincoln, Nebraska or approved equal.

22.6.3 Wind/Seismic Tank Restraint System, as manufactured by Snyder Industries, 6940 O Street, Suite 200, Lincoln, Nebraska or approved equal.

22.7. TANK FOUNDATION:

22.7.1 Temporary tanks shall be supported by reinforced concrete pad foundations.

22.7.2 The concrete pads shall 12' square and 6" thick.

22.7.3 Reinforcement shall consist of welded wire fabric 6x6 W2.9/W2.9.

22.7.4 Concrete mix design shall be DWS2500.

22.7.5 The pads shall be clean, smooth and level, so it fully supports the entire tank bottom with no deflection.

22.7.6 The wind/seismic tank restraint system shall be anchored in the concrete pad.

22.8. TANK INSTALLATION:

22.8.1 Tanks shall be installed according to the manufacturer's instructions.

22.9. TANK DECOMMISSIONING:

22.9.1 The 10,000-gallon temporary tanks shall be decommissioned after the permanent 1.0 MG tank is in service and after approval from the Department of Water. Decommissioning shall consist of the following:

22.9.1.1 Drain each tank in accordance with NPDES Appendix F permit,
22.9.1.2 Clean each tank to remove any accumulated dirt or debris,
22.9.1.3 Dismantle appurtenant piping as described below, and
22.9.1.4 Install a 4" D.I. plug and gasket on the 4" D.I. flange end (three each tank) as described below.

22.9.2 The following temporary tank components shall remain in place, and remain property of the Department of Water, at the end of the project:

22.9.2.1 10,000-gallon temporary tanks,
22.9.2.2 tank concrete foundations,
22.9.2.3 wind/seismic tank restraint systems,
22.9.2.4 bulkhead fittings (three each tank),
22.9.2.5 4" D.I. flange end (three each tank), and
22.9.2.6 4" vent with stainless steel insect screen.

22.9.3 The following temporary tank piping and appurtenances shall be removed and disposed of at the end of the project

22.9.3.1 Above ground 4" D.I. piping, fittings and valves,
22.9.3.2 4" D.I. caps shall be installed on open ends of abandoned piping, and
22.9.3.3 Concrete support blocks for the appurtenant piping,

22.10. PAYMENT: Payment for the furnishing, installation, connection and removal of the temporary tanks shall be part of the respective Unit Price of the Proposal item.

END OF SECTION

SECTION SP-23 – OFFSITE STAGING AND STOCKPILE SITE

23.1 GENERAL

23.1.1 The Kaua'i Department of Water has identified an offsite staging and stockpile site on the construction plans. Contractor shall be responsible for preparing the site for project use, maintaining the site and restoring the site to a condition equal or better than the pre-project site condition. The site is to be used by the Kaua'i Department of Water's contractor only for the purposes of staging and stockpiling for the project.

If the Contractor identifies a different staging and/or stockpile site, the Contractor shall be responsible for all permitting and improvements necessary.

23.1.2 No machinery repairs shall take place on the site that could potentially risk soil contamination with oil, fuel, etc. Any spills or contamination shall be immediately reported to Kaua'i Department of Water's Engineer,

23.1.3 Access to the site is from Kuhio Highway. Contractor shall apply for a Temporary Driveway Approach from the State of Hawaii, Department of Transportation, Highways Division. Contractor is responsible for constructing the temporary driveway approach, maintaining the approach and restore the approach area to a condition equal or better than the pre-project condition.

23.1.4 Site shall have Best Management Practices (BMPs) and erosion control measures as shown on the construction plans and per NPDES regulations. Contractor shall update the NPDES Appendix C SWPPP to include the offsite staging and stockpile site.

23.1.5 Utilities including water, sanitary sewer and electricity are not available at the site. Contractor shall make arrangement for a temporary utility water connections as needed.

23.1.6 Kaua'i Department of Water and the Kaua'i Housing Agency reserve the right to access the site at any time for inspection or other purposes.

23.1 SUBMITTALS

23.1.1 Furnish for approval a site plan showing the locations and dimensions of BMPs, temporary facilities, equipment and material storage area, etc. Identify any areas which may have to be graveled to prevent the tracking of mud.

23.2 PERMITS

23.2.1 Temporary Driveway Approach from the State of Hawaii, Department of Transportation, Highways Division.

23.2.2 Contractor to update the NPDES Appendix C SWPPP to include the offsite staging and stockpile site.

23.3 PRODUCTS

23.3.1 Driveway Approach. Construct temporary driveway approach per the construction

plans and per State of Hawaii, Department of Transportation, Highways Division permit requirements

23.3.2 Fencing. Provide dust screen fencing along the perimeter of the site in accordance with the construction plans and SWPPP. Remove the fence upon completion and acceptance of the work.

23.3.3 Warning Signs. Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards. Post signs at all points of entry and attach signs to the perimeter fencing every 150 feet warning the public of the presence of construction hazards. Signs must require unauthorized people to keep out of the construction site.

23.4 TEMPORARY UTILITIES AND FACILITIES

23.4.1 Water. Contractor shall arrange for a temporary water connection if needed.

23.4.2 Sanitary Sewer. Provide and maintain one (1) field-type sanitary facility within the staging and stockpile site. Locate the facility within the construction fence and out of the public view. Clean unit and empty waste at least once a week or more frequently into a public sanitary sewage system.

23.4.3 Electrical. Contractor shall arrange for a temporary electrical connection if needed.

23.4.4 Field Office. Contractor may provide temporary field office if needed.

23.4.5 Rubbish Dumpster. No rubbish shall be stored within the staging and stockpile site unless contained in one or more rubbish dumpster(s). Equip dumpsters with a secure cover and keep dumpster(s) closed, except when being loaded with trash and debris. Locate dumpsters behind the construction fence and out of the public view. Empty site dumpsters at least once a week, or as needed to keep the site free of debris and trash.

23.4.6 Site Maintenance. Material stockpiles shall be neatly placed and organized. Dispose of construction debris, waste materials, packaging material and the like in rubbish dumpster daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Neatly store all salvageable materials resulting from demolition activities within the site.

23.4.7 Restoration of offsite staging and stockpile site. Upon completion of the project remove the driveway approach, dust fence and all other temporary products from the site. Restore areas used during the performance of the Contract to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including topsoil and grassing as necessary.

End of Section

SP-24 – DRINKING WATER STATE REVOLVING FUND

24.1 DESCRIPTION:

The Department of Water (DOW) has or will apply for federal funding under the Drinking Water State Revolving Fund (DWSRF). To comply with program requirements, the Contractor shall comply with and ensure all tiers of subcontractors comply with all federal regulations listed herein as applicable "Cross-Cutter" regulations, which have been determined as applying to the DWSRF loan program.

The "DWSRF BOILERPLATE" FEDERAL REQUIREMENTS FOR CONSULTANTS AND CONTRACTORS" is located in Appendix H. Consultation request letters and response letters to the U.S. Fish and Wildlife Service and the State of Hawai'i, Department of Land and Natural Resources, State Historic Preservation Division are located in Appendix L.

24.2 REQUIRED FEDERAL FORMS AND INFORMATION:

The Contractor shall complete and/or assist the DOW in completing the following form when so directed:

- EPA Form 5700-52A (MBE/WBE Utilization Under Federal Grants, Cooperative Agreements, and Other Federal Financial Assistance)

The Contractor and their subcontractors shall furnish all required information in a timely manner to ensure periodic filing deadlines are met.

24.3 AMERICAN IRON AND STEEL REQUIREMENT:

Projects funded with monies from the Drinking Water State Revolving Fund are subject to the American Iron and Steel (AIS) requirement, such that all products made primarily of iron or steel must be produced in the United States. The Contractor shall submit certification that the material was produced in the United States or information necessary to verify an approved waiver of the AIS Requirement. Additionally, Contractor shall comply with, and shall execute and submit any written documentation or certification required by the AIS or other applicable law, rule or regulation. Failure to comply with AIS Requirements by the Contractor shall permit the Department of Water or State of Hawaii to recover as damages against the Contractor any loss, expense, or cost (including, without limitation, attorney's fees) incurred by the Department of Water or State of Hawaii resulting from any such failure (including, without limitation, any impairment or loss of funding, whether in whole or in part, from the State of Hawaii or any damages owed to the State of Hawaii by the Department of Water).

24.4 DWSRF WATER NOTES:

In addition to the requirements listed in this section, the Contractor shall also comply with the following DWSRF water notes. These notes shall supplement the WATER CONSTRUCTION NOTES on the plans.

CHLORINATION OF WATER SYSTEMS

1. WATER MAINS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA

STANDARD FOR DISINFECTING WATER MAINS, ANSI/AWWA C651-99, SECTION 4.4.3, CONTINUOUS-FEED METHOD.

2. STORAGE TANKS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA STANDARD FOR DISINFECTING WATER-STORAGE FACILITIES, ANSI/AWWA C652-92, SECTION 4.1, CHLORINATION METHOD 1.

3. LIQUID CHLORINE OR CALCIUM HYPOCHLORITE, THAT HAS BEEN TESTED AND CERTIFIED AS MEETING THE SPECIFICATIONS OF ANSI/NSF STANDARD 60, DRINKING WATER TREATMENT CHEMICALS – HEALTH EFFECTS, SHALL BE USED FOR THE CHLORINATION OF THE WATER MAINS AND/OR STORAGE TANKS.

4. PRIOR TO CHLORINATION, THE WATER MAINS AND/OR STORAGE TANKS SHALL BE THOROUGHLY FLUSHED.

5. THE INTERIOR SURFACES OF THE WATER MAINS AND/OR STORAGE TANKS SHALL BE EXPOSED TO THE CHLORINATING SOLUTION, BY COMPLETELY FILLING THE MAIN TO REMOVE ALL AIR POCKETS, FOR A MINIMUM OF 24 HOURS AND THE FREE CHLORINE RESIDUAL SHALL NOT BE LESS THAN 10 PPM AFTER SUCH TIME.

6. SHOULD CALCIUM HYPOCHLORITE BE USED, NO SOLID AND/OR UNDISSOLVED PORTION OF THE COMPOUND SHALL BE INTRODUCED INTO ANY SECTION OF THE WATER MAINS AND/OR STORAGE TANKS TO BE CHLORINATED.

7. AT THE END OF THE 24 HOUR DISINFECTION PERIOD, REPRESENTATIVE SAMPLES SHALL BE TAKEN AND ANALYZED TO ASSURE A FREE CHLORINE RESIDUAL OF AT LEAST 10 PPM.

8. SHOULD THE FREE CHLORINE RESIDUAL RESULTS INDICATE ADEQUATE CHLORINATION, THE WATER MAINS AND/OR STORAGE TANKS SHALL BE THOROUGHLY FLUSHED AND FILLED WITH WATER FROM THE EXISTING SYSTEM AND AGAIN TESTED FOR FREE CHLORINE RESIDUAL. THE FLUSHING SHALL BE CONSIDERED ADEQUATE IF THE FREE CHLORINE RESIDUAL TEST RESULTS INDICATE THAT THE WATER IN THE WATER MAINS AND/OR STORAGE TANKS HAS A COMPARABLE CHLORINE RESIDUAL AS THE WATER IN THE EXISTING SYSTEM.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER DISPOSAL OF CHLORINATED WATER TO SAFEGUARD PUBLIC HEALTH AND ENVIRONMENT IN ACCORDANCE WITH APPLICABLE STATE DEPARTMENT OF HEALTH REQUIREMENTS. A NEUTRALIZING CHEMICAL SHALL BE APPLIED TO THE WATER TO BE WASTED TO THOROUGHLY NEUTRALIZE THE CHLORINE RESIDUAL REMAINING IN THE WATER IN ACCORDANCE WITH AWWA C651-99, SECTION 4.5.2, AND APPENDIX C.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FROM THE DEPARTMENT OF HEALTH, CLEAN WATER BRANCH PRIOR TO THE START OF

CONSTRUCTION, FOR THE DISPOSAL OF WATER USED FOR HYDROTESTING AND CHLORINATION.

11. FOLLOWING THE ACCEPTABLE FLUSHING OF THE WATER MAINS AND/OR STORAGE TANKS, TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES, TAKEN AT LEAST 24 HOURS APART, FROM REPRESENTATIVE POINTS SHALL BE TAKEN AND SUBJECTED TO MICROBIOLOGICAL TESTS (TOTAL AND FECAL COLIFORM). FOR WATERLINES, AT LEAST ONE SET OF SAMPLES SHALL BE COLLECTED FROM EVERY 1,200 FEET OF THE NEW WATER MAIN, PLUS ONE FROM THE END OF THE LINE AND AT LEAST ONE SET FROM EACH BRANCH. FOR STORAGE TANKS, THE SAMPLE SHALL BE COLLECTED FROM THE TANK'S EFFLUENT LINE SAMPLE TAP. POSITIVE OR INVALID TEST RESULTS WILL NOT BE ACCEPTABLE AND THE PROCESS WILL BE REPEATED.

12. ALL MEASUREMENTS FOR CHLORINE RESIDUAL SHALL BE ANALYZED USING E.P.A. APPROVED METHODS FOR DRINKING WATER.

13. ALL MICROBIOLOGICAL TESTS SHALL BE PERFORMED BY A LABORATORY APPROVED BY THE DEPARTMENT OF HEALTH, STATE OF HAWAII.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH ALL OF THE FOREGOING.

15. SEE ANSI/AWWA C651-99, SEC. 4.3.6 FOR SWABBING CHLORINATION PROCEDURES.

OTHER:

16. ALL MATERIALS (PIPE, PIPE LUBRICANTS, PAINTS, SEALANTS, FORM OIL, CONCRETE ADMIXTURES, ETC.) IN DIRECT CONTACT WITH THE POTABLE WATER SHALL HAVE NATIONAL SANITATION FOUNDATIONS (NSF) APPROVALS. THE CONTRACTOR SHALL SUBMIT THESE APPROVALS TO THE BOARD OF WATER SUPPLY FOR INFORMATION ONLY PRIOR TO ITS APPLICATION

24.5 Build America Buy America Requirement.

Projects funded with monies from the Drinking Water State Revolving Fund are subject to the Build America Buy America requirement, which requires the use of materials produced in the United States, and increases the requirement for American-made content, and strengthens the waiver process associated with Buy America provisions. The Contractor shall comply with the Build America Buy America requirement. Failure to comply with the Build America Buy America requirement by the Contractor shall permit the Department of Water or State of Hawai'i to recover as damages against the Contractor any loss, expense, or cost (including, without limitation, attorney's fees) incurred by the Department of Water or State of Hawai'i resulting from any such failure (including, without limitation, any impairment or loss of funding, whether in whole or in part, from the State of Hawai'i or any damages owed to the State of Hawai'i by the Department of Water).

24.6 PAYMENT:

Payment for complying with DWSRF Requirements will not be made separately; the compensation shall be considered incidental to the Total Sum Offer of which it is a part.

END OF SECTION

SECTION SP-25 – DEMOLITION

25.01 GENERAL

A. SUMMARY

1. Section includes:

   a. Demolition and removal of the existing 0.1 MG reinforced concrete water tank and appurtenances as shown on the approved construction plans.
   b. Demolition and removal of site improvements including AC pavement, concrete swales, base course material and other improvements as shown on the approved construction plans.
   c. Demolition and removal of water lines, electrical lines and other utilities to be abandoned as shown on the construction plans.

2. Demolition materials recycling: The work of this contract encourages solid waste generated to be diverted from landfill disposal through a combination of re-use and recycling activities.

B. DEFINITIONS

1. Remove: Remove and legally dispose of items, except those identified for use in recycling, re-use, and salvage programs.

2. Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human or animal life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.

3. Inert Solids/Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete, that does not contain hazardous substances or soluble pollutants at concentrations in excess of water-quality standards established by a regional water board and does not contain significant quantities of decomposable solid waste.

4. Class III Landfill: A landfill that accepts non-hazardous materials such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations.

5. Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.

6. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.

7. Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

8. Reuse: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.

9. Solid Waste: All putrescible and non-putrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by State law.

C. MATERIALS OWNERSHIP

Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain property of the Department of Water, demolished materials shall become the Contractor's property and shall be removed, recycled, or disposed from Project site in an appropriate and legal manner.

D. SUBMITTALS

1. Demolition Plan. Submit to the Department of Water a Demolition Plan prior to scheduling of any demolition work. The plan shall include at minimum the following:

   a. Proposed dust-control measures.
   b. Proposed noise-control measures.
   c. Schedule of demolition activities indicating the following:
      i. Detailed sequence of demolition and removal work, including start and end dates for each activity.
      ii. Dates for shutoff, capping, and continuation of water, electric and all other utility services.

2. Hazardous Materials. It is not expected that hazardous materials will be encountered in the work. However, if hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

3. Record drawings. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

E. QUALITY ASSURANCE

1. Demolition Firm Qualifications: Engage a licensed demolition contractor and an experienced firm that has successfully completed demolition work similar to that indicated for this project.

2. Regulatory Requirements: Comply with all County of Kaua`i regulations in regards to demolition, hauling and disposal. Obtain and pay for all permits required.

3. Pre-demolition Conference: Conduct conference at project site. Review the goals of this project with Contractors, subcontractors, and waste haulers and make a proactive effort to increase awareness of these goals among all labor forces on site.

F. PROJECT CONDITIONS

1. The existing 0.1 MG water tank and appurtenances to be demolished shall not be damaged and shall remain in good working order until the Engineer has given approval to demolish.

2. Storage or sale of removed items or materials on-site will not be permitted without advance written approval from the Engineer.

25.02 PRODUCTS (NOT USED)

25.03 EXECUTION

A. EXAMINATION

1. Verify that utilities have been disconnected and capped.

2. Survey existing conditions and correlate with requirements indicated to determine extent of demolition and recycling required.

3. Survey condition of the structure to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.

4. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

B. PREPARATION

1. As part of the project scope, the Contractor shall prepare all drawings, documents, and applications and shall obtain all government agency approvals and permits required for demolition activities.

2. Conduct demolition operations and remove materials to ensure minimum interference with roads, streets, walks, and other adjacent occupied and utilized facilities. Do not close or obstruct streets, walks, or other adjacent occupied or utilized facilities without

permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.

    a. Arrange to shut off indicated utilities with utility companies.
    b. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
    c. Cap, valve, or plug and seal remaining portion of pipe or conduit after according to requirements of the Department of Water and other authorities having jurisdiction.

4. Conduct demolition operations to prevent injury to workers, inspectors and other people and damage to adjacent buildings and facilities to remain. Ensure safe passage of workers, inspectors and other people around demolition area.

    a. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways for protection purposes and as required by authorities having jurisdiction.

    b. Protect existing site improvements, appurtenances, and landscaping that are designated to remain in place.

5. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of structures to be demolished and adjacent buildings to remain. Strengthen or add new supports when required during progress of demolition.

C. EXPLOSIVES

Use of explosives will not be permitted.

D. ENVIRONMENTAL CONTROLS

1. Comply with federal, state and local regulations pertaining to water, air, solid waste, recycling, chemical waste, sanitary waste, sediment and noise pollution.

2. Protection of Natural Resources: Preserve the natural resources within the project boundaries or restore to an equivalent condition.

    a. Confine demolition activities to areas defined by public roads, easements, and work area limits indicated on the drawings.

    b. Water Resources: Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters.

c. Dust Control, Air Pollution, and Odor Control: Prevent creation of dust, air pollution and odors.

i. Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.

ii. Use water mist and other suitable methods to limit spread of dust and dirt. Do not use water when it may create hazardous or objectionable conditions, such as flooding, pollution or other problems

iii. Store volatile liquids, including fuels and solvents, in closed containers.

iv. Properly maintain equipment to reduce gaseous pollutant emissions.

d. Noise Control: Perform demolition operations to minimize noise.

i. Repetitive, high level impact noise will be permitted only between the hours of 9:00 a.m. and 4:00 p. m. Repetitive impact noise on the property shall not exceed the following dB limitations:

Sound Level in dB	Time Duration of Impact Noise
70	More than 12 minutes in any hour
80	More than 3 minutes in any hour

ii. Provide equipment, sound-deadening devices, and take noise abatement measures that are necessary to comply with the requirements of this Contract.

e. Salvage, Re-Use, and Recycling Procedures

i. Identify re-use, salvage, and recycling facilities.

ii. Develop and implement procedures to re-use, salvage, and recycle demolition materials. Procedures may include on-site recycling, source-separated recycling, salvage, and/or mixed debris recycling efforts.

iii. Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.

iv. Source-separate new construction, excavation and demolition materials including, but not limited to the following types:

- Asphalt
- Concrete, Concrete Block, Concrete Masonry Units (CMU), and Rock
- Asphalt Concrete
- Metal (ferrous and non-ferrous)
- Other materials as appropriate

E. DISPOSAL PRACTICES AND WASTE HAULING

1. Legally transport and dispose of materials that cannot be delivered to a source-separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

2. Use a permitted waste hauler or Contractor's trucking services and personnel.

3. Become familiar with the conditions for acceptance of new construction, excavation and demolition materials at recycling facilities, prior to delivering materials.

4. Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.

5. Do not burn, bury or otherwise dispose of rubbish and waste materials on project site.

F. REVENUE

1. Revenues or other savings obtained from recycled, re-used, or salvaged materials shall accrue to Contractor unless otherwise noted in the Contract Documents.

2. Remove and transport materials in a manner that will prevent spillage on adjacent surfaces, streets, and areas or dust being emitted into the atmosphere.

3. Clean adjacent streets of dust, dirt, and materials caused by demolition operations. At the end of each work day, return adjacent areas to condition existing before start of demolition.

25.04 DEMOLITION

A. Tank Demolition: Demolish tank completely and remove from the site. Use methods required to complete work within limitations of governing regulations and as follows:

1. Locate demolition equipment throughout the site and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

2. Demolish concrete in sizes that will be suitable for acceptance at recycling or disposal facilities.

3. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

4. Demolish and remove reinforcing steel. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations. Maintain fire watch during and for at least 4 hours after flame cutting operations. Maintain adequate ventilation when using cutting torches.

5. Remove all disconnected, abandoned utilities on site.

B. Below-Grade Construction: Demolish foundation walls and other below-grade construction, as follows:

1. Completely remove below-grade construction, including foundation walls and footings.

2. Break up and completely remove below-grade concrete slabs, in small sizes, suitable for acceptance at recycling or disposal facilities.

3. Below-Grade Areas: Completely fill below-grade areas and voids resulting from demolition operations to level with satisfactory soil materials.

C. Damages: Promptly repair damages to adjacent facilities caused by demolition operations.

D. Payment: Payment for the work described herein will be made at the lump sum price bid of which the item is a part and shall be full compensation for all work in accordance therewith, complete and finished in accordance with the drawings and specifications. Demolition includes the removal and disposal of all designated Project elements, including but not limited to the existing 0.1 MG reinforced concrete tank, foundation, footing, appurtenances, AC pavement perimeter road, existing chain link fence, waterlines, valves, valve boxes, and other water structures.

END OF SECTION

SECTION SP-26 – ELECTRONIC SECURITY PADLOCKS

26.01 GENERAL: The Contractor shall provide to the Owner electronic security padlocks in accordance with the manufacturer, model and quantity specified in the following Products sub-section.

26.02 PRODUCTS:

A. All electronic security padlocks shall be manufacturered by CyberLock®, Corvallis OR (www.cyberlock.com).

B. Padlocks shall be Cyberlock® Model PL-02KR. Padlocks shall be Wilson Bohannan key-retaining brass padlock with weather-resistant 6-pin Schlage format cylinder pre-installed (CyberLock® Model CL-6P3WR). Padlocks shall have 2-in x 3/8-in diameter stainless steel shackle.

C. Total quantity of padlocks to be provided to the Owner: six (6). Padlock locations are as follows:
   1. SCADA Cabinet Main Door (one total),
   2. Tank Exterior Ladder Access Cage (one total), and
   3. Tank Roof Hatches (four total)

26.03 PAYMENT:

Payment for SP-26 ELECTRONIC SECURITY PADLOCKS will not be made directly but shall be included in the payment of which it is a part. Such payment shall represent full compensation for furnishing all materials, labor, tools, equipment and incidentals required to complete the work.

END OF SECTION