SPECIFICATIONS AND PROPOSAL

FOR

REPAIR LIFT STATIONS AT PIERS 21 AND 27

HONOLULU HARBOR, OAHU, HAWAII

JOB S10849

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

NOTICE TO BIDDERS
(Chapter 103D, Hawaii Revised Statutes)

The receiving of bids for **REPAIR LIFT STATIONS AT PIERS 21 AND 27, HONOLULU HARBOR, OAHU, HAWAII, JOB S10849** will begin as of the HIePRO Release Date. Bidders shall register and submit complete bids through HIePRO only. Refer to the following HiePro Link for important information on Vendor Registration: https://hiepro.ehawaii.gov/welcome.html.

The solicitation of plans, specifications, proposal, and additional documents designated or incorporated by reference shall be available in HIePRO.

HIePRO OFFER DUE DATE & TIME is November 18, 2024, at 2:00 p.m., Hawaii Standard Time (HST). **Bidders shall submit and upload the complete proposal to HIePRO prior to the offer due date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents as part of their proposal. The record of each bidder and their respective proposal shall be open to public inspection. FAILURE TO UPLOAD THE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION.**

The scope of work for this project consists of the demolition of the existing packaged sewer lift stations including associated wet well piping, and the installation of new packaged duplex lift stations and full height enclosures. The work also includes removal of existing electrical apparatus and equipment connections; installation of new electrical distribution equipment, conduit, conductors and equipment connections; concrete foundation work; the replacement of a portion of a gravity sewer; and site improvements. The estimated cost of

construction is between $1,000,000 and $2,000,000.

To be eligible for award, bidders must possess a valid State of Hawaii General Engineering Contractor's "A" license **at the time of bidding.**

The Hawaii Department of Transportation, Air and Water Transportation Facilities Division, 2016 GENERAL PROVISIONS FOR CONSTRUCTION PROJECTS, applicable to this project is available on the internet at: http://hidot.hawaii.gov/administration/con/.

A virtual pre-bid conference is scheduled for October 18, 2024, at 9:00 a.m., HST. Interested bidders shall contact Gregg Hirokawa, Design Project Manager, directly at gregg.hirokawa@hawaii.gov, no later than five working days prior to the scheduled pre-bid conference to receive the meeting invitation. All prospective bidders and/or their respective representatives are encouraged to attend, however, attendance is not mandatory. All information presented at the pre-bid conference shall be provided for clarification and information only. Any amendments to the solicitation shall be made by formal addendum and posted in HIePRO.

All Request for Information (RFI) questions and Substitution Requests shall be submitted in HIePRO **no later than October 21, 2024, at 2:00 p.m., HST.** RFI questions received after the stated deadline shall not be addressed. Substitution Requests received after the stated deadline shall not be considered. Verbal RFI(s) shall not receive a response. All responses to RFI questions shall be provided for clarification and information only and issued by formal addendum. Any amendments to the solicitation shall be made by formal addendum and posted in HIePRO.

Apprenticeship Preference. A five percent bid adjustment for bidders that are party to apprenticeship agreements pursuant to HRS, § 103-55.6, is applicable to this project.

Employment of State Residents on Construction Procurement Contracts. Compliance with HRS, § 103B-3, is a requirement for this project whereby a minimum of 80 percent of the

bidder's work force on this project must consist of Hawaii residents.

Campaign Contributions by State and County Contractors. Contractors are hereby notified of the applicability of HRS, § 11-355, which states that campaign contributions are prohibited from specified State or County government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body. For more information, contact the Campaign Spending Commission at (808) 586-0285.

Protests. Any protest of this solicitation shall be submitted in writing to the Director of Transportation, in accordance with HRS, § 103D-701, and Hawaii Administrative Rules, § 3-126.

The Equal Employment Opportunity Regulations of the Secretary of Labor implementing Executive Order 11246, as amended, shall be complied with on this project.

The U.S. Department of Transportation Regulation entitled "Nondiscrimination in Federally Assisted Programs of the U.S. Department of Transportation," Title 49, Code of Federal Regulations (CFR), Part 21, is applicable to this project. Bidders are hereby notified that the Department of Transportation will affirmatively ensure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the grounds of race, color, national origin, or sex (as directed by 23 CFR, Part 200).

For additional information, contact Gregg Hirokawa, Design Project Manager, by phone at (808) 587-1985, or by email at gregg.hirokawa@hawaii.gov.

The State reserves the right to reject any or all proposals and to waive any defects in said proposals for the best interest of the public.

Dreanalee Kalili

DREANALEE K. KALILI
Deputy Director of Transportation for Harbors

HIePRO RELEASE DATE: October 11, 2024

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INSTRUCTIONS FOR CONTRACTOR'S LICENSING

"A" general engineering contractors and "B" general building contractors are reminded that due to the Hawaii 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" 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 *(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.

SPECIAL PROVISIONS

The General Provision is amended as follows:

A. ARTICLE I - TERMS, ABBREVIATIONS, AND DEFINITIONS

1. Section 1.3 Definitions: The definition for "Subcontractor" is amended by deleting it and replacing it with the following:
   "Subcontractor – An individual, partnership, firm, corporation, or joint venture, or other legal entity, as licensed or required to be licensed under Chapter 444, Hawaii Revised Statutes, as amended, which enters into an agreement with the Contractor to perform a portion of the work."

2. Section 1.3 Definitions: The definition for "Proposal (or Bid)" is amended by deleting it and replacing with the following:
   "PROPOSAL (OR BID) - The offer of a Bidder, on the prescribed HDOT form, submitted by the Bidder in response to a solicitation request, to perform the work required by the proposed contract documents, for the price quoted and within the time allotted."

3. Add the following to section 1.3 Definitions.
   "HAWAII ePROCUREMENT SYSTEM (HIePRO) - The State of Hawaii eProcurement System for issuing solicitations, receiving proposals and responses, and issuing notices of award."

B. ARTICLE II – STANDARD PROVISIONS FOR COMPETITIVE SEALED BIDS AND AWARDS

1. 2.7 Request for Substitution of Specified Materials and Equipment Before Bid Opening is amended as follows:

   a. The last sentence in the first paragraph (line 147 to 152) be replaced with the following:
      "Where a bidder intends to use a material or equipment of an unspecified brand, make, or model, the bidder must submit a request to the Department for review and approval at the earliest date possible. Requests shall be submitted via email to the Contact person listed in HIePRO for the solicitation and also posted as a question in HIePRO under the question/answer tab referencing the email with the request. The request must be posted in HIePRO no later than twenty-seven (27) calendar days before the bid opening date."

b. The first sentence in the second paragraph (line 154 to 156) shall be replaced with the following:

"It shall be the responsibility of the bidder to submit sufficient evidence based upon which a determination can be made by the Department that the alternate brand is a qualified equivalent."

2. 2.8 Preparation and Delivery of Bid is amended as follows: Last paragraph (line 189 to 192) shall be replaced with the following:

"**Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Do not include confidential and/or proprietary documents with the proposal.** The record of each bidder and respective bid shall be open to public inspection. Original (wet ink, hard copy) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between the specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified."

3. 2.11 Bid Security is amended by deleting (a) and replacing it with:

"(a) Unless directed otherwise in the invitation for bids, each bid shall be accompanied by bid security which is intended to protect the Department against the failure or refusal of a bidder to execute the contract for the work bid or to supply the required performance and payment bonds. Bid security shall be in an amount equal to at least five percent of the base bid and additive alternates. Bid security shall be in one of the following forms:

(1) A deposit of legal tender;

(2) A valid surety bid bond, underwritten by a company licensed to issue bonds in the State of Hawaii; or

(3) A certificate of deposit; credit union share certificate; or cashier's, treasurer's, teller's, or official check drawn by or a certified check accepted by a bank, savings institution, or credit union insured by the Federal Deposit Insurance Corporation (FDIC) or the National Credit Union Administration (NCUA) and payable at sight or unconditionally assigned to the Department. These instruments may be utilized only to a

maximum of one hundred thousand dollars ($100,000.00). If the required amount totals over one hundred thousand dollars ($100,000.00), more than one instrument not exceeding one hundred thousand dollars ($100,000.00) each and issued by different financial institutions shall be accepted.

If bidder elects options (1) or (3) above for its bid security, said security shall be in its original form and shall be submitted before the bid deadline to the Contract Office, Department of Transportation, Aliiaimoku Hale, 869 Punchbowl Street, Room 105, Honolulu, Hawaii 96813. **Original surety bid bonds do <u>not</u> need to be submitted to the Contracts Office. Bidders are reminded that a copy of its bid bond shall be <u>included with its bid</u> submitted and uploaded to HIePRO.**"

4. <u>2.12 Pre-Opening Modification or Withdrawal of Bids</u> is amended by deleting 2.12 Pre-Opening Modification or Withdrawal of Bids in its entirety and replacing it with the following:

   "2.12 Pre-Opening Modification or Withdrawal of Bids. Bids may be modified or withdrawn prior to the bid opening date and time. Withdrawal or revision of proposal shall be completed, and submitted and uploaded to HIePRO prior to the bid opening date and time."

5. <u>2.14 Public Opening of Bids</u> is amended by deleting 2.14 Public Opening of Bids in its entirety.

6. <u>2.20 Bid Evaluation and Award</u> is amended by replacing 2.20(a) and 2.20(b) with the following:

   "(a) The award shall be made to the lowest, responsive, responsible bidder within 120 days after bid opening and shall be based on the criteria set forth in the invitation for bids. The Department may request the bidders to allow the Department to consider the bids for the issuance of an award beyond the 120 day period. Agreement to such an extension must be made by a bidder in writing. Only bidders who have agreed to such an extension will be eligible for the award.

   (b) No bid shall be withdrawn or corrected for a period of 120 days after bid opening except for a mistake as described in this article; however, a bidder may withdraw a bid without penalty anytime prior to award of the contract if it finds it is unable to comply with the provisions regarding the employment of State of Hawaii residents as described in Section 7.2 and 103B-3, H.R.S."

C. <u>ARTICLE VII – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC</u>

1. <u>7.1 Insurance Requirements</u> is amended by deleting paragraph "(b)(4) Builder's Risk for All Work" in its entirety.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HONOLULU, HAWAII

SPECIFICATIONS

PART I

GENERAL PROVISIONS

The Hawaii Department of Transportation AIR and WATER Transportation Facilities Division General Provisions for Construction Projects dated 2016 is not physically included in these specifications. The General Provisions are available at

http://hidot.hawaii.gov/administration/con/

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HONOLULU, HAWAII

SPECIFICATIONS

PART II

TECHNICAL PROVISIONS

JOB S10849

ARTICLE X - PROJECT DESCRIPTION

10.1 GENERAL - The work to be done on this project includes furnishing all labor, materials and equipment necessary to upgrade the sewer lift stations at Piers 21 and 27. The work includes the demolition of the existing packaged lift stations including associated wet well piping, and the installation of new packaged duplex lift stations and full height enclosures. The work also includes remove of existing electrical apparatus and equipment connections, installation of new electrical distribution equipment, conduit, conductors and equipment connections, concrete foundation work, the replacement of a portion of a gravity sewer, and site improvements.

Bidders are advised to examine the existing conditions at the proposed project site to familiarize themselves with the nature and extent of work involved and working conditions. Appointments may be made with the Harbors Division Project Engineer for clarification of the work involved or definition of the limits of the work.

Lift station locations are indicated on the plans.

10.2 SCOPE OF WORK - The work to be done includes, but is not necessarily limited to, the following major items of work:

A. Mobilization and demobilization.

B. Provide a Best Management Practices (BMP) Plan.

C. Perform lift station upgrade work including the following:

1. Demolish the existing packaged lift stations including associated wet well piping.

2. Install new packaged duplex lift stations and full height enclosures,

3. Install electrical and control connections,

4. Line the wetwells,

5. Replace a portion of the gravity sewer upstream of the Pier 21 Lift Station,

6. Site improvements (lighting, signing, striping, bollards, etc.), and

7. Site restoration.

D. Installation and maintenance of ADA portable toilets and hand washing units for tenant use during construction.

10.3 HARBOR OPERATIONS - The Contractor shall coordinate its work so as to minimize interference with harbor operations. The work schedule shall be coordinated with the Harbors

Division Oahu District Manager and the Harbors Division Construction Engineer and shall be subject to their approval. All work shall be scheduled to minimize interference with any operations in the project area. Night and weekend work may be required. Contractor should not expect a continuous 5-day work week.

Shipping and dock activities will take precedence over the Contractor's activities. Vessels call at various days of the week. An approximate vessel schedule for the project area can be found at www.hawaii.portcall.com. The exact scheduling of the work and restrictions on the Contractor's activities will be established at the pre-construction meeting.

Phasing and careful coordination of the work will be required to allow continuous use of the project location and adjacent areas. The Contractor shall be responsible for coordination with all tenants/users and the Harbors Division on a daily basis regarding scheduling of all work at no additional cost to the State.

Emergency vehicle access with a minimum width of 10'-0" through the pier apron area shall be maintained at all times.

All work shall be scheduled with the Harbors Division Oahu District Manager, and the Harbors Division Construction Engineer. The Contractor shall give the Harbors Division Oahu District Manager and the Construction Engineer at least 2 weeks prior notice whenever its work will render a portion of the pier unusable.

The Contractor shall provide 2 sets of portable ADA toilets and hand washing stations at Pier 21, and 4 sets of portable ADA toilets and hand washing stations at Pier 27 to serve the tenants affected by the construction. Coordinate with DOT for the location. The toilets and hand washing stations shall be operational such that the tenants have continuous sewer service. The Contractor shall empty, clean and restock the toilets and hand washing stations twice per week.

10.4 HARBOR SECURITY - The Contractor shall submit required documentation of all Contractor and subcontractor's employees, their representatives, suppliers, manufacturers, and alike, and of all necessary vehicles needing access to the project site to the Harbors Division Construction Engineer and Oahu District Manager before starting work on the project. The documentation will include the following:

A. Authorized personnel's first name, middle initial(s), and last name by company name.

B. Vehicle(s) license plate number(s) by company name.

C. The Contractor may be directed to use a specified entrance to enter and exit the harbor. Upon every entry, each employee must present and possess a photo identification (ID) card.

D. All Contractor's and sub-contractor's employees, their representatives, suppliers, manufacturers, and authorized personnel needing access to the project site shall wear their photo ID card at all times.

E. Contractor's vehicles must be identified with a company logo and will be subject to search. Any employee's personal belongings will also be subject to search.

F. If the Contractor wishes to remove any fencing or open any locked gates, they shall coordinate with and request approval from the Harbors Division Construction Engineer and Oahu District Manager. If approval is granted, the Contractor shall then be responsible for securing open fencing or gate(s) immediately after entering, or posting security personnel to monitor ingress and egress. Inspections of vehicles and equipment moving through the access points will be done in accordance with current MARSEC level and directives.

G. If security personnel are required, the Contractor shall hire the same contract security that provides service to the State of Hawaii, Department of Transportation, Harbors Division. In the event that the security contract for Harbors changes, contractor must hire the new security contractor.

H. By the end of each day, the Contractor shall re-erect and restore all fencing/barrier/perimeter security measures to the satisfaction of the Harbors Division Construction Engineer and the Oahu District Manager. Electricity and lighting shall also be restored and in satisfactory working order, to no less than pre-construction conditions, by the end of each day, to the satisfaction of the Harbors Division Construction Engineer and District Manager.

I. Under no circumstances shall perimeter security be compromised. If determined by the State, and solely by the State, that the contractor has left the project site in a condition that compromises security of the harbor, the State reserves the right to make the necessary arrangements to provide and enhance perimeter security, including restoration of electrical power and lighting, at the sole expense of the Contractor.

J. At times, the maritime security level for the State of Hawaii and/or the general color-coded security level for State of Hawaii may be temporarily elevated. In these events, the contractor may be prohibited to access the project site and may be required to stop work as directed by either the Harbors Division Construction Engineer or Oahu District Manager. The Harbors Division will consider impacts to the work and schedule as a result of prolonged work stoppages.

K. Maritime Security Awareness training is mandatory for all personnel entering the Harbor facility. The Contractor shall be responsible to ensure all of its employees, representatives, subcontractors, vendors, and all alike, requiring access to the harbor area for this project, have been trained and possess the required maritime security card before entering the Harbor's property. Prior to starting work on this project, the Contractor shall provide a list of names (full

legal name) and birth dates of all employees, representatives, subcontractors, vendors, and all alike, as well as their vehicles license number, year, make, color and model that will be entering the project site, together with a letter attesting that all personnel have received this training to the Harbors Division Oahu District Manager and Construction Engineer. All employees, representatives, subcontractors, vendors, and all alike, shall wear their respective company's identification card bearing the company's name, the individual's first and last name, and middle initial(s), and a recent photograph of the individual on the front of the identification card at all times while on Harbor's property.

With the possible exception of Item J above, all other requirements indicated shall be considered incidental to the project and shall be provided by the contractor at no cost to the State.

The Contractor's personnel requiring unescorted access to secure areas of maritime facilities will be required to obtain a Transportation Worker Identification Credential (TWIC). No escorting of personnel is allowed. The project area has been deemed to be within a secured area. TWIC was established by Congress through the Maritime Transportation Security Act and is administered by the Transportation Security Administration (TSA) and U.S. Coast Guard. To obtain a TWIC, the applicant must provide biographic and biometric information such as fingerprints, sit for a digital photograph and successfully pass a security threat assessment conducted by TSA. The Contractor will be responsible to obtain and pay for all costs associated in providing their appropriate employees with TWIC. Information regarding TWIC is available on the TSA website at http://www.tsw.dhs.gov/what_we_do/layers/twic/index/shtm.

10.5 STORAGE AREA - Arrangements for work and storage areas shall be made with the Harbors Division Oahu District Manager, the Harbors Division Construction Engineer, and the tenants. The Contractor shall be responsible for maintaining the work and storage areas and, if necessary, shall restore these areas to their original condition at no cost to the State in the event any damage results from its operations.

10.6 LIABILITY AND RESPONSIBILITY - The Contractor shall provide, erect and maintain warning signs, lights, barricades, fences, watchmen and/or all other means as necessary to prevent unauthorized persons from wandering onto the job site where they may suffer injury or create a hazard to the construction operations or the work in progress. The Contractor shall also take all reasonable precautions for safety in its operations and to prevent injury to its employees and to others at the job site.

The Contractor shall be responsible for any and all damages to harbor facilities caused by its operations. The Contractor shall, at its own expense, make prompt restitution for damages to the harbor facility caused by its operations or negligence. The Contractor shall hold the State harmless from all claims for loss or injury.

The Contractor shall remove defective work and replace the required work at no cost to the State.

The Contractor shall verify conditions in the field prior to ordering any materials. The existing conditions are based on the best available information. The Contractor shall make no claim for extra compensation should actual existing conditions differ from those shown on the plans and specifications.

10.7 PERMITS - The Contractor will be required to complete and submit the form, "Permit for Shoreside and Vessel Work". The Contractor shall obtain the required work permit from the Harbors Division Oahu District Manager.

A Building Permit from the City & County of Honolulu will not be required for this project.

The Contractor is responsible for any permits related to the handling, storage, transport and disposal of hazardous materials.

Hawaii One Call. The Contractor shall comply with the Hawaii One Call law, HRS Section 269E-4. This includes, but is not limited to, coordination with the Hawaii One Call Center (HOCC) for any work involving excavation at least five (5) working days, but not more than twenty-eight (28) calendar days prior to commencing excavation. The Contractor shall provide to HOCC a description of the excavation site that may include the county, place, address, and measurements as needed. HOCC contact information: telephone 811; website http://www.digsafelyhawaii.com.

The Contractor shall be aware that this project site is in a petroleum-contaminated area managed by IDPP. Notification of HDOH is likely to be triggered. The Contractor shall stay vigilant during excavation of in situ soil. If contaminated soil is encountered, the Contractor shall follow HDOH guidance to manage the excavated soil and segregate the contaminated soil from the clean one, and collect stockpile soil sample(s) for lab analysis prior to waste disposal.

The CONTRACTOR shall use the attached HDOH Programmatic EHE/EHMP Document prepared for Iwilei District as guidance during this project, especially during in situ soil excavation, excavation soil excavation, stockpile sample, and related waste disposal. The Contractor shall complete appropriate documentation in its Appendix B to confirm that the work is completed according to this plan plus all disposal documentation (if any).

Air Monitoring of methane and hydrogen sulfide is required during the active excavation near or at in situ soil.

The HDOH Programmatic EHE/EHMP Document prepared for Iwilei District is included after Article X.

10.8 SUBMITTALS - Submittals shall be submitted no later than thirty (30) calendar days after Notice to Proceed and at least forty-five (45) calendar days prior to the proposed work. Review of the Contractor's plans and methods of construction by the Engineer does not relieve the Contractor of the responsibility to meet the contract requirements. Submit shop drawings and calculations for the open excavation support systems concrete mix design, patching compounds,

reinforcing steel coating, curing compound, and other related information as requested by the Engineer.

10.9 BEST MANAGEMENT PRACTICES - The Contractor must follow standard best management practices (BMPs) for air pollution, water pollution, noise and solid waste control, as required by Federal, State and County regulations, to protect the environment from effects of construction activity, including prohibiting any construction debris or other deleterious materials to fall, flow or otherwise enter harbor waters.

The Contractor shall submit a site-specific BMP to the Harbors Division Construction Engineer before work begins. The plan shall satisfy the (applicable) requirements of ARTICLE XII – TEMPORARY WATER POLLUTION, DUST, AND EROSION CONTROL. This plan shall describe and detail all methods and procedures to be used to prevent air and water pollution, including preventing any materials, wastes, and debris from entering any adjacent storm drain system and the harbor to the satisfaction of the Harbors Division. The Contractor shall revise the BMP plan – at no additional cost to the State – should it be determined by the Harbors Division Construction Engineer that the plan is insufficient to prevent pollution.

10.10 APPROVED EQUAL - The term “approved equal” as used in these specifications refers to the use of alternate equipment, articles or materials of equal quality and characteristics for the purpose intended. An approved equal will be permitted, upon approval of the Director prior to bid opening, in accordance with the General Provisions.

10.11 STANDARD SPECIFICATIONS - The term "Standard Specifications" as used in these Technical Provisions of these Specifications, shall mean the "Hawaii Standard Specifications for Road and Bridge Construction, 2005, Department of Transportation Highways Division, Honolulu, Hawaii."

10.12 COMPLETION TIME - All work for this project shall be completed within the specified time period as listed in page P-1 of the Proposal. The number of days shall commence on the issuance of the notice to proceed. The intent of the contract is to provide for the construction final acceptance of the work described by the contract documents at the accepted bid price and within the time established by the contract. The Contractor has the duty to furnish all labor, materials, equipment, tools, transportation, incidentals, and supplies and to determine the means, methods and schedules required to complete the work in accordance with the contract documents. Unless otherwise directed by the Engineer in writing, the Contractor shall not commence with physical construction without sufficient materials and equipment available at the project site for either continuous construction until completion, or completion of a specified portion of the work.

10.13 AS BUILT DRAWINGS - The Contractor shall keep one set of drawings at the job site and make all field changes thereon. After completion of the project, the Contractor shall submit

an electronic copy of the as-built in PDF(A) format to the Harbors Division Construction Engineer.

10.14 PAYMENT - Payment shall be made as specified below. Such payment shall include furnishing all labor, material, equipment and other expenses required to complete each item in accordance with the plans and specifications.

Item 1 - Mobilization (Not to exceed 6% sum of all Items, excluding this Item). Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment described in Article XI of these Specifications shall include setting up all plant equipment and materials at the job site, providing temporary barricades as required for Harbor operations during construction, and all other incidental work required to complete this item.

Item 2 – Remove Existing Pump Station at Pier 21. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include demolition and removal of the existing pump station at Pier 21 and related appurtenances, in place complete.

Item 3 - Remove Existing Pump Station at Pier 27. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include demolition and removal of the existing pump station at Pier 27 and related appurtenances, in place complete.

Item 4 - Install New Pump Station at Pier 21. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include the installation of a new packaged duplex lift station and full height enclosure, valves, pipes, appurtenances, testing, and all related work, in place complete.

Item 5 - Install New Pump Station at Pier 27. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include the installation of a new packaged duplex lift station and full height enclosure, valves, pipes, appurtenances, testing, and all related work, in place complete.

Item 6 – Electrical Work at Pier 21. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include removal of existing electrical apparatus and equipment connections, installation of new electrical distribution equipment, conduit, conductors and equipment connections, testing and all related work, in place complete.

Item 7 – Electrical work at Pier 27. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include removal of existing electrical

apparatus and equipment connections, installation of new electrical distribution equipment, conduit, conductors and equipment connections, testing and all related work, in place complete.

Item 8 – New 8" Sewerline. Removal of Existing and Installation of New 8" Sewerline. Payment shall be made at the unit price bid per linear foot in the Proposal Schedule. Such payment shall include removal of existing and installation of the new 8" sewerline, and as applicable, pipe, fittings, leakage testing, cleaning, connections, and all necessary work, in place complete.

Item 9 – New 4" Sewer Force Main. Payment shall be made at the unit price bid per linear foot in the Proposal Schedule. Such payment shall include removal of existing and installation of the new 4" sewer force main, and as applicable, pipe, fittings, leakage testing, cleaning, connections, and all necessary work, in place complete.

Item 10 – Sewerline Trench Work. Payment shall be made at the unit price bid per linear foot in the Proposal Schedule. Payment shall include excavation; removal and disposal of existing pipe, bedding, backfill, and base course; utility locating; protect and support of existing utilities, facilities, and structures; pavement demolition; traffic covers (steel plates with asphalt concrete patch); temporary excavation support system including Contractor's shop drawing preparation; removal of excavation support prior to site restoration; groundwater control oand disposal; traffic control; material handling and stockpiling of materials; new pipe bedding; new backfill, compaction, warning tape, and quality control testing; pavement restoration (new base course, tack coat, ac pavement, compaction, etc.) and all other necessary work required for open excavation construction.

Item 11 – Sewer Manhole. Payment shall be made at the unit price bid per each in the Proposal Schedule. Payment shall include construction/ installation, sealing, testing, cleaning, inspection, and all required work necessary to complete the work.

Item 12 – Line Pump Station Wetwell at Pier 21. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include cleaning and preparation work, surface preparation, applying underlayment and epoxy topcoat, testing of installed epoxy coatings, sewer flow control, disposal of excess materials, and other necessary services required to complete the rehabilitation work.

Item 13 – Line Pump Station Wetwell at Pier 27. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include cleaning and preparation work, surface preparation, applying underlayment and epoxy topcoat, testing of installed epoxy coatings, sewer flow control, disposal of excess materials, and other necessary services required to complete the rehabilitation work.

Item 14 – Replace Manhole Frame & Cover at Pier 21. Payment shall be made at the unit price bid per each in the Proposal Schedule. Payment shall include removal and disposal of the existing Pier 21 Pump Station Wetwell manhole frame and cover, cleaning, surface preparation, concrete work, installation of the manhole frame and cover, and other necessary services required to complete the work.

Item 15 – Replace Manhole Frame & Cover at Pier 27. Payment shall be made at the unit price bid per each in the Proposal Schedule. Payment shall include removal and disposal of the existing Pier 27 Pump Station Wetwell manhole frame and cover, cleaning, surface preparation, concrete work, installation of the manhole frame and cover, and other necessary services required to complete the work.

Item 16 – Site Improvements at Pier 21. Payment shall be made at the lump sum price bid in the Proposal Schedule. Payment shall include site improvements and restoration at Pier 21, removal and disposal of existing bollards, installation of new bollards, new signs and posts, striping, miscellaneous improvements, and site restoration.

Item 17 – Site Improvements at Pier 27. Payment shall be made at the lump sum price bid in the Proposal Schedule. Payment shall include site improvements and restoration at Pier 27, removal and disposal of existing bollards, installation of new bollards, new signs and posts, striping, miscellaneous improvements, and site restoration.

Item 18 –Portable ADA Toilets at Pier 21. Payment shall be made at the unit price bid pier each in the Proposal Schedule. Such payment shall include providing portable ADA toilets and hand washing stations at Pier 21, installation, all work required to make the units operational, maintenance, and removal after the sewer system is operational.

Item 19 –Portable ADA Toilets at Pier 27. Payment shall be made at the unit price bid pier each in the Proposal Schedule. Such payment shall include providing portable ADA toilets and hand washing stations at Pier 27, installation, all work required to make the units operational, maintenance, and removal after the sewer system is operational.

Item 20 – Hazardous Material Handling and Disposal. Payment shall be made at the unit price bid per cubic yard in the Proposal Schedule. Payment shall include material handling and stockpiling, loading, transporting, testing and permitting, and disposal of materials, and all other necessary work required for the disposal of excavated material.

Item 21 – Air Monitoring of Methane and Hydrogen Sulfide during active excavation near or at in situ soil. Payment shall be made at the lump sum price bid in the Proposal Schedule. Such payment shall include all equipment and labor to perform the required air monitoring.

Programmatic EHE/EHMP Document

Iwilei District
Honolulu Hawaii

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Version 2.0

Prepared by:

HAWAII STATE DEPARTMENT OF HEALTH

State of Hawai‘i Department of Health (HDOH)

Hazard Evaluation and Emergency Response Office (HEER Office)

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- **Environmental Science International for Sections of EHE and EHMP**
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FIGURES

APPENDICES

ACRONYMS

AST	Aboveground storage tank
bgs	Below ground surface
BMP	Best management practice
BTEX	Benzene, toluene, ethylbenzene, and xylenes
C&C	City and County
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
COPC	Contaminant of potential concern
COC	Contaminant of concern
CPR	Cardiopulmonary resuscitation
cy	Cubic yard
DCS	Debris-contaminated soil
EAL	Environmental action level
EHE	Environmental Hazard Evaluation
EHMP	Environmental Hazard Management Plan
EPA	U.S. Environmental Protection Agency
eV	Electron volt
GPS	Global Positioning System
HAR	*Hawaii Administrative Rules*
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDOH	Hawaii Department of Health
HDOT	Hawaii Department of Transportation
HEER	Hazard Evaluation and Emergency Response
HIOSH	Hawaii Occupational Safety and Health
HRS	*Hawaii Revised Statutes*
HSERC	Hawaii State Emergency Response Commission
HSP	Health and Safety Plan
HVOC	Halogenated volatile organic compound
IAP	Incident Action Plan
IC	Institutional control
ID	Iwilei District
IDN	Iwilei District North
IDPP	Iwilei District Participating Parties
IDS	Iwilei District South
kg	Kilogram

LEL	Lower explosive limit
LEPC	Local Emergency Planning Committee
LOC	Letter of Completion
LNAPL	Light non-aqueous phase liquid
mg	Milligram
mil	Milliliter
MTBE	Methyl tertiary butyl ether
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OPA	Oil Pollution Act
OSHA	Occupational Safety and Health Administration
OU	Operational unit
PAH	Polycyclic aromatic hydrocarbon
PCS	Petroleum-contaminated soil
PEL	Permissible exposure limit
PID	Photoionization detector
PPE	Personal protective equipment
ppm	Parts per million
ppmv	Parts per million by volume
PRP	Potentially responsible party
RP	Responsible party
RQ	Reportable quantity
SOSC	State On-scene Coordinator
SPH	Separate phase hydrocarbons
STEL	Short-term exposure limit
TCLP	Toxicity Characteristic Leaching Procedure
TGM	Technical Guidance Manual
TPH	Total petroleum hydrocarbons
TPH-d	Total petroleum hydrocarbons as diesel fuel
TPH-g	Total petroleum hydrocarbons as gasoline
TPH-o	Total petroleum hydrocarbons as oil
TWA	Time-weighted average
UGP	Underground pipeline
UIC	Underground injection control
UST	Underground storage tank
VOC	Volatile organic compound
VRP	Voluntary Response Program

1.0 INTRODUCTION

The Iwilei District (ID) encompasses approximately 315 acres of land north and south of Nimitz Highway. The ID includes land owned privately and by the State of Hawaii, and is managed by the Hawaii Department of Transportation (HDOT). Historical and current land uses are primarily industrial and commercial—docking and unloading of ships, warehousing, and bulk petroleum storage with associated pipelines, and minor residential use.

The Hazard Evaluation and Emergency Response (HEER) Office of the Hawaii Department of Health (HDOH) is overseeing remediation of historical impacts associated with (1) petroleum handling activities that have resulted in petroleum hydrocarbon releases from now-inactive storage tanks and underground pipelines (UGP), and (2) impacts by metal and other compounds resulting from past industrial or imported fill activities.

Both engineered remedial measures and long-term Institutional Controls (IC) have been and continue to be implemented to prevent hazards to human health and the environment within the ID. Potentially hazardous contaminants of concern (COC) are present in soil, groundwater, and soil gas at various locations within the ID. Some of these COCs have been removed, and removals of these will continue via engineered remedies. Management of potential hazards associated with the remaining (also referred to as residual) COCs is addressed by ICs, which are described in Environmental Hazard Management Plans (EHMP). These plans—an HDOH requirement —are described in HDOH's Technical Guidance Manual (TGM).

Site-specific EHMPs have been implemented within the ID, developed by parties HDOH considers responsible for residual COCs at specific parcels or sites. Site-specific EHMPs are developed after completion of site characterization and implementation of any required engineered remedies. Site-specific EHMPs include (1) those developed under the Voluntary Response Program (VRP) by a group of potentially responsible parties referred to as the Iwilei District Participating Parties (IDPP), and (2) other EHMPs already prepared by HDOT and other parcel/site operators/owners. Figure 1 shows the areas for which site-specific EHMPs have been established and for which site-specific EHMPs are under preparation. Copies of these site-specific EHMPs are or will be available at the HEER office in Honolulu. As environmental impacts are identified at other sites within the ID, HDOH may require preparations of additional site-specific EHMPs in the future.

Under present conditions and controls, which include implementations of engineered remedies, the COCs within the ID do not currently pose hazards to human health and the environment. However, exposures to residual COCs could occur during (1) minor future subsurface activities—including belowground constructions of utility trenches (for water, natural gas, electricity, telephone, cable), box culverts and storm drain laterals, sanitary sewers, street lights, traffic lights, grease traps, and septic tanks; and (2) minor construction activities within roadways and common areas. This Programmatic Environmental Hazard Evaluation (EHE)/EHMP and the relevant site-specific EHMPs specify requirements, procedures, and guidelines intended to prevent occurrences of these potential exposures that would pose hazards to human health and the environment.

This Programmatic EHE/EHMP addresses sites of known or suspected presence of COCs where no previous site investigations have occurred and for which no EHMPs have been established. These sites are shown on Figure 1 as "Area Covered by HDOH's Programmatic EHMP." HDOH may update the extent of this area periodically. Importantly, pursuant to the

Environmental Response Law (*Hawaii Revised Statutes* [HRS] 128-D) and the State Contingency Plan (*Hawaii Administrative Rules* [HAR] 11-451), parties are required to comply with this Programmatic EHE/EHMP.

Parties may utilize this Programmatic EHE/EHMP as is, and HDOH expects this for small-scale projects within private sites, roadways, and common areas. Off-site construction within roadways and common areas will likely encounter COCs that must be properly managed by construction and environmental contractors.

Alternatively, parties can refine or modify the details of this Programmatic EHE/EHMP in order to better address site-specific requirements. So in effect, parties have the option to create their own site-specific EHMPs provided the site is properly characterized based on the Programmatic EHE/EHMP.

2.0 PURPOSE

The purpose of this Programmatic EHE/EHMP is to specify consistent and effective practices for managing the following COCs if these are encountered during minor subsurface activities within the ID: petroleum-contaminated soil (PCS) and debris-contaminated soil (DCS) normally containing high levels of metals, petroleum- or dissolved metals-contaminated groundwater, or elevated soil vapors. Petroleum-related contamination and metals are emphasized because these are the most common contaminants found within most if not all of the affected areas. Activities covered by this document include: (1) minor work at the subsurface within utility trenches (for water, natural gas, electricity, telephone, cable), box culverts and storm drain laterals, sanitary sewers, street lights, traffic lights, grease traps, and septic tanks; and (2) minor construction activities within roadways, common areas, and sites for which a site-specific EHE has not occurred and a site-specific EHMP has not been established.

If unsure whether this Programmatic EHE/EHMP is detailed enough to provide appropriate guidance for planned minor subsurface construction activities, contact HDOH prior to commencing the project.

Important: Complete site characterization must precede full-scale redevelopment (including construction of additional buildings or major building alterations) within areas of known or suspected contamination. If contamination is encountered, preparation of a site-specific EHE/EHMP must be prepared to address contamination within the site boundary.

3.0 AREA COVERED

The area covered by this document is the ID of Honolulu. The ID consists of two distinctly separate parcels—Iwilei District North (IDN) and Iwilei District South (IDS). The IDN is bordered north by Dillingham Hwy. and south by North Nimitz Hwy. The IDS is bordered north by North Nimitz Hwy. and south by Honolulu Harbor. The eastern boundary of both parcels is North King Street, and the western boundary is the Kapalama Canal (Figure 1). Technical approaches presented in this document can also be applied to other areas of Oahu with similar COCs and lithology, and with non-drinking water utility.

3.1 History and Background

Iwilei District North. For the past 100 years, the IDN has been dominated by heavy industry, including pineapple canning and support industries, a box manufacturing plant, a manufactured gas plant, a petroleum bulk storage facility, and a chemical manufacturing and storage facility. These industries required large volumes of petroleum products that were supplied by pipelines originating at Honolulu Harbor, and were stored on site in aboveground storage tanks (AST) and underground storage tanks (UST).

The area has since transitioned from heavy industry to retail outlets. The retail outlets in the IDN include Costco, Home Depot, Lowe's, Best Buy, Brewer Environmental Industries, Latour Plaza, and Best Buy. A number of these retail outlets entered the HDOH VRP, and have received or will soon receive Letters of Completion (LOC) exempting them from liability for COCs remediated under the VRP. Site-specific EHE/EHMPs have been established for some VRP sites within the IDN, and therefore this document does not apply to those sites.

Because of numerous petroleum releases over the years, site redevelopment activities in the area often encounter both PCS and DCS. DCS is normally attributed to fill material from the two Chinatown fires. For few sites in the IDN have approved, site-specific EHE/EHMPs been established. No guidance presently exists for construction within roadways and common areas owned by the City and County (C&C) or the State, or for properties lacking site-specific EHE/EHMPs.

Iwilei District South. IDPP is a group of responsible parties (RP), including HDOT, that has signed an enforceable agreement (May 2006) with the State to remediate certain parcels of land called operational units (OU) in the Iwilei Harbor area, which includes the IDS.

For the past 100 years including the present, the IDS area has been dominated by Port activities, docking and unloading of ships, warehousing, bulk petroleum storage with associated pipelines, heavy industry, support industries, petroleum, and other commercial/industrial activities. The area remains dominated by heavy industry and Port activities, although some retail activities have recently developed within the area (i.e., the Fishing village). Numerous petroleum releases occurred over the years, and contaminated fill was used to raise the ground level. Site redevelopment activities within the area often encounter contamination. For some IDPP OUs, HDOH-approved site-specific EHE/EHMPs are in place. Little guidance presently exists for construction on sites not included in IDPP OUs, and for work within roadways and common areas owned by C&C and/or the State.

Most land within the IDS is owned by the HDOT Harbors Division. Some properties within the IDS where responsibility for release(s) is clearly defined must be remediated by the RP(s).

***Under the present conditions and controls, contamination within the ID does not pose a threat to human health or the environment*.** This document does not supersede existing site-specific EHE/EHMPs or the need to develop site-specific documents for land development and large construction projects. HDOH recognizes that developing independent, site-specific EHE/EHMPs for small-scale projects within private sites, roadways, and common areas can lead to delays in construction because of the requirement that HDOH approve new plans prior to construction. In addition, off-site construction within roadways and common areas will likely encounter contamination that must be properly managed by construction and environmental contractors. EHE/EHMPs currently do not exist to deal with these contingencies. This Programmatic EHE/EHMP can also be used by landowners, tenants, and utilities companies to assist in developing individual EHE/EHMPs for large construction activities.

4.0 HOW TO USE THIS DOCUMENT

An EHE assesses hazards to human health and the environment from contaminant concentrations in soil and groundwater that exceed HDOH environmental action levels (EAL). An EHMP details how contaminants are to be managed when encountered during subsurface work. Many properties, roadways, and common areas within the ID are contaminated by various chemical constituents that are presently managed in place. The intent of this document is to provide guidance when relatively minor subsurface excavations encounter contaminated soil and groundwater at properties for which site-specific EHE/EHMPs have not been established. The EHE consists of Sections 6 and 7 while the EHMP consists of Sections 8 through 17.

Note: In this document, the terms “encounter” and “release” are presumed synonymous where applied to contamination exposed within a medium during subsurface construction/repair activity.

This document is meant for use in the field upon encounter with contamination during subsurface activities. Following procedures specified in this document precludes need to stop work upon encounter with contamination. The first person to notice contamination is typically the backhoe or heavy equipment operator. An environmental consultant or a supervisor knowledgeable in dealing with contaminated soil and groundwater should be on site during construction activities. The machine operator relays the discovery of the contamination to the designated on-site environmental consultant or supervisor, who then phones in this information, communicates with others involved in the chain of command, and ensures that the EHE/EHMP is followed in dealing with the contaminated soil and groundwater. Based on the nature and type of construction, the EHE is broad enough to detail potential hazards. The EHMP provides a range of options for dealing with contaminated soil and groundwater. The Guidelines for Landowners, Tenants, Utilities Companies and Construction Contractors (Appendix A) provides graphic and photographic examples of how to deal with contaminated soil and groundwater, and includes a Project Implementation Form. This form is a checklist based on HDOH experience with a wide range of events that can occur during construction.

Use of the forms in Appendix B is required to document proper handling of contamination, provide record keeping for the project, and fulfill reporting requirements for HDOH. The forms should detail deviations from standard practices in the text, and explain how those deviations were protective of human health and the environment.

If subsurface construction is planned within the ID:

1. Read the EHE section of this document to become familiar with the potential hazards associated with contaminated soil and groundwater.
2. Develop a site-specific Health and Safety Plan (HSP) (Section 10 and Appendix B.2).

During subsurface construction work, if contaminated media or inactive pipelines or USTs are encountered, take the following necessary steps as applicable to ensure proper handling of contaminated media:

- Report any petroleum-contaminated soil or groundwater to the HEER Office (Section 9 and Appendix B.1).
- Follow the Construction Activities Release Response Plan (Section 11 and Appendix B.3).

- If inactive pipelines or USTs are encountered, follow the Inactive Pipeline and UST Removal Plan (Section 12 and Appendix B.4).
- If contaminated soil is encountered, follow the Soil Management Plan (Section 13 and Appendix B.5).
- If contaminated groundwater is encountered, follow the Groundwater Management Plan (Section 14 and Appendix B.6).
- If free product is encountered, follow the Free Product Management Plan (Section 15 and Appendix B.7).
- If elevated soil vapor is encountered, follow the Soil Vapor Management Plan (Section 16 and Appendix B.8).
- If contaminated soil and/or groundwater is in or could be in contact with stormwater, follow the Stormwater Management Plan (Section 17 and Appendix B.9).

Fill out the individual plans in Appendix B by following approved practices in the EHMP sections of the document (Sections 9 through 17). Record actions taken on the appropriate form(s), keep a copy for your records, and submit a copy to the HEER Office to fulfill reporting requirements.

If RPs do not follow this document, they must follow previously established procedures that include halting excavation when contamination is discovered, reporting the release to HEER Emergency Preparedness and Response Section, and/or waiting for an inspection by an On-scene Coordinator prior to re-commencing excavation. Failure to report a release could lead to fines of up to $10,000 per day. Failure to properly handle soil and groundwater could lead to fines from other agencies such as the Solid and Hazardous Waste Branch, the Clean Water Branch, and the U.S. Coast Guard.

Disclaimer:

The procedures, information, guidelines, and sample hazard management plans referred to herein are not intended to be a comprehensive description of all rules, regulations, laws, and other requirements applicable to a construction project. They are only intended to provide general information and should not be used in place of appropriately qualified personnel. Each landowner, tenant, and construction contractor is responsible for complying with all applicable rules, regulations, laws, and other requirements, and for preparing his/her/its own hazard management plans for his/her/its own site-specific project.

5.0 AREA GEOLOGY

The Iwilei area is on the southeast coastal plain of the Island of Oahu, which was formed on the eroded banks of two shield volcanoes, the Koolau and the Waianae. The volcanic series underlying the site was formed by rapid succession of volcanic flows with little evidence of erosion between eruptive events (Stears 1966, MacDonald et al 1983). The mode of emplacement produced vesicular and fractured basalt formations with a very high permeability. Groundwater in the basalt is referred to as the basal aquifer and is the primary major water supply for the island (Mink and Lau, 1990).

The basal aquifer beneath the Iwilei area is overlain by at approximately 600 feet of interlayered marine and terrestrial sediments, as well as thin volcanic tuff and basalt units. These formations are collectively referred to as the "caprock," since they form a confining layer over the underlying basalt. Shallow sediments are primarily composed of porous, coarse-grained gravels and sands). A laterally continuous, confining layer occurs within the caprock at a depth of approximately 40 feet below ground surface (bgs) and extends to a depth of approximately 65 to 75 feet bgs. The unit is composed of inorganic, finer-grained sediments that are described in the geotechnical borings as stiff to hard silts. Soil classification tests indicate that the silt has low permeability and is plastic with a substantial amount of clay. This unit is underlain by several hundred feet of coral and additional marine and terrestrial sediments.

The top of the caprock unit is overlain by approximately 2 to 10 feet of fill material in most areas. Historically, the Iwilei area was filled with material from a variety of sources to raise the ground surface elevation for development and improvement of Honolulu Harbor facilities. The emplaced fill consisted of dredge spoils from the nearby harbor channels, as well as soil and debris imported from other areas, including debris from several significant Chinatown fires (one of which in 1866 leveled most of the 50-acre Chinatown district, and another of which, the "Great Chinatown Fire" in January 1900, was a historical Honolulu event). The fill is laterally discontinuous and generally consists of sands and clays similar to the underlying caprock unit sediments.

No active drinking water wells are present within the ID. The area is seaward (Makai) of the underground injection control (UIC) line, and the caprock groundwater is not considered a potential drinking water source (Mink and Lau 1990).

6.0 ENVIRONMENTAL HAZARD EVALUATION

6.1 Contaminants of Potential Concern

The EHE consists of Sections 6 and 7.

Based on previous investigations in the area, the following contaminants of potential concern (COPC) may be encountered in soil and groundwater during subsurface construction projects. The COPCs are further broken down to petroleum related contaminants and non petroleum related contaminants

Petroleum related contaminants:

- Total petroleum hydrocarbons (TPH) as gasoline (TPH-g), as diesel (TPH-d), and as oil (TPH-o)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Methyl tertiary butyl ether (MTBE)
- Styrene
- Halogenated volatile organic compounds (HVOC)
- Polycyclic aromatic hydrocarbons (PAH)
- Lead
- Light non-aqueous phase liquid (LNAPL)/free product (e.g., gasoline, diesel fuel, fuel oils, lubricating oils, benzene, toluene, xylenes)
- Methane.

The PAHs identified in this area include acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene.

Non Petroleum related contaminants:

Metal COCs detected in the area include arsenic, barium, cadmium, chromium, lead, mercury, and silver.

Metals associated with DCS from landfill disposal after the Chinatown fires of 1886 and 1900 (lead, arsenic, and cadmium) have been identified in the area. Metals detected in the area also may be associated with DCS from previous industrial activities on site.

6.2 Gross Contamination

Gross contamination refers to physical conditions that present odor, nuisance, and general pollution concerns. It includes free product, sheen, objectionable odors and tastes (in drinking water), and general resource degradation. At high levels, certain types of gross contamination can become a physical hazard (e.g., presence of flammable vapors or liquids, such as those associated with gasoline). In general, contaminants in areas considered grossly contaminated are relatively immobile, are nontoxic to humans, and do not threaten ecological receptors.

Gross contamination in groundwater includes potentially mobile free product, nuisance odors from surface water, petroleum hydrocarbon sheen on surface water, and general resource degradation.

In the absence of ICs and/or engineered controls, future human populations and ecological receptors at the property could be exposed to gross contamination (e.g., free product, objectionable odors).

6.3 Direct Exposure

The direct exposure hazard involves human contact with contaminated soil and groundwater, or soil vapor either directly or indirectly. Direct contact can occur via incidental ingestion or dermal contact, or inhalation of dust in outdoor air. Indirect contact can occur via inhalation of soil vapors in outdoor air. In general, contaminants in areas considered to present a direct exposure hazard are relatively immobile, are potentially toxic to humans, and do not threaten ecological receptors.

In the absence of ICs and engineered controls, future human populations at the property could be exposed to contaminated soil (including contaminated dust), groundwater, or soil vapor inside buildings

6.4 Soil Vapor Intrusion

Vapor intrusion involves exposure of human populations to volatile chemical compounds that have entered a building or other enclosed structure from contaminated subsurface soil or contaminated groundwater. In general, contaminants in areas considered to present a vapor intrusion hazard are volatile chemicals that are toxic to humans via inhalation of vapors.

In the absence of remediation, institutional controls (ICs), and engineered controls (EC), future human receptors at the property could be exposed to volatile organic compound (VOC) vapors.

6.5 Leaching

Leaching is movement of contaminants from vadose zone soils into underlying groundwater through chemical and physical mechanisms. The principal chemical mechanism is dissolution of contaminants into water (e.g., percolating rainwater, irrigation water) moving downward through the vadose zone. Physical mechanisms include (1) entrainment of contaminants bound in a colloid phase by water moving through the vadose zone, and (2) mass movement of contaminants through the vadose zone by infiltrating water. Most contaminants in areas considered to present a leaching hazard typically are mobile, volatile chemicals that are toxic to humans and may threaten ecological receptors at sites close to surface water bodies (including Honolulu Harbor).

In the absence of engineered controls, groundwater could be contaminated via leaching of contaminants from vadose zone soils by infiltrating groundwater.

6.6 Ecotoxicity

6.6.1 Terrestrial Ecotoxicity

Ecotoxicity refers to the capability of a contaminant to damage an ecological population, ecological community, or ecosystem. The ecotoxicity of a contaminant typically is based on its

toxicity to one or more species, its persistence in the environment, and its ability to bioaccumulate. Under consideration are flora and fauna in terrestrial (i.e., land) habitats and aquatic (e.g., marine) habitats.

Impacts on terrestrial flora and fauna can occur through exposure of populations to contaminated soil. Most contaminants in areas considered to present a terrestrial eco-toxicity hazard typically are relatively immobile, non-volatile chemicals that are toxic to ecological receptors. Because no current or future sensitive ecological receptors are or will be present within the ID, terrestrial eco-toxicity is not considered a concern and will not be evaluated further. In the absence of concerns regarding terrestrial flora or fauna in the area, terrestrial eco-toxicity is not considered an environmental hazard.

6.6.2 Aquatic Ecotoxicity

Impacts on aquatic (i.e., marine) flora and fauna can occur through discharge of contaminated groundwater into surface waters. Most contaminants in areas considered to present an aquatic eco-toxicity hazard typically are mobile, volatile chemicals that are toxic to ecological receptors. In the absence of engineered controls, sensitive populations could be exposed to groundwater contaminants entering the surface water bodies such as the ocean, streams, or lakes via migration through the Harbor wall or a potential preferential pathway (i.e., current and future storm drains).

7.0 EXPOSURE PATHWAYS

Identified potential exposure pathways to human receptors within the ID include ingestion, inhalation, and dermal contact. These are described briefly below.

7.1 Ingestion

Ingestion is oral intake of a solid or liquid material. Ingestion of contaminated soil or groundwater is a human health risk and a direct exposure hazard. Accidental ingestion of contaminated soil or groundwater will be of concern during construction when contaminated soil and groundwater are encountered.

7.2 Inhalation

Inhalation is the act of drawing air, other gases, vapors, fumes, smoke, dust, or mists into the lungs. Inhalation of contaminated soil (as dust) is a human health risk and a direct exposure hazard. VOC vapors released from surface soil potentially pose an indirect exposure hazard. During excavation and construction activities, contaminated subsurface soils may be disturbed, thus increasing potential for release of dust into the work area.

7.3 Dermal Contact

Dermal contact is direct exposure of skin to solids, liquids, or gases. Dermal contact with contaminated soil, groundwater, or soil vapor is a direct exposure hazard. During excavation and construction activities, contaminated subsurface soils and groundwater are likely to be encountered, thus increasing potential for dermal contact. Dermal contact with contaminated soil, groundwater, and soil vapor (and contact with free product) will be of concern during construction activities when contaminated soil and groundwater are encountered.

8.0 ENVIRONMENTAL HAZARD MANAGEMENT PLAN

The EHMP consists of Sections 8 through 17.

This EHMP has been developed to mitigate potential exposure of construction workers, other on-site workers, and the aquatic ecosystem to COCs during activities associated with future construction activities. The EHMP consists of nine individual plans presented as Sections 9 through 18 as follows, each addressing a specific potential source of COCs (see Section 6.1) and methods of handling contaminated media:

- Release Reporting Plan
- Health and Safety Plan (HSP)
- Construction Activities Release Response Plan
- Inactive Petroleum Pipeline and UST Management Plan
- Soil Management Plan
- Groundwater Management Plan
- Free Product Management Plan
- Vapor Management Plan
- Stormwater Management Plan

The plans include engineering and institutional controls, as well as requirements for personal protective equipment (PPE) and a monitoring program. Prior to initiation of construction work, on-site workers will be informed and educated about potential hazards posed by COCs and methods used to prevent exposure.

Construction activities in contaminated media are to be reported by filling out appropriate form(s) in Appendix B and submitting the forms to the HEER Office.

9.0 RELEASE REPORTING PLAN

Encounters with petroleum contaminated soil, DCS, or contaminated groundwater during subsurface construction activities is considered a release and must be reported to the HEER Office according to the following procedures. Releases that occur during construction activities or releases due to contingencies should also be reported by following the directions in this Section.

The contractor must immediately notify the Hawaii State Emergency Response Commission (HSERC)/HEER) (808-586-4249 or 808-247-2191 after work hours) and the Local Emergency Planning Committee (LEPC) (808-723-8960) after discovery of contaminated soil and/or groundwater.

A release of oil within the ID would be indicated by any of the following:

- Any amount of oil that causes a sheen on the groundwater in an excavation.
- Any free product that appears on groundwater.
- Visual or olfactory evidence of oil contamination.

If free product is encountered, report the release in accordance with HAR 11-451. It is not necessary to stop work if you follow procedure specified in this document.

Note that any release of oil to Honolulu Harbor falls under the Oil Pollution Act (OPA) of 1992, and must be reported to the Coast Guard as a release to surface water.

9.1 Immediate Verbal Notification

In the event of a release that causes an imminent threat to human health or the environment, the first call shall be to 9-1-1.

Immediate verbal notification shall be provided to the HSERC/HEER and LEPC either via telephone or in person. HEER/HSERC will not accept initial notification via fax or e-mail. In addition, unless it is specifically stated that a verbal notification is being given to a State On-scene Coordinator (SOSC) on scene during an incident, mere presence of an SOSC does not constitute a notification. When in doubt, the contractor should call and speak to an SOSC. There is no penalty for reporting a release unnecessarily, but there are large penalties for not reporting a release.

Notification should occur within 20 minutes of discovery of the release. Provide the following information to the extent known at the time of notification (do not delay notification if notification information regarding the release is incomplete):

- Name and telephone number of the caller
- Name and telephone number of a contact person (if different from the caller) who can provide timely information as the incident is occurring
- Name (trade and chemical) of the hazardous substance that has been released
- Approximate quantity of the hazardous substance that has been released
- Location of the incident
- Date and time of spill, release, or threatened release

- Description of what happened (source and cause of the release)
- Immediate danger or threat posed by the release
- Name, address, and telephone number of the RP or potentially responsible party (PRP)
- Measures taken or proposed to be taken in response to the release as of the time of notification
- Any known injuries or advice regarding medical attention necessary for exposed individuals
- Names and phone numbers of other federal, state, or local government agencies that have been notified of the release
- Any other information that may help emergency personnel respond to the incident.

Once the information has been conveyed, the caller will be provided with a HEER Incident Case Number, which shall be referenced in any future correspondence including the written notification submittal—federal requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and OPA.

Releases of Reportable Quantities (RQ) of CERCLA hazardous substances and releases of oil that cause a sheen on water must also be reported to the National Response Center at 1-800-424-8802.

9.2 Written Follow-Up Notification Contents

Notification, including all information provided in the verbal notification described above and any other pertinent information not previously provided, shall also be made in writing to the HSERC/HEER. This written notification shall be sent to HSERC/HEER no later than thirty (30) days after initial discovery of a release. The written notification can be sent by certified mail, fax, hand-delivery, or another means that provides proof of delivery. Photos should be included to document the incident. A copy of the Written Follow-up Notification Form is in Appendix B.1.

9.3 Recordkeeping Requirements for Encountered Contamination

Fill out Form B.1 for your records and send a copy to the HEER Office.

10.0 HEALTH AND SAFETY PLAN

Provide an HSP for workers performing excavations who will encounter or potentially encounter the COCs and hazards described in Sections 6.0 (EHE). The HSP should generally include the following:

- Requirements that workers be trained in dealing with separate phase hydrocarbons (SPH) and chemical substances and hazards, including, but not limited to, use of appropriate PPE
- General site control and safety requirements such as site access controls, information on emergency medical facilities, and good worker practices
- Description of present and potential hazards, including COC action concentration levels, where appropriate
- Emergency contact information.

A HSP is not a substitute for OSHA/ Hawaii Occupational Safety and Health (HIOSH) requirements. Employers of construction workers/utility workers must comply with all applicable OSHA/HIOSH requirements. See form B.2 for additional guidance.

11.0 CONSTRUCTION ACTIVITIES RELEASE RESPONSE PLAN

Parties should operate under a site-specific release response plan. The sample Construction Activities Release Response Plan provided in Appendix B.3 can be used as a starting point.

On-site workers need to minimize probability of releases from excavations during construction. They should familiarize themselves with site conditions and potential presence of SPH in the subsurface. An HSP and soil and groundwater management plans should be prepared.

If uncontrolled releases of SPH, SPH-impacted soil, and SPH- and metals-impacted groundwater could occur, human health concerns would include possible contact with SPH, exposure to fire hazards, and disruptions to site activities, including possibly local traffic. Environmental impacts of concern would be discharges of metals-contaminated groundwater, SPH, or sheen to harbor waters either directly or via a storm drain or other type of surface water conveyance.

A response plan to deal with uncontrolled releases should be available to the construction workers and other parties. It should include descriptions of the types of releases, a list of names and contact information regarding the release response team and the parties that must be notified, a list of available response equipment, descriptions of response procedures, and an outline of release reporting requirements.

The plan should also note that the HEER Office has developed an Incident Action Plan (IAP) to deal with any major accidental releases of COCs within the ID. If a release threatens to go beyond the control of the construction contractors or parties performing work at the site, the contacts listed in the IAP must be notified.

12.0 INACTIVE PETROLEUM PIPELINE AND UST MANAGEMENT PLAN

This section provides guidance on how to prepare for and manage belowground inactive petroleum pipelines or USTs located or exposed during excavation or other subsurface activities.

12.1 Preparatory Work

Prior to performing any subsurface work, parties should review historical documents and plans for information on inactive pipelines or USTs identified to date. However, accuracy and completeness of this information are not warranted or guaranteed because historical pipeline information has not been well documented. In some instances, previously unknown inactive pipelines or USTs may be discovered for the first time during excavation or other subsurface activities.

Notify the HEER Office if any inactive pipelines or USTs are encountered.

12.2 General

Parties should manage soil from the excavation or other subsurface activities in accordance with the soil management plan Section 13. To the extent possible, leave inactive pipelines in the ground if they extend beyond the required excavation. If a UST is discovered, it must be removed as per HEER Office or Solid and Hazardous Waste Branch requirements.

12.3 Pipeline Tapping, Draining, and Removal

If a pipeline or UST is discovered, attempt to identify the nature of the pipeline or UST, and to confirm that it is not active. Prior to any excavation work, confirm that any pipeline segments to be removed are inactive by contacting the HEER Office or others, including Hawaii One Call Center and the appropriate utility company if one can be identified. Parties undertaking their own pipeline or UST removal should prepare and use a site-specific plan that incorporates the procedures described in this section. The site-specific plan can be based on the sample Inactive Pipeline or UST Removal Plan provided in Appendix B.4.

Do not attempt to remove USTs or pipeline segments without first draining the UST or pipeline segment or determining that it is empty. To the extent practicable, any drainable fluids must be drained before cutting the pipeline or UST. Petroleum fluids recovered must be representatively sampled and tested to determine how they can be recycled or disposed of in full accordance with Title 11, 58.1 and Chapters 260-279 of HAR and any other state and federal regulation governing this activity.

Only personnel knowledgeable and trained in pipeline and UST removal should cut, drain, and remove USTs and pipelines. Remove the required pipeline segments by cutting. If an explosion hazard is possible, cutting should be with a wet saw or some other non-sparking tool. If the pipelines are suspected to be asbestos-covered, a qualified contractor must direct this work and recommend appropriate procedures and PPE, including procedures for removal. Ensure that the area below and adjacent to cutting locations is covered with plastic sheeting and absorbent material. In addition, place a catch basin directly beneath the cutting location. Because pipelines may be under pressure, a vacuum truck should be on site during cutting to recover any released fluids. Pipeline fluids collected in the catch basin should be pumped out.

Cut-off ends of remaining pipeline segments must be appropriately sealed, or otherwise closed, to prevent any potential leakage. Suitable seals include cement plugs, blind flanges, or other methods not involving hot welding. Welding is not appropriate due to the potentially explosive nature of SPH and its associated vapors.

12.4 Removed UST and Pipe Handling

In many cases, sections of removed pipeline and USTS contain heavy viscous petroleum products that appear to be immobile. However, once the pipes and product heat up on the surface, the product can liquefy and cause a release. If sections of waste pipe or USTs are stored on site prior to disposal, the area should be lined with plastic and bermed to contain any SPH that may mobilize due to atmospheric heating. All removed pipelines and USTs should be properly disposed of or recycled.

12.5 Other Sub-Surface Utilities

Other subsurface utilities such as cable, water and sewage lines, and electrical lines may also be discovered during excavations. The nature of the utilities and whether they are presently active should be determined prior to removal. The One Call Center at 1-866-423-7287 (or 811) can help identify the nature and origin of active subsurface utilities.

12.6 Record Keeping

Parties should record field observations that include the location of the UST and pipeline relative to fixed landmarks (including Global Positioning System coordinates); depth, diameter, and type of pipeline and any other distinguishing features; type of SPH; beginning and ending fluid levels; volumes of each type of fluid removed (e.g., water and SPH); flow rates; direction of flow; and any other information pertinent to the UST or pipeline contents. Provide records of field observations with detailed photographs to the HEER Office, and, if requested, to the landowners. Major deviations from the EHE/EHMP should be approved by HDOH prior to implementation. Minor deviations from the EHE/EHMP are acceptable based on field discretion. All deviations should be explained and documented; complete Appendix B.4 for your records and send a copy to HDOH.

13.0 SOIL MANAGEMENT PLAN

The purpose of the soil management plan is to ensure proper handling and management of PCS and DCS that could be encountered during future construction. The principal hazards posed by PCS and DCS are direct exposure, gross contamination, leaching to groundwater, and/or vapor intrusion into existing or future buildings. Contaminated soil cannot be re-used off site prior to laboratory testing and confirmation that testing results meet the most restrictive EALs (for unrestricted use, within 150 meters of a water body over a drinking water resource).

Previous results of the site characterization within the ID indicate that soil can be contaminated from the surface and into the saturated zone. Subsurface soil contamination is readily apparent through visual and olfactory detections. Typically, PCS is stained black or discolored and has a petroleum hydrocarbon odor, and DCS is a dark brown/black layer of silt/clay fill containing a significant amount of debris, such as scrap metal, piping, wire, wood, glass, and pottery shards.

Contaminated soil should be assessed during subsurface construction activities. Contractors that will work within areas of known contamination should be so notified prior to mobilization so they can properly prepare for dealing with contaminated soil.

Two landfills on Oahu are permitted by the State to accept contaminated soil for disposal: Waimanalo Gulch Sanitary Landfill and PVT Land Company Landfill. A Hazardous Waste Characterization must be performed on the soil prior to disposal. Contact the HDOH Solid and Hazardous Waste Branch at 808-586-4226 for further information, and see the HDOH *Construction and Demolition (C&D) Waste Disposal General Guidance* (HDOH 2011c). Potential characteristics that could cause PCS to be classified as Hazardous Waste include: (1) ignitability and (2) failure of contaminants in the soil—especially lead, cadmium, and arsenic—to pass the Toxic Characterization Leaching Procedure (TCLP). Soil classified as hazardous waste must be disposed of at a hazardous waste facility on the mainland. No permitted hazardous waste landfills are present in Hawaii.

Soil containing metal, wire, glass, pottery shards, and charred soil or wood may have originated as fill from the Chinatown fires or from on-site industrial activities. This soil could contain elevated levels of metals such as lead, cadmium, and arsenic, and must be properly managed during construction activities. These soils may fail TCLP testing, which would classify the soil as hazardous waste. Special precautions should be taken to avoid generation of excess hazardous waste during subsurface activities.

Refer to the HEER Office document *Evaluation of Imported and Exported Fill Material* for guidance on testing of soils for reuse or disposal (HDOH 2011b).

13.1 Soil Management

If contaminated subsurface soil is encountered during excavation, appropriate response actions will be taken and the actions will conform to HDOH and U.S. Environmental Protection Agency (EPA) regulatory guidelines. The response actions include ensuring that workers have the appropriate level of PPE, that the excavated PCS and DCS is segregated from clean soil, and that the PCS and DCS is managed properly following excavation. PCS is defined as soil that exhibits petroleum staining, and/or a petroleum hydrocarbon odor, with or without mobile free product. DCS is defined as a dark brown/black layer of silt/clay fill containing a significant amount of debris, such as scrap metal, piping, wire, wood, glass, and pottery shards, and may emit hydrocarbon odors. An environmental consultant will reference field observations and

measurements to assess the excavated soil. Based on professional experience and judgment, the consultant will determine whether or not the excavated soil is PCS or DCS.

PCS falls into two categories: (1) moderately contaminated soil with slight petroleum odors and exhibiting staining, and (2) heavily contaminated soil with a very strong petroleum odor, very dark staining, and potentially mobile free product. From an analytical standpoint, heavily contaminated soil is defined as soil with total TPH concentration exceeding 5,000 milligrams per kilogram (mg/kg) (subsurface gross contamination; see HDOH 2011a). Gasoline and diesel free product in soil could be mobile at concentrations as low as 5,000 mg/kg. Although somewhat arbitrary, this serves as a useful tool for distinguishing heavily contaminated soil from less contaminated soil. Test to determine if soil exceeds 5,000 mg/kg TPH include laboratory analysis and field tests such as the glove test and the paper towel test. The glove test consists of squeezing a handful of soil in a gloved hand. If oil droplets remain on the glove, assume the soil exceeds the 5,000 mg/kg threshold and do not reuse the soil on site. The paper towel test consists of squeezing a handful of soil in a paper towel. If droplets of oil appear on the paper towel, assume the soil exceeds the 5,000 mg/kg threshold and do not reuse the soil on site. The soil used in the field tests should be representative of the soil in the stockpile. If the soil contains free product, it should be handled as per Section 15 Free Product Management Plan.Anticipated tasks associated with managing excavated soil are summarized as follows:

- Notify the HDOH HEER Office at least 7 days prior to construction activities that could disturb PCS.
- If PCS or DCS is observed during excavation activities, provide field oversight to direct the excavated soil to the appropriate stockpile, and to specify appropriate use of excavated soils as on-site backfill versus off-site disposal; and provide health and safety guidance related to potential exposure of workers to COCs.
- Oil-impacted stockpiled soils can also be placed in containers (such as 20-yard steel roll-off bins, super sacks, tri-wall boxes, or drums). Drain any liquid-phase oil or fuel product associated with the soil prior to stockpiling. Remove and properly dispose of any oil observed in the excavation.
- Soil must be stockpiled on site near the project area prior to reuse.
- Create soil stockpiles by laying down 10-millimeter (mil) black plastic (polyethylene) sheeting within a designated on-site soil stockpiling area. PCS and DCS should be in separate stockpiles. Underlay edges of the plastic sheeting with bermed soil. Ensure that the height of the bermed soil will be sufficient to prevent stormwater runoff from breaching it. Place excavated soil inside the bermed area on top of the plastic sheeting. At the end of each day or in the event of a significant rain event, cover the stockpiles with plastic sheeting. Secure the plastic covering with sufficient ballast (e.g., sandbags, boulders, concrete blocks) so that it will not be dislodged by strong winds.
- Segregate excavated PCS from clean soil, and stockpile the PCS on plastic sheeting. Cover both the clean soil and PCS stockpile(s) at the end of each day with plastic sheeting to mitigate potential dust concerns and to prevent contact with rainwater and stormwater runoff. See Appendix A for additional details.
- If soil is classified as moderately contaminated (i.e., reported TPH <5,000 mg/kg), the soil can be used as backfill on site if more than 100 feet from the Harbor wall and it iis place more than one foot above the tidally influenced high water level. Remove floating free product to the extent practicable prior to backfilling any excavation

- If soil is classified as heavily contaminated (i.e., reported TPH>5000 mg/kg), it must be profiled and disposed of at an appropriate landfill site.
- If structurally suitable, DCS should be given preference for re-internment in the excavation. If there is excess DCS classified as hazardous waste, develop a plan to reinter the soil at a known clean area of the site so the excess hazardous waste does not have to be shipped for mainland disposal.
- In determining whether excavated soil can be used for on-site backfill, consider also its structural suitability, although this is not a requirement under HDOH guidance. The soil could be considered not structurally suitable if it cannot support foundation loading of a structure intended to be placed over backfilled and compacted soil, or if it does not meet the technical specifications for backfilling of utility trenches, or if it does not meet other design or constructability requirements.
- If PCS- or DCS-contaminated soil is to be used in roadways, the soil must also meet roadway design criteria of the C&C and HDOT.
- Soil not structurally suitable for reuse should be reused at other areas of the site, or should be profiled and taken off site for appropriate disposal in a landfill.
- Place PCS and DCS used as backfill on site a minimum of 1 foot bgs above the tidally influenced high water table (to prevent leaching), cover it with clean soil, and as required, cap with asphalt or cement.
- If there is no place to stockpile PCS or DCS soil, profile it and haul it to a landfill for disposal. Stockpiling more than 1 cubic yard (cy) of PCS at an off-site location requires a solid waste management permit from the Solid and Hazardous Waste Branch (see HDOH 2011c).
- Decontaminate equipment used in contaminated areas before using it in non-contaminated areas. All liquid and solid waste resulting from on-site decontamination must be collected and appropriately disposed of at a certified landfill site.

13.2 Soil Testing

The two types of chemical testing detailed below may occur before stockpiled soil is placed back in the excavation (i.e., re-used) or disposed of in a suitable landfill (i.e., disposal, see also HDOH 2011c).

Re-Use Testing. This testing involves field tests or laboratory tests for PCS- and DCS-related COCs, and for other potentially relevant COCs (Section 6.1). Results of this testing are referenced to guide soil re-use, as described above. Note that this testing can occur either on stockpiled, excavated soils or on in-situ soils during pre-excavation field investigations.

Landfill Profile Testing. This testing involves determining suitability of the soil for use as daily cover or for disposal as a waste at a landfill. Soils not to be reused (backfilled), as described above, can generally be disposed of in a suitable landfill. Disposal of these soils would be subject to Landfill Profile Testing. Information regarding chemical analysis and disposal options (i.e., as cover or as waste) should be obtained from the relevant landfill. Soils that meet the landfill's standards for interim/daily cover or longer term, intermediate cover should be used as such. The former typically requires that the soil meet HDOH EALs for commercial/industrial land use, while the latter typically requires that the soil meet EALs for unrestricted reuse. Costs for disposal of these soils are typically lower than for disposal of more contaminated soil that cannot be used for cover. Soils not suitable for use as cover or other uses at the landfill must

be disposed of as waste. Soil testing to pre-profile the soil for off-site disposal can also occur as part of the pre-excavation field investigations.

Stockpile Testing. Recommendations for sampling soil stockpiles are provided in the HDOH guidance *Evaluation of Imported and Exported Fill Material* (HDOH 2011b). If the stockpile is less than 20 cy, one soil batch ("Decision Unit") should be tested using multi-increment sampling approaches. If the stockpile is larger than 20 cy, every 20 cy up to the first 100 cy should be tested. For stockpiles larger than 100 cy, multi-increment (MI) samples should be collected from a minimum of five Decision Units totaling up to 500 cy of soil (e.g., up to 100 cy each). Appropriate Decision Unit volumes for larger stockpiles of soil should be discussed with the HEER office on a case-by-case basis. If the cost of sampling and segregating clean soil from PCS is higher than the cost of disposal of all soil as PCS, the benefit of testing small volumes of PCS for potential reuse may be precluded. The qualified environmental professional should direct soil sample collection and testing methods in accordance with the most current TGM guidelines. Parties undertaking excavation are responsible for employing a qualified environmental professional and complying with the latest TGM guidelines.

13.3 Soil Contingency Plan

The Soil Contingency Plan provides guidelines for actions to be taken when engineering controls, administrative controls, or PPE fail, and risk of exposure to PCS or DCS is imminent.

13.3.1 Open Excavations

During construction activities, subsurface PCS could be exposed in excavations for utility corridors or other subsurface structures. If PCS or DCS is more contaminated than anticipated is encountered and could pose a direct exposure hazard to on-site workers, the following actions may be taken:

- If site conditions warrant, PPE will be upgraded from Level D to Level C. Respiratory protection and vapor monitoring are described in the Vapor Management Plan (Section 9.4) and the Site-Specific HSP.
- If warranted, the PCS or DCS will be excavated and properly stockpiled prior to continuance of work. The stockpiling procedures are described in the Soil Management Plan (Section 9.1).
- If airborne dust generated from PCS or DCS becomes significant, additional dust control measures will be implemented. This may require more frequent use of or an increased volume of applied water. Also, the dust screen cloth on the site boundary fence will be inspected for damage and repaired as necessary.

13.3.2 Soil Stockpiles

During construction activities, the plastic sheeting used to berm and cover soil stockpiles could be damaged by strong winds or punctured by debris or other sharp objects. Such damage could allow on-site workers to come into contact with PCS. To prevent that from occurring, the following actions may be taken:

- Damaged sections of plastic sheeting will be replaced promptly.
- Damaged sections of the berm will be repaired promptly.

13.4 Engineering and Administrative Controls

Dust and vapor control methods may be necessary during construction-related work in which PCS or DCS is encountered. These controls include use of plastic sheeting on soil stockpiles, vapor control using vapor suppressants, and dust suppression using applied water.

It is anticipated that Level D PPE will be appropriate for workers during future construction. Should site conditions warrant, the PPE will be upgraded to Level C. Ultimately, the contractor is responsible for monitoring site conditions and supplying site workers with appropriate training and PPE, in accordance with 29 *Code of Federal Regulations* (CFR) 1910 and 29 CFR 1926.

13.5 Periodic Inspections and Preventive Maintenance

A key component of the plan is routine inspections. Accordingly, all locations where exposure of on-site workers to PCS or DCS is possible (e.g., open excavations, soil stockpiles) will be inspected at a frequency appropriate for access and activities carried out on the site (e.g., daily for sites used or accessed on a daily basis). The site should also be inspected prior to and following adverse weather conditions that could disrupt control measures (e.g., heavy winds or rains). In addition, daily inspections of the security fence, locked gates, and dust screen will occur during construction and excavation activities. Replacement and repair of damaged or inadequate chain link fences, dust screens, stormwater control measures, stockpile covers, berms, etc., will occur immediately after discovery. PPE will be inspected for damage and defects before personnel don the PPE.

13.6 Record Keeping and Reporting

Detailed records will be maintained of workspace monitoring, PCS excavation, soil stockpiling and testing, soil testing, soil reuse and disposal, inspections, and maintenance and response activities. Significant issues will be communicated to site workers promptly. Major deviations from this EHE/EHMP should be approved by HDOH prior to implementation. Minor deviations from the EHE/EHMP are acceptable based on field discretion. All deviations should be explained and documented; complete Appendix B.5 for your records and send a copy to HDOH.

14.0 GROUNDWATER MANAGEMENT PLAN

The purpose of the groundwater management plan is to ensure proper handling and management of contaminated groundwater that could be encountered during construction. Principal hazards posed by contaminated groundwater are gross contamination and aquatic ecotoxicity.

Shallow groundwater in the area is typically encountered at approximately 4 to 7 feet bgs. Results of previous site characterizations indicate that groundwater in the area has been impacted by COCs. Groundwater contamination may be apparent through visual evidence and olfactory detection. Contaminated groundwater may have a measurable thickness of free product, emit petroleum hydrocarbon odor, or exhibit sheen.

Contaminated groundwater in the area has been encountered during a number of previous site characterizations and remedial activities. It is unlikely that residual groundwater contamination is at a level warranting extensive response actions or disposal; however and importantly, additional site characterization may be required depending on conditions encountered in the field.

14.1 Groundwater Management

If contaminated groundwater is encountered during excavation activities, appropriate response actions must be taken that conform to HDOH and EPA regulatory guidelines. These response actions include ensuring that workers have the appropriate level of PPE and that free product, sheen, and groundwater are managed properly if dewatering is conducted. Anticipated tasks associated with managing groundwater are summarized as follows:

- If groundwater is encountered during construction excavation activities, provide field oversight to identify contaminated groundwater, direct appropriate dewatering if this is conducted, manage disposal of groundwater if this is necessary, and provide health and safety guidance related to potential exposure of workers to COCs.
- If free product is encountered during construction excavation activities, manage free product as described in Section 15.
- Dewatering is not anticipated during future construction. However, if dewatering becomes necessary, water will likely be pumped into on-site infiltration pits, and will not be allowed to discharge off site.
- If off-site discharge is necessary, a Notice of Intent (NOI) for National Pollutant Discharge Elimination System (NPDES) coverage will be submitted to HDOH. The NOI will include a dewatering plan. Prior to discharge into a storm sewer or aquatic habitat, the water will be tested and, if necessary, treated to address both free product and dissolved-phase contamination. Water with contaminant concentrations exceeding EALs for chronic aquatic toxicity will not be discharged off site.
- Generation of groundwater requiring disposal is not anticipated during future construction. However, if such disposal becomes necessary, the groundwater will be stored on site in appropriate containers (e.g., 55-gallon drums), sampled, analyzed for the appropriate COCs to determine disposal options, and disposed of properly. For additional details, see the Guidelines Appendix A.

14.2 Vapor Control

Vapor control methods (e.g., vapor suppressants) may be necessary during construction-related work in which contaminated groundwater is encountered. It is anticipated that Level D PPE will generally be appropriate for workers. Should site conditions warrant, the PPE will be upgraded to Level C. Respiratory protection and vapor monitoring are described in the Vapor Management Plan (Section 16.0).

14.3 Groundwater Contingency Plan

The Groundwater Contingency Plan provides guidelines for actions to be taken when engineering controls, administrative controls, or PPE fail, and risk of exposure to contaminated groundwater is imminent.

14.3.1 Open Excavations

During construction activities, contaminated groundwater could be exposed in excavations for utility corridors or other subsurface structures. If contaminated groundwater is encountered that could pose a direct exposure hazard to on-site workers, the following actions may be taken:

- If site conditions warrant, PPE will be upgraded from Level D to Level C. Respiratory protection and vapor monitoring are described in the Vapor Management Plan (Section 9.4) and Site-Specific HSP.
- If appropriate, the excavation will be backfilled using appropriate materials (e.g., gravel, select borrow) to a level above the groundwater prior to continuance of work.
- If it becomes necessary to remove contaminated groundwater from the excavation, the groundwater will be stored on site in appropriate containers (e.g., 55-gallon drums), sampled, analyzed for the appropriate COCs to determine disposal options, and disposed of properly.

14.3.2 Dewatering Pits

Dewatering is not anticipated during future construction. However, if dewatering is conducted, and contaminated dewatering water is encountered that could pose a direct exposure hazard to on-site workers, the following actions may be taken:

- If site conditions warrant, PPE will be upgraded from Level D to Level C. Respiratory protection and vapor monitoring are described in the Vapor Management Plan (Section 9.4).
- If appropriate, dewatering will be discontinued until such time that contaminants at the source of the dewater (i.e., an open excavation) can be mitigated.
- If it becomes necessary to discharge contaminated groundwater from a dewatering pit, such discharge will fully comply with the conditions of any required NPDES permit.

14.4 Periodic Inspections and Preventive Maintenance

A key component of the plan is routine inspections. Accordingly, all locations where exposure of on-site workers to contaminated groundwater is possible (e.g., open excavations, dewatering pits) will be inspected daily.

If groundwater requiring disposal is generated, the storage containers will be inspected regularly for rust and other signs of deterioration while they remain on site, pending disposal. If on-site dewatering is conducted, the infiltration pit(s) will be inspected daily to ensure that no accidental discharge occurs.

14.5 Record Keeping and Reporting

Detailed records will be maintained of workspace monitoring, dewatering (if performed), groundwater disposal (if conducted), and response activities. Significant issues will be communicated to site workers on a regular basis. Major deviations from the EHE/EHMP should be approved by HDOH prior to implementation. Minor deviations from the EHE/EHMP are acceptable based on field discretion. All deviations should be explained and documented; complete Appendix B.6 for your records and send a copy to HDOH.

15.0 FREE PRODUCT MANAGEMENT PLAN

The purpose of the Free Product Management Plan is to ensure proper handling and management of free product encountered during subsurface construction activities. The principal hazards posed by free product are direct exposure and gross contamination. Additional related hazards include flammable/explosive vapors.

Free product within the ID is confined to the general area of the capillary fringe of the water table, which is approximately 4 to 7 feet bgs. Results of the site characterization in the area indicate that the free product occurs as (1) free-flowing, black, viscous product; (2) a thin layer of black, viscous product; (3) a discontinuous layer of product; and (4) a petroleum hydrocarbon sheen. The free product is readily apparent visually and via olfactory detection.

Distribution of free product within the ID has not been completely defined, and free product could be encountered during any subsurface activities. Free product recovery will be required where possible and practicable.

15.1 Free Product Management

If excavation occurs to the depth of the capillary fringe of the water table at approximately 4 to 7 feet bgs, free product may be encountered. However, anticipated problems associated with free product can be mitigated by performing the tasks described in this plan.

If free product is encountered during excavation, appropriate response actions will be taken that conform to HDOH and EPA regulatory guidelines. These response actions include ensuring that workers have the appropriate level of PPE, and that free product is managed properly. The anticipated tasks associated with managing free product are summarized as follows:

- If free product is encountered during construction excavation activities, field oversight should be provided to identify free product; to recover the product to the extent practicable using absorbent pads/booms, oil-water separators, and/or vacuum trucks to skim free product off the water table; and to provide health and safety guidance related to potential exposure of workers to the product. Following completion of product recovery, the absorbents, PPE, and plastic sheeting will be allowed to dry prior to mandatory proper disposal.
- Dewatering is not anticipated during future construction. However, if dewatering becomes necessary and free product is floating on the water in the on-site infiltration pit(s), the product will be recovered to the extent practicable, and any absorbent material such as absorbent pads will be disposed of properly.
- If free product produces vapors that could adversely affect air quality during construction activities in the area, follow the Vapor Management Plan Section 16.0.

15.2 Engineering and Administrative Controls

Generation of explosive vapors from free product is a slight possibility. If generated, such vapors increase risk of fire and/or explosion. Accordingly, if free product is encountered, the lower explosive limit (LEL) of the workspace atmosphere will be monitored using a combustible gas indicator.

Vapor control methods (e.g., vapor suppressants) may be necessary during construction-related work in which free product is encountered. It is anticipated that Level D PPE will be appropriate for workers. If site conditions warrant, the PPE will be upgraded to Level C. Respiratory protection and vapor monitoring are described in the Vapor Management Plan (Section 9.4).

15.3 Periodic Inspections and Preventive Maintenance

A key component of the plan is routine inspections. Accordingly, all locations where exposure of on-site workers to free product is possible (e.g., open excavations, dewatering pits, hoses, pumps, tanks, or spills from any of these sources) will be inspected daily or more frequently as appropriate. In addition, daily inspections of the security fence and locked gates will occur during construction activities where free product is encountered. PPE will be inspected for damage and defects before personnel don the PPE. If respiratory protection is required, a daily positive pressure respirator fit test will be conducted at the start of each day, and filter cartridges will be replaced regularly as described in the site-specific HSP.

Excavations (including infiltration pit[s] if on-site dewatering is conducted) will be inspected daily for presence of free product on the water. If free product is present, removal of it will be attempted using absorbent pads, skimming with a vacuum truck, or applying other means such as processing through an oil-water separator.

15.4 Record Keeping and Reporting

Detailed records will be maintained of workspace monitoring (including LEL measurements), product recovery, and response activities. Significant issues will be communicated to site workers on a regular basis. Major deviations from the EHE/EHEMP should be approved by HDOH prior to implementation. Minor deviations from the EHE/EHMP are acceptable based on field discretion. All deviations should be explained and documented; complete Appendix B.7 for your records and send a copy to HDOH.

15.5 Free Product Contingency Plan

The Free Product Contingency Plan provides guidelines for actions to be taken when engineering controls, administrative controls, or PPE fail, and risk of exposure to free product is imminent.

15.5.1 Open Excavations

During construction activities, free product could be encountered on groundwater in excavations used for utility corridors or other subsurface structures. If free product is encountered that could pose a direct exposure hazard to on-site workers, the following actions may be taken:

- If site conditions warrant, PPE will be upgraded from Level D to Level C. Respiratory protection and vapor monitoring are described in the Vapor Management Plan (Section 6.4).
- If the volume of free product encountered is too great for absorbent pads to handle effectively, a vacuum truck will be used to pump product out of the excavation, and the product will be disposed of properly.
- If appropriate, following removal of free product and prior to continuance of work, the excavation will be backfilled using appropriate materials (e.g., gravel, select borrow) to a level above the groundwater.

15.5.2 Dewatering Pits

Dewatering is not anticipated during future construction. However, if dewatering is conducted and free product is encountered that could pose a direct exposure hazard to on-site workers, the following actions may be taken:

- If site conditions warrant, PPE will be upgraded from Level D to Level C. Respiratory protection and vapor monitoring are described in the Vapor Management Plan (Section 6.4).
- If the volume of free product encountered is too great for absorbent pads to handle effectively, a vacuum truck will be used to pump product out of the dewatering pit, and the product will be disposed of properly.
- If appropriate, dewatering will be discontinued until such time that the free product can be recovered.
- Under no circumstances will water contaminated with free product be discharged from a dewatering pit.

16.0 VAPOR MANAGEMENT PLAN

The purpose of the Vapor Management Plan is to identify VOC vapors that could adversely affect air quality during construction activities within the area covered by this document. The principal hazards posed by VOC vapors at levels below LELs are direct exposure and gross contamination. The areas within which these hazards potentially pose the greatest concern are where contaminated soil, contaminated groundwater, and free product have been previously encountered.

Results of past site characterizations within the ID indicate that soil vapor across most of the area has been impacted by one or more COCs. Soil vapor contamination is readily apparent throughout much of the ID because the vapor has a petroleum hydrocarbon odor. The principal sources of contaminated soil vapor within the ID are PCS, contaminated groundwater, and free product.

This EHE/EHMP describes the necessary controls for minimizing exposure of on-site workers to hazardous vapors. It also describes measures for minimizing exposure of off-site human populations (i.e., the general public) to hazardous vapors created as a result of construction activities. Included are procedures for identifying and mitigating potential physical hazards posed by generation of explosive vapors. Importantly, this EHE/EHMP describes general procedures for monitoring hazardous vapors during field activities. Rather than as a stand-alone document to address vapor issues, it should be considered a companion document to the site-specific HSP, which should describe in detail procedures and equipment for monitoring hazardous vapor concentrations, as well as PPE and engineering controls.

16.1 Vapor Management

If VOC vapors are encountered during excavation, appropriate response actions will be taken that comply with HDOH and EPA regulatory guidelines. The response actions include ensuring that on-site workers have the appropriate level of PPE, and that the general public is not affected adversely. Anticipated tasks associated with managing VOC vapor exposure are summarized as follows:

- If VOC vapors below LELs are encountered during excavation activities, field oversight must be provided to identify VOC vapors and provide health and safety guidance related to potential exposure of workers to COCs.
- Air monitoring will be conducted during excavation associated with future construction activities. Air monitoring will also occur when workers are required to enter excavations regardless of whether PCS or free product is present. The monitoring will include both workspace (on site) and perimeter measurements of VOC vapors.
- If warranted by air monitoring results, on-site workers will be notified to upgrade PPE to include respiratory protection.
- Air monitoring required for confined space entry (if required) will be conducted by the contractor responsible for construction. Confined space entry and associated air monitoring requirements will be described in the site-specific HSP for construction.

16.2 Vapor Contingency Plan – Exposure Monitoring

To assess potential exposure of on-site workers to hazardous VOC vapors and determine the level of PPE that might be required, a baseline exposure assessment will be required. To conduct the assessment, both total VOC concentrations and benzene concentrations must be measured during excavation of a trench. Measurements of concentrations of these COCs within the workspace atmosphere and at the perimeter (off site) are required.

Based on results of the exposure assessment, exposure limits must be established for workers performing remedial excavation. The exposure limits are based on Occupational Safety and Health Administration (OSHA) permissible exposure limits (PEL). The exposure monitoring plan is summarized as follows:

- Level D PPE will be appropriate for on-site workers under normal working conditions.
- Both workspace (on site) and perimeter (off site) air monitoring will be conducted.
- Air monitoring will proceed using a conventional photoionization detector (PID) to determine total VOC concentration, and using an Ultra-Rae PID, which is benzene-specific, to determine benzene concentration.
- If total VOC concentration in the workspace atmosphere exceeds an 8-hour, time-weighted average (TWA) of 20 parts per million (ppm) or a 15-minute, short-term exposure limit (STEL) of 100 ppm, PPE requirements will be upgraded to Level C, and it may be necessary to implement a modified work schedule. These levels are based on a maximum benzene concentration in gasoline of 5 percent by volume.
- On-site workers will be notified immediately if benzene is detected in the workspace atmosphere at a concentration exceeding 0.5 ppm, and wearing respirators with organic vapor cartridges will be recommended (i.e., recommendation will be to upgrade respiratory protection to Level C).
- If benzene concentrations in the workspace atmosphere exceed the 8-hour TWA PEL (1 ppm) or the OSHA 15-minute STEL (5 ppm), PPE requirements will be upgraded to Level C, and it may be necessary to implement a modified work schedule.
- If benzene concentrations in the workspace atmosphere exceed the TWA PEL (1 ppm), short-term exposure monitoring will be conducted. To determine short-term exposure, a minimum of five samples will be collected within a 15-minute period.
- If daily average benzene concentrations in the workspace atmosphere exceed the OSHA STEL (5 ppm), or benzene concentrations exceed the OSHA acceptable ceiling concentration (25 ppm), PPE will be upgraded to Level C, with either full-face respirators or powered air-purifying respirators and protective goggles.
- If benzene concentrations in the workspace atmosphere exceed the OSHA 8-hour TWA for a 40-hour work week (10 ppm), or benzene concentrations exceed the OSHA acceptable maximum peak for an 8-hour shift (50 ppm), work will be stopped immediately, the on-site representative will be notified, and workers will be requested to leave the work zone.
- If benzene concentrations along the site perimeter (off site) exceed the 15-minute STEL (5 ppm) or the TWA PEL (1 ppm), the exclusion zone will be extended beyond the property boundary.

- If benzene concentrations along the site perimeter (off site) exceed the OSHA acceptable ceiling concentration (25 ppm), work will be stopped immediately, and the project on-site representative will be notified.

16.3 Engineering and Administrative Controls

Vapor control methods may be necessary during construction-related work in which VOC vapors are encountered. These controls include use of plastic sheeting on soil stockpiles, vapor suppressants, and supplied ventilation.

It is anticipated that Level D PPE will be appropriate for workers during future construction. If site conditions warrant, as described above, PPE will be upgraded to Level C.

In addition to respiratory protection practices, engineering controls and safe work practices will be employed. Engineering controls include barriers that prevent workers from unnecessarily entering work zones and use of recycled air conditioning in mobile equipment cabs. Safe work practices include monitoring wind direction and having workers stand upwind of VOC vapor sources whenever possible, or instituting a modified work schedule.

A natural control is that vapors originating within the ID normally will be diluted by the prevailing northeasterly trade winds. If left undisturbed, surface soil (0 to 2 feet bgs) not impacted by VOCs provides a natural barrier, covering VOC-contaminated subsurface soil and groundwater, and thereby reducing potential for vapor emissions.

Because anaerobic degradation of petroleum products will continue in the area for many years, methane gas remains a potential problem for indoor workers within the ID. In addition, THP-g, TPH-d, and BETX remain potential soil vapor COPCs in the area. HDOH therefore takes the most conservative approach when dealing with the vapor intrusion issue.

To ensure proper protection of inside workers from soil vapor intrusion, all existing buildings should be inspected for floor cracks and other areas that could allow a pathway for soil vapor. All cracks and pathways should be properly sealed with an appropriate epoxy sealant to prevent vapor intrusion.

While not under the purview of this document, modification of floors, major structural changes to existing buildings, or construction of new buildings may necessitate installation of vapor control measures such as a sub floor vapor barriers. This would necessitate proper characterization of the area and site-specific oversight by HEER.

If methane soil vapor intrusion issues have been identified, new vaults should be properly sealed to prevent soil vapor intrusion that could cause an explosion hazard during work in the vaults. Unsealed vaults should be tested for methane prior to entry.

16.4 Periodic Inspections and Preventive Maintenance

A key component of the plan is routine inspections and air monitoring. Accordingly, daily or more frequent (if appropriate) air monitoring will occur at all locations where exposure of on-site workers to hazardous vapors is possible (e.g., open excavations, soil stockpiles). PPE will be inspected for damage and defects before personnel don the PPE. If respiratory protection is required, a daily positive pressure respirator fit test will be performed at the start of each day, and filter cartridges will be replaced regularly.

Both the conventional PID and the benzene-specific Ultra-Rae PID require daily calibration. The conventional PID will be calibrated using a 100 ppm isobutylene standard. The Ultra-Rae PID will be calibrated using a 5 ppm benzene standard, and measurements of the standard will occur as needed to confirm that the calibration is maintained. Records of the recalibrations will be maintained.

16.5 Record Keeping and Reporting

Detailed records of workspace monitoring and changes to PPE requirements will be maintained. Daily monitoring results and sampling locations will be documented in field logs. Significant issues will be communicated to site workers on a regular basis. Major deviations from this EHE/EHMP should be approved by HDOH prior to implementation. Minor deviations from the EHE/EHMP are acceptable based on field discretion. All deviations should be explained and documented; complete Appendix B.8 for your records and send a copy to HDOH.

17.0 STORMWATER MANAGEMENT PLAN

The purpose of the stormwater management plan is to provide procedures to prevent stormwater runoff from coming into contact with contaminated soil or groundwater, and to provide contingencies in the event that such contact does occur. The principal hazards posed by stormwater runoff are direct exposure, gross contamination, and aquatic eco-toxicity. If contaminated stormwater is allowed to leave the construction site, downgradient human populations (the general public) and ecological receptors (marine flora and fauna in Honolulu Harbor) could be exposed to COCs. Areas within which these hazards potentially pose the greatest concern are where contaminated soil, contaminated groundwater, and free product have been encountered.

This plan describes the necessary measures for controlling stormwater within the area covered by this document during construction activities. Preventing stormwater from coming into contact with contaminated media is the principal concern during future construction activities. Construction activities could expose stormwater runoff to contaminated media as follows:

- Subsurface excavation could expose stormwater to contaminated subsurface soil and/or groundwater.
- Stormwater could be exposed to excavated PCS or DCS stored temporarily in stockpiles.
- Although not anticipated, if dewatering is conducted that utilizes an on-site infiltration pit, stormwater could be exposed to contaminated groundwater.

17.1 Stormwater Management

If contaminated soil or groundwater is encountered during excavation, appropriate response actions will be taken that conform to HDOH and EPA regulatory guidelines. The response actions include ensuring that these media are not exposed to stormwater. Anticipated tasks associated with managing stormwater are summarized as follows:

- Field oversight will be provided during excavation activities associated with construction. The purpose of the oversight is to identify contaminated media that could be exposed to stormwater runoff, and to provide guidance related to controlling stormwater at the site. In addition, weather will be monitored throughout each work day for signs of approaching storms and/or heavy rains.
- Inspections of engineering stormwater controls will occur each day to ensure that contaminated media will not be exposed to stormwater runoff, and that contaminated stormwater will not leave the construction site.
- All construction activities—including clearing, grading, and excavation—that result in disturbance of 1 or more acres of total land area will accord with the conditions of an HDOH-approved NPDES NOI permit for stormwater discharge associated with construction activity. Conditions of the permit include preparation of a Construction Site Best Management Practices (BMP) Plan. For projects involving disturbance of less than 1 acre of land, an NPDES permit is not required; however, the C&C of Honolulu Department of Planning and Permitting requires erosion controls or implementations of BMPs at all disturbed areas.

17.2 Engineering and Administrative Controls Open Excavations

In the absence of engineering and administrative controls, PCS and/or groundwater exposed in open excavations could come into contact with stormwater, thus potentially contaminating the stormwater with COCs. To prevent this, the following activities will occur:

1. Where possible, excavations will be backfilled as soon as practicable to limit the time they are open and potentially exposed to stormwater runoff and direct precipitation.
2. Where possible, the edges of excavations will be bermed, thus preventing stormwater runoff from entering.
3. Open excavations will be inspected each day to minimize potential for direct precipitation to cause the excavation to overflow.

Soil Stockpiles. In the absence of engineering and administrative controls, excavated PCS stored in stockpiles could come into contact with stormwater, thus potentially contaminating the stormwater with COCs. To prevent this, the following activities will occur:

- Soil stockpiles will be placed on plastic sheeting, and the sheeting will be bermed at the edges, thus preventing contact with stormwater runoff.
- At the end of each day, or in the event of a storm, the soil stockpiles will be covered with plastic sheeting, thus preventing contact with direct precipitation.
- The soil stockpiles will be inspected each day to ensure that the plastic sheeting is intact.

Dewatering Infiltration Pits. In the absence of engineering and administrative controls, the water in infiltration pits used for on-site dewatering could come into contact with stormwater. To prevent this, the following activities will occur:

- Where possible, infiltration pits will be backfilled as soon as practicable to limit the time they are open and potentially exposed to stormwater runoff and direct precipitation.
- Where possible, the edges of infiltration pits will be bermed, thus preventing entry of stormwater.
- Infiltration pits will be inspected each day or more frequently as appropriate to minimize potential for direct precipitation to cause the pit to overflow.

Erosion and sediment control measures will be in place and functional before construction activities commence. These measures will be maintained throughout the construction period. If stormwater discharge from the site is anticipated, the following preventive measures may be taken:

- Stormwater flowing towards active construction areas will be diverted using appropriate control measures, as practicable.
- Erosion control measures will be designed to handle the size of the disturbed or drainage area in order to detain runoff and trap sediment.
- Height of the property boundary can be increased using sandbags.

- Additional silt fencing will be added to affected property boundaries, if warranted.
- Berms surrounding soil stockpiles will be increased as necessary.
- Moveable booms will be available to contain spills.
- Absorbent pads will be employed if free product is observed in stormwater runoff.

17.3 Stormwater Contingency

Open Excavations. During construction activities, stormwater could come into contact with contaminated soil or groundwater exposed in excavations for utility corridors or other subsurface structures. If a storm event is more severe than anticipated and could result in entry of stormwater to an excavation or overflow of water from an excavation, the following actions may be taken:

1. Height of the berm along the edges of the excavation may be increased to prevent stormwater runoff from entering the excavation.
2. If feasible, stormwater runoff may be diverted away from the excavation.
3. The excavation may be covered with plastic sheeting to prevent entry of direct precipitation or stormwater runoff.

Soil Stockpiles. During construction activities, stormwater could come into contact with PCS stored in stockpiles. If a storm event is more severe than anticipated and could result in stormwater runoff coming into contact with stockpiled soil or in damage to the plastic covering the stockpile, the following actions may be taken:

- Berms surrounding soil stockpiles that are damaged by a storm will be repaired. Additional plastic sheeting may be necessary.
- Height of the berm surrounding the stockpile may be increased.
- If feasible, stormwater runoff may be diverted away from soil stockpiles.
- Plastic sheeting covering soil stockpiles that is damaged by a storm will be repaired or replaced. Additional plastic sheeting may be necessary.

Dewatering Pits. During construction activities, stormwater could come into contact with contaminated groundwater exposed in dewatering pits, if dewatering become necessary (not anticipated). If a storm event is more severe than anticipated (i.e., capable of overcoming engineering controls) and could result in stormwater runoff entering a dewatering pit or water overflowing a dewatering pit, the following actions may be taken.

- Height of the berm along the edges of the dewatering pit may be increased to prevent stormwater runoff from entering the excavation.
- If feasible, stormwater runoff may be diverted away from the dewatering pit.

Stormwater Run-on. During construction activities, stormwater run-on could enter the property and come into contact with contaminated soil or groundwater. If a storm event is more severe than anticipated and could result in stormwater run-on entering the property, the following action may be taken:

- Height of the property boundary can be increased using sandbags.

Off-Site Discharge of Contaminated Stormwater. If, during construction activities, stormwater comes into contact with contaminated soil or groundwater and that stormwater is not contained, contaminated stormwater could discharge off site. If a storm event is more severe than anticipated and could result in discharge of contaminated stormwater off site, the following actions may be taken:

- Height of the property boundary can be increased using sandbags.
- If feasible, stormwater runoff may be diverted away from the property boundary.
- Additional silt fencing may be added at affected property boundaries.
- Moveable, petroleum-absorbent booms may be deployed along the affected property boundary.
- Absorbent pads may be used if free product is observed on stormwater runoff.
- Moveable, petroleum-absorbent booms may be deployed in front of off-site storm drain entrances in the immediate vicinity of the property.

17.4 Inspection and Preventive Maintenance

A key component of the plan is routine inspections. Accordingly, all locations of possible contact of stormwater with contaminated media (e.g., open excavations, soil stockpiles, dewatering pits) will be inspected daily. During storm events, inspections will occur to minimize possibilities of stormwater runoff, contact of direct precipitation with soil stockpiles, and entry of stormwater runoff into open excavations or (if present) infiltration pits. If stormwater run-on occurs, accumulated water on the site will be inspected for visual and olfactory evidence of contamination (e.g., petroleum hydrocarbon sheen, discoloration, free product, petroleum hydrocarbon odors).

Storage containers, vehicles, and heavy equipment that could come into contact with stormwater will be stored within one area and will be inspected regularly to ensure proper functioning. Signs of deterioration or leaks that could lead to an unanticipated release of petroleum-based products or hazardous substances will be reported immediately, and corrective measures will be taken.

General site inspections will occur periodically and will be documented. Engineering controls will be inspected and repaired as necessary. During prolonged rainfall, daily inspections may be necessary. Accumulated sediment at the silt fence will be removed once accumulation reaches one-third the height of the fence. If damaged, the silt fence will be repaired or replaced within 24 hours. During storm events, stormwater runoff will be inspected to assess whether it has been impacted by COCs or by contaminants associated with construction activities.

17.5 Record Keeping and Reporting

Detailed records of storm events, inspections of engineering controls, and response activities will be maintained. Significant issues will be communicated to site workers and the project on-site representative on a regular basis. Reporting requirements of the NPDES stormwater discharge permit will be followed strictly. Major deviations from this EHE/EHMP should be approved by HDOH prior to implementation. Minor deviations from the EHE/EHMP are acceptable based on field discretion. All deviations should be explained and documented; complete Appendix B.9 for your records and send a copy to HDOH.

Appendix A

Environmental Hazard Management Plan

GUIDELINES FOR LANDOWNERS, TENANTS, UTILITIES COMPANIES, AND CONSTRUCTION CONTRACTORS

Environmental Hazard Evaluation

Environmental Hazard Management Plan

North Iwilei Area

GUIDELINES FOR LANDOWNERS, TENANTS,

UTILITIES COMPANIES, AND CONSTRUCTION CONTRACTORS

Prepared by

HDOH

Version 1

March, 2015

These guidelines are for landowners, tenants, utility companies, and construction contractors involved in construction projects within the Iwilei District (ID) of Honolulu, which is described in more detail below. They describe controls that provide protection from oil, oily soil and water, debris-contaminated soil (DCS), and soil vapors. They will guide you through three steps on how to:

1. Determine if your project is within the area covered by the guidelines (see page A-3).
2. Determine if you should consider these guidelines
3. If you follow these guidelines, use them as an aid in determining the controls you need to conduct your specific project safely and protect the environment.

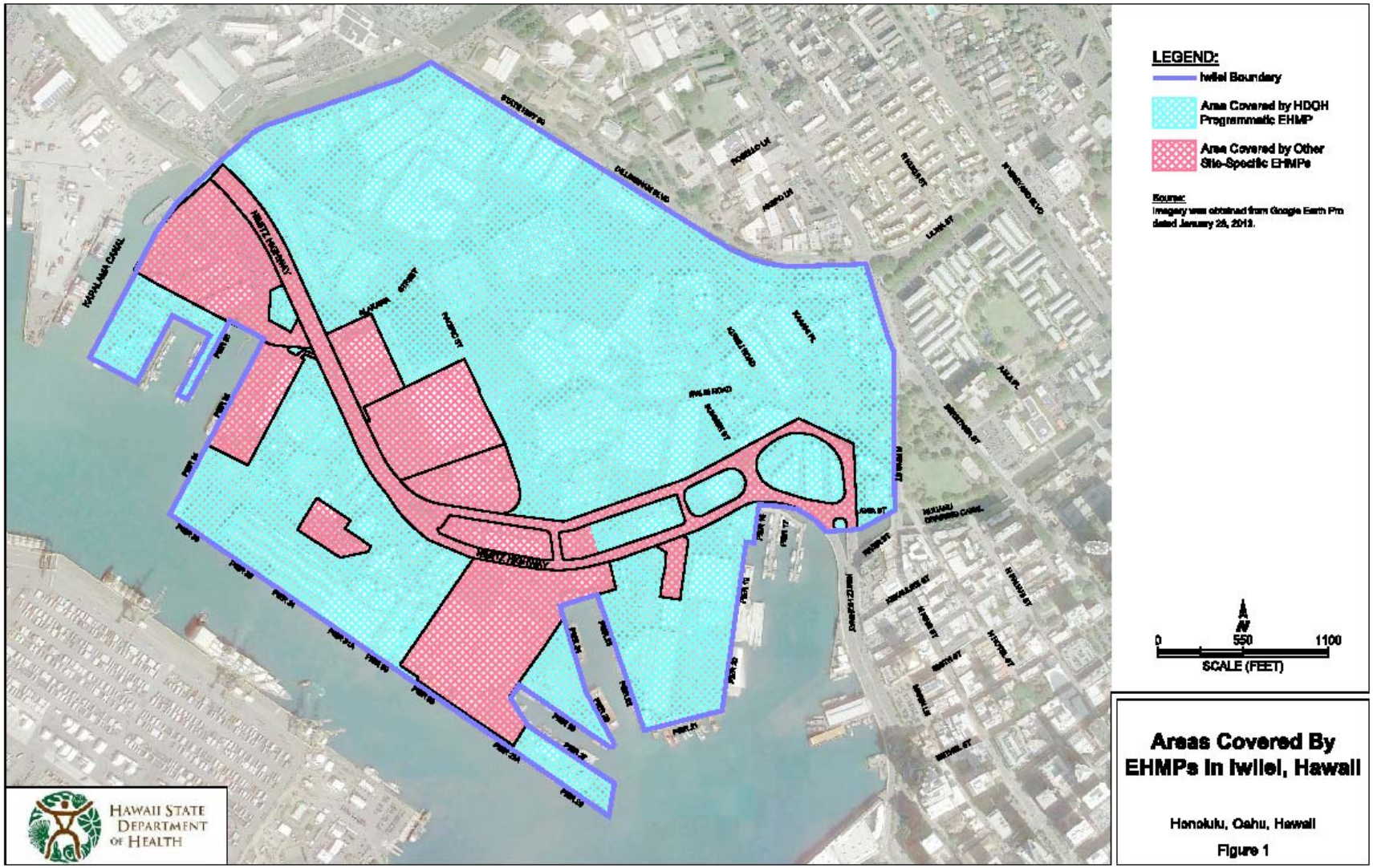
Soil and groundwater within the ID have been impacted by oil released from historical tanks and buried pipelines, and from contaminated fill material. The ID and site with site specific EHMPs are shown on the map on page A-3.

Remediation has been undertaken at many properties within the ID. Because remedial activities did not remove all oil or oily soil and groundwater, appropriate precautions must be taken so that workers involved in excavating within the area are not exposed to risks related to remaining petroleum product released on site. Installation of vapor barriers or other mitigation measures may also be needed to prevent methane, a flammable gas, or other harmful soil vapors from entering buildings, vaults, or other structures.

These guidelines explain how parties performing construction work within the ID shown on the map on page A-3 can protect those who may be exposed to oil, oily soil and groundwater, or DCS.

Disclaimer:

The procedures, information, guidelines, and sample hazard management plans referred to herein are not intended to be a comprehensive description of all of the rules, regulations, laws, and other requirements applicable to a construction project. They are only intended to provide general information, and should not be used in place of appropriately qualified personnel. Each landowner, tenant, and construction contractor is responsible for complying with all applicable rules, regulations, laws, and other requirements, and for preparing his/her/its own hazard management plans for his/her/its own site-specific project.


LEGEND:
Iwilei Boundary
Area Covered by HDOH Programmatic EHMP
Area Covered by Other Site-Specific EHMPs
Source:
Imagery was obtained from Google Earth Pro dated January 26, 2013.
0
550
1100
SCALE (FEET)
Areas Covered By EHMPs in Iwilei, Hawaii
Honolulu, Oahu, Hawaii
Figure 1
HAWAII STATE DEPARTMENT OF HEALTH

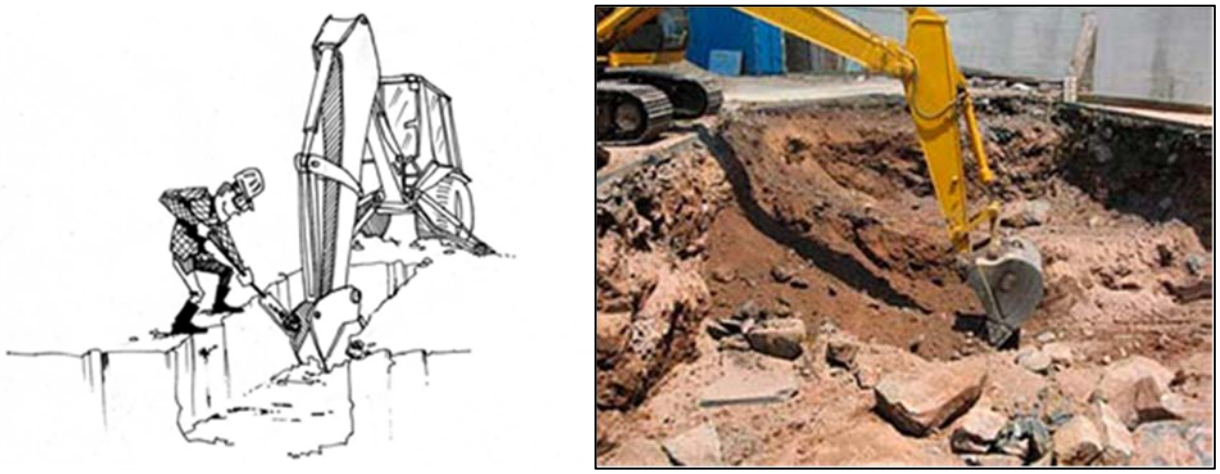
Determine if you should consider these guidelines for work within the ID:

- If you are landscaping, paving, or excavating to a depth of less than 3 feet, you probably do not need to consider these guidelines. However, be vigilant for any evidence of oil, oily soil, oily water, or soil containing debris, and consult with the Hazard Evaluation and Emergency Response (HEER) Office if you encounter any of these materials.
- If you are excavating deeper than 3 feet, replacing or repairing belowground utilities, consider these guidelines when implementing proper procedures to protect construction workers, tenants, visitors, or customers from hazards related to historical releases. Check with the HEER Office for information and support.
- If you are replacing floor slabs, replacing or substantially modifying foundations, or constructing new buildings, contact the HEER Office to determine whether a site-specific assessment is required.

Some potential hazards that can occur during excavation and how they can be prevented are described below.

During excavations, workers may be exposed to oil or metals remaining in the soil or on groundwater. **Site-Specific Health and Safety Plans (HSP)** (which require appropriate protective clothing, equipment, and training) may be needed.

Backhoe excavation in the North Iwilei Area.



Backhoe Excavation

Oil might seep from the side of an excavation and cause an oil sheen. It may be necessary to manage the oily water.

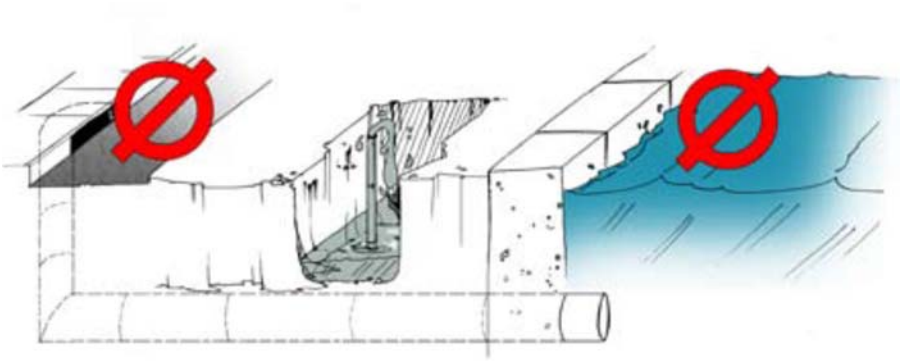
Oily soil or DCS may be inadvertently spread around the work area. Also, clean and oily soil could be mixed, increasing the volume of soil that must be disposed of.

Site-Specific Environmental Hazard Management Plans (EHMP) with a Soil Management Plan approved by the HEER Office may be needed to prevent spreading oily soil or DCS (Appendix B.5). Separate clean soil from PCS or DCS. Always cover the contaminated soil stockpile with plastic sheeting.

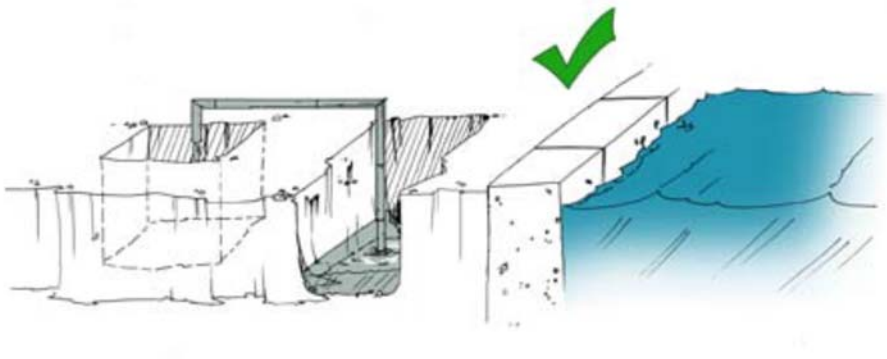
Oil might seep from the side of an excavation and cause oil sheen. It may be necessary to manage the oily water.

Oil or oily water or DCS extracted from excavations could be released and reach surface waters, including the ocean. Releasing any oil to surface waters, storm drains, or the harbor or the ocean is illegal.

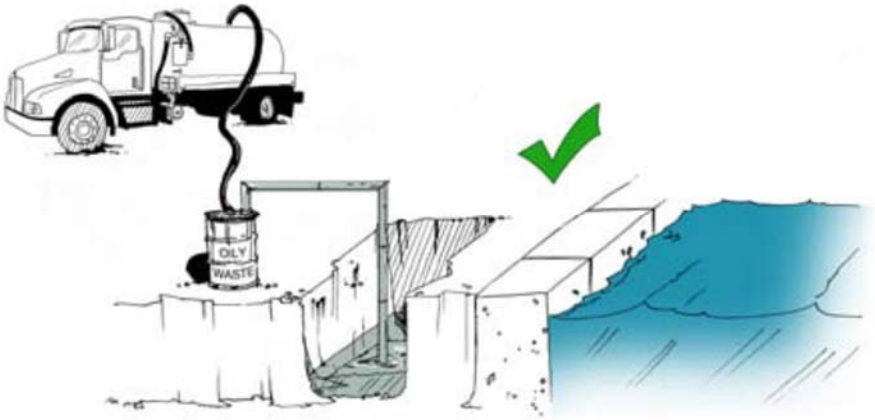
Do not discharge extracted groundwater unless it meets the requirements of, or is approved by the HEER Office and other applicable government agencies. Prepare and follow a **Groundwater Management Plan (Appendix B.6)** and obtain necessary permits or approvals from the HEER Office and other applicable government agencies to appropriately manage any oil and oily water that is encountered.



In some instances, oily water must be removed from excavations.
Do not discharge to the ocean or storm drains.

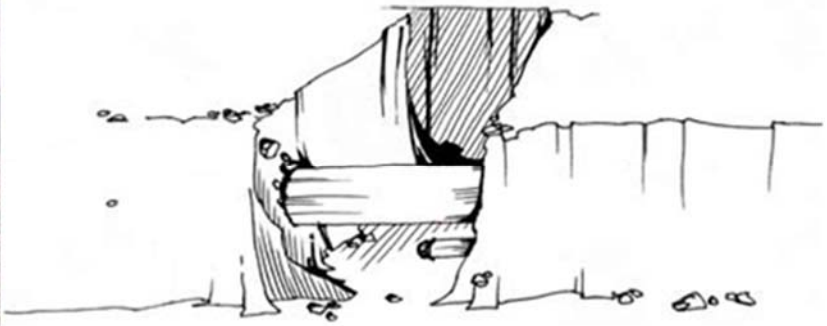


Upon acquisition of applicable government approval, contaminated water can be discharged into a newly excavated pit/trench within the impacted area.



Upon acquisition of applicable government approval, oily water can be hauled for off-site disposal.

Abandoned petroleum product pipelines or underground storage tanks (UST) may be discovered in excavations. If these are discovered, contact the HEER Office. If you need to remove a segment of an abandoned pipeline, develop an Inactive Pipeline Removal Plan (Appendix B.3), and tap, drain, cut, and cap the pipeline in accordance with the plan. Obtain HEER Office approval if you undertake removal.



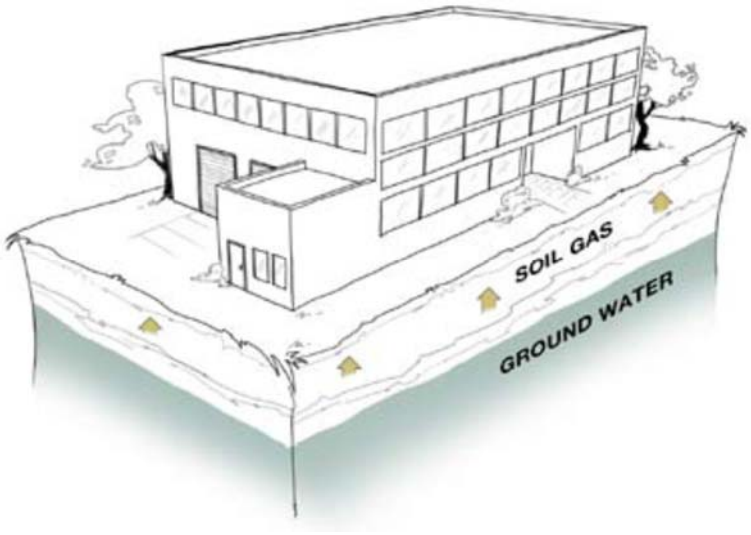
Exposed abandoned pipelines in the harbor area

Workers tapping and draining abandoned pipelines

Methane or other soil vapors can intrude into buildings. Vapor intrusion can occur when the floors are modified or major structural changes are made to buildings, resulting in need for vapor barriers. New buildings may also need vapor barriers to meet current HEER Office requirements.

If you are modifying floors, constructing a new building, or making major structural changes to existing buildings, you may need to conduct a soil gas investigation and if appropriate, install control measures such as floor vapor barriers. This will require site-specific oversight by HEER.

When modifying floors, be alert for evidence of existing vapor barriers or vapor mitigation systems. Do not compromise systems without prior consultation with HEER.



Soil Vapor Figure

Large-scale excavations may emit vapors and odors.

An **Air Monitoring Plan** may be required for excavations. Develop a Vapor Management Plan (Appendix B-8). Contact the HEER Office for site-specific oversight to determine requirements and obtain any needed approvals.

Large-scale excavation in the harbor area

Emergency responses to releases of oily soil or water.

Accidental releases of oil, oily soil, DCS, or oily water can occur during construction. Sudden releases can also occur if a water line or other utility fails. Develop a Construction Activities Release Response Plan (Appendix B-2) that describes how to deal with an accidental release of oil, oily soil, or oily water during construction.

Emergency responses to releases of oily soil or water.

HOW TO PROCEED

Planned Projects:

Determine whether your project falls under these guidelines. If you have any questions, contact the HEER Office. (See Contacts on page 15.) If your project does fall under these guidelines, complete the following steps:

1. Notify the HEER Office as soon as possible about your project. HEER can provide information and support.
2. Determine whether you need the support of an environmental consultant.
3. You are encouraged to read the attached "Project Implementation Form" because it provides a useful checklist of the items you should consider. Filling out the form will help HEER determine how to support you. If necessary, have HEER assist you in completing the form.
4. Consult with the HEER Office as needed.
5. Determine what steps you should take to protect your workers and the environment during construction, and have a qualified environmental professional complete the needed hazard management plan forms. Specific types of plans are listed on pages 4 through 7. Sample plans that can be considered by your environmental professional are at the back of these guidelines.
6. Proceed with your project.
7. As appropriate, keep the HEER Office informed.

Unplanned Release Responses:

If any releases associated with your project occur, you should act in accordance with your Construction Activities Release Response Plan. If you discover a release of oil, oily soil, or oily water within the property where you are working, do the following:

1. Review release reporting requirements (described in the HEER Technical Guidance Manual [TGM]), and Section 9.0 of this EHMP and if the release is determined to be reportable, notify the HEER Office immediately.
2. Notify the landowner or tenant for whom you are working.

HEER Office Contact:

HEER Office:

Steve Mow
Honolulu Harbor/Iwilei District Project Manager

e-mail: steve.mow@doh.hawaii.gov
phone: (808) 586-4249

The HEER web-site for Spill Reporting and Emergency Response is:

http://hawaii.gov/health/environmental/hazard/spill.html

DISCLAIMER:

The procedures described herein are not intended to be a comprehensive description of all requirements (e.g., federal, state, and local) with which landowners/tenants and others must comply while undertaking a construction project.

Filling out this form will help HEER determine what support to provide.

PROJECT IMPLEMENTATION FORM:

Project: _____

Project Owner: _____

Location: _____

Project Description: _____

_____

Completed By (Name): _____

Title/Company:_____

Phone Number: _____e-mail: _____

Expected Date of Construction: _____Date Form Completed: _____

Are you considering land use other than Commercial or Industrial?

YES: _____ NO: _____.

If Yes, explain: _____

_____

Are you considering Excavation below 3 Feet? YES: _____ NO: _____

Do you need the support of an environmental company? YES: _____ NO: _____

If yes, who do you intend to use? _____

_____

Other Comments: _____

_____

_____

Questions continued on next page

QUESTIONS	ANSWERS	Useful remarks by HEER and/or Tenant/Contractor
Have you reviewed the site background information available in the public record maintained by the HEER Office:	**YES NO**	**Describe reports and information sources that may be useful:**
• **Site Characterization Reports?**	☐ ☐	
• **Environmental Hazard Management Plan?**	☐ ☐	
• **Monitoring Reports?**	☐ ☐	
• **Appropriate As-built Reports describing past cleanup and construction reports?**	☐ ☐	
Have you determined if your project may result in exposure to oily soil, DCS or potentially harmful soil gases:	**YES NO**	**Further describe the hazards that may be encountered during construction:**
• **During construction?**	☐ ☐	
• **At the completion of construction (of a new building for example)?**	☐ ☐	
Do you understand potential hazards to:	**YES NO**	**Refer to Environmental Hazard Management Plan, as necessary, for more details.**
• **Construction workers?**	☐ ☐	
• **Building occupants?**	☐ ☐	
• **Visitors or customers?**	☐ ☐	
• **Ocean water, storm drains, etc.?**	☐ ☐	
• **Do you understand the requirements and your responsibilities to prevent hazards from occurring?**	☐ ☐	
QUESTIONS	**ANSWERS**	**Useful remarks by HEER and/or Tenant/Contractor**

QUESTIONS	ANSWERS	Useful remarks by HEER and/or Tenant/Contractor
Are you preparing appropriate plans or documents[2] as detailed in Appendix B:	**YES NO**	**What HEER support do you need in preparing the Plans?**
• **Site-specific Health and Safety Plan?**	☐ ☐	
• **Free Product Management Plan**	☐ ☐	
• **Construction Activities Release Response Plan?**	☐ ☐	
• **Inactive Pipeline Removal Plan?**	☐ ☐	
• **Air Monitoring Plan?**	☐ ☐	
• **Soil Management Plan?**	☐ ☐	
• **Groundwater Management Plan?**	☐ ☐	
Are you undertaking additional environmental investigations for the project planning or implementation purposes:	**YES NO**	**What HEER support do you need in undertaking investigations?**
• **Soil and groundwater?**	☐ ☐	
1. Soil gas?	☐ ☐	
Based on soil gas investigation results, are you preparing designs for soil gas controls for buildings?	**YES** ☐ **NO** ☐	**What HEER support do you need in preparing designs?**
Are you complying with:	**YES NO**	**Remarks:**
• **Landowner's environmental requirements?** (These may be included in lease agreements or other legal documents)	☐ ☐	
Are the construction workers that may encounter contaminated soil or groundwater 40 hour HAZWOPER trained?	**YES** ☐ **NO** ☐	

[1] Either NO or NOT NEEDED.
[2] Routine air monitoring is included in the Health and Safety Plan. This plan is intended for large-scale excavations (i.e., down to five feet or deeper and over an area exceeding one half acre, or as required by the HEER Office).
[3]See sample plans at the back of these guidelines.

What is HEER's role?

For Planned Projects, HEER may be able to:

- Provide oversight and technical support for dealing with oil, oily soil, DCS, oil- or DCS-contaminated water, and soil vapors, and for implementing the Environmental Hazard Management Plan (EHMP).
- Suggest possible reimbursement of reasonable incremental environmental costs from known responsible parties (RP).
- Develop guidelines for consideration when implementing the EHMP.
- Monitor effectiveness of the EHMP in properly dealing with environmental issues during subsurface construction. This may require HEER to access monitoring points on your parcel.

If an accidental release of oil occurs, and oily soil, DCS, and oil-contaminated water must be addressed, HEER may be able to:

- Participate as a member of the emergency response team.
- Assist in providing the appropriate method(s) for proper management of oil, oily soil, and oily water.

What type of HEER technical and logistical support can I expect?

- HEER's Project Manager is available to provide general guidance on how to comply with the EHMP, and to assist with the logistics of addressing oil, oily soil and water, and soil vapors.
- HEER will provide sample plans that can be considered by your environmental consultant in preparing plans that may be required for your project.
- HEER can help identify environmental companies that can perform support services. The landowner or tenant and utilities companies are responsible for directing the work of the professional.

What are the responsibilities of Landowners?

The landowner is responsible for the following:

- Complying with applicable federal, state, and local laws and regulations
- Determining whether historical activities at the site may have resulted in release of possible non-petroleum and/or petroleum contaminants of concern (COC)
- Verifying that the site has been adequately characterized by identification of the nature and extent of contamination
- Identifying any site conditions requiring appropriate protection of human health and the environment that must be added to the plan template of this EHMP
- Complying with requirements of the EHMP
- Developing/complying with a Management Plan consistent with these guidelines
- Communicating requirements of the EHMP and these guidelines to whoever is undertaking construction work (e.g., excavation, building construction, etc.)
- Notifying HEER about construction project plans within the ID , contacting HEER for support to help address requirements of the EHMP, and cooperating with HEER by providing timely information and site access
- Ensuring appropriate hazard management plans are prepared and implemented, and providing appropriate documentation to the HEER Office
- Keeping the HEER Office informed regarding construction work
- Notifying the HEER Office of any accidental release of oil, oily soil, or oily wateror DCS.

What is the Tenant's responsibility?

Any tenant undertaking excavation, building re-construction, or new construction should coordinate with the landowner; comply with applicable federal, state, and local laws and regulations; and ensure adherence to the EHMP and consideration of these guidelines.

What are the responsibilities of the Utilities Companies and Construction Contractor?

The Utilities Companies and Construction Contractors undertaking excavation, building reconstruction, or new construction work should (as appropriate to the size and nature of each project) operate under the appropriate Health and Safety Plans (HSP), implement air monitoring, manage soil and groundwater in accordance with the EHMP, and consider these guidelines. Utilities Companies and Contractors must identify tasks/actions not already covered in the plan templates included in the EHMP. The Contractor should request that the landowner make appropriate changes to the plan(s) prior to commencement of site work.

Contacts:

HEER Office:

Steve Mow
Honolulu Harbor/Iwilei District Project Manager

e-mail: steve.mow@doh.hawaii.gov
phone: (808) 586-4249

The HEER web-site for Spill Reporting and Emergency Response is:

http://hawaii.gov/health/environmental/hazard/spill.html

Environmental Statutes and Guidelines:

The following environmental statutes, regulations, and guidance documents, or any recent updates to these, may apply:

- The Hawaii Environmental Response Law (*Hawaii Revised Statutes* [HRS] Chapter 128D) and the State Contingency Plan (*Hawaii Administrative Rules* [HAR] 11 451 1 through 11 451 24). These outline legal requirements for protecting human health and the environment from releases or threatened releases of hazardous substances, including oil.
- The Hazard Evaluation and Emergency Response Office Technical Guidance Manual (TGM) for implementation of the State Contingency Plan (Interim Final, June 21, 2009). This provides many helpful guidelines and procedures to comply with the Hawaii Environmental Response Law and the State Contingency Plan.
- Hawaii Water Quality Standards (HAR Title 11, Chapter 54). This specifies standards for water quality discharge.
- Hawaii Ambient Air Quality Standards (HAR Title 11, Chapter 59). This specifies air quality standards. Specific standards may apply during soil excavation, remediation, and construction, or during other activities.
- Hawaii Occupational Safety and Health Standards (HAR Title 12, Chapter 99). This specifies health and safety requirements during remedial work and construction.

In addition to the TGM, current technical guidance issued by the HEER Office indicating how it can enforce requirements of the EHMP includes the following:

- Screening Environmental Hazards at Sites with Contaminated Soil and Groundwater (December 2011).
- Guidance Fact Sheet For Use When Petroleum Contamination is Encountered During Subsurface Soil Excavation (Interim Final, November 2008).
- Long-term Management of Petroleum Contaminated Soil and Groundwater (June 2007).
- EAL Surfer (Fall 2011).

Contact the HEER Office if you are interested in the latest version of these documents.

Appendix B

Reporting Forms

B.1 Written Follow-Up Notification Form

B.2 Health and Safety Plan – Oil Hazards

B.3 Construction Activities Release Response Plan

B.4 Inactive Pipeline Removal Plan

B.5 Soil Management Plan

B.6 Groundwater Management Plan

B.7 Free Product Management Plan

B.8 Vapor Management Plan

B.9 Stormwater Management Plan

The purpose of the reporting forms are to ensure consistency between actions taken and the associated management plans. Add notation to indicate all deviations from the management plans.

B.1

Hawaii Hazardous Substance Written Follow-Up Notification Form

PLEASE PROVIDE THE FOLLOWING INFORMATION

Incident Case No.: _____

Contact Information

Caller's Information:

Name: _____

Address: _____

City: _____ State: _____ Zip code: _____

Telephone Number: _____

Owner's Information:

Name: _____

Address: _____

City: _____ State: _____ Zip code: _____

Telephone Number: _____

Operator's Information:

Name: _____

Address: _____

City: _____ State: _____ Zip code: _____

Telephone Number: _____

Name of contact person at the facility or vessel where the release has occurred: _____

_____

Telephone Number: _____

Hazardous Substance Released

Name (trade and chemical) of the hazardous substance which has been released: _____

_____

Chemical Abstracts Service (CAS) Number (if applicable):
_____

Approximate quantity of the hazardous substance released: _____

Incident Information

Location of the release: _____

_____

Brief description of the release: _____

_____

Media into which the release occurred or is likely to occur (indicate all those that apply):

☐ Air ☐ Soil ☐ Groundwater ☐ Concrete ☐ Asphalt ☐ Stream ☐ Ocean ☐ Other

Cause of the release: _____

_____

Date of the release: _____

Time of the release: _____

Duration of the release: _____

Time when person in charge of construction learned of release:
_____

_____

Source of the release: _____

_____

Response Information

Response measures taken thus far: _____

_____

Any appropriate information regarding ability of the owner or operator of the facility or vessel where the release has occurred to pay for or perform any proposed or required response actions:

_____

_____

Names of other federal, state, or local government agencies that have been notified of the release:

_____

_____

Health Information

Known or anticipated acute health risks: _____

_____

Known or anticipated chronic health risks: _____

_____

Advice regarding medical attention necessary for exposed individuals: _____

_____

Potential impacts on public health or welfare:
_____

_____

Potential impacts on the environment:
_____

_____

"I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the submitted information is true accurate and complete."

Signature: _____ **Date:** _____

Printed Name: _____

Title: _____

Company: _____

B.2

Health and Safety Plan – Oil Hazards

Prepared By: **Organization:**_____ **Name:** _____ **Signature:** _____	**Health and Safety Plan – Oil Hazards**
	Environmental Hazard Management Plan Iwilei District
	Version: **Reference:** **Date:**

Project Name: _____

Project Location: _____

Parties may use this sample as a basis for preparing their own site-specific plans.

Revise this Sample Plan by:

1. Completing Table 2 with names and telephone numbers.
2. Attaching a Figure 1 map below at conclusion of Appendix B.2 to show locations of the work site and nearest medical facilities and hospitals. Alternatively, ensuring that on-site workers know locations of closest medical facilities.
3. Reviewing the Occupational Safety and Health Administration (OSHA) regulations to ensure that hazard levels described in Table 1 are still current.
4. Including any additional specific instructions.

Implement this Plan by:

5. Warning on-site workers that they may encounter oil, oily water, and oil-impacted soil in belowground excavations.
6. Making the on-site workers aware of need for proper safety procedures, and familiarizing them with the contents of this plan.
7. Making sure a copy of this completed plan is present at the construction site.

Note: If you are dealing with hazardous chemicals other than oil, oily water, and oil-impacted soil, you may need additional hazardous Chemical Response Plans and Procedures not covered in this plan.

Delete this box after completing this plan.

2. INTRODUCTION

Oil, oily water, and oil-impacted soil may be encountered during excavation projects. This Health and Safety Plan (HSP) provides information regarding potential hazards that may be encountered (Table 1 below), specifies protective measures and necessary monitoring (Table 1 below), and lists emergency contact information (Table 2 below).

3. WORKER AWARENESS

On-site workers who may be exposed to oil, oily water, oil-impacted soil and DCS should have the appropriate and current level of Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard (29 *Code of Federal Regulations* [CFR] 191 0.120) training.

A daily on-site tailgate safety meeting should occur. These meetings should include a discussion of the day's work and an analysis of hazards that may be encountered.

If site or work conditions change, this HSP may have to be amended accordingly. Apprise on-site workers of any change

4. SITE CONTROL AND GENERAL HEALTH AND SAFETY REQUIREMENTS

Minimize exposure of workers and others to potential hazards by restricting workplace access.

Do not smoke, eat, or drink during and after entering the work zone. Conduct these activities upwind and outside of the work zone after first washing hands.

Avoid skin contact with oil, oily water, oil-impacted soil and debris, and contaminated soil, and avoid inhalation of dust particles.

5. WORKSPACE AIR MONITORING AND ACTION THRESHOLDS

Monitor workspace air conditions during work activities to verify that safe conditions are maintained by comparing measurements to the action levels in Table 1.

If action levels are exceeded, take the actions listed in Table 1 or others, if necessary.

Use the field monitoring devices listed in Table 1, or equivalent, to monitor workspace air conditions.

Acute exposure to elevated concentrations of these constituents listed in Table 1 may cause the following symptoms, among others:

- Abnormal eye and nose irritation
- Headache
- Giddiness
- Nausea
- Abnormal fatigue.

Table 1: Action Levels

Contaminant	Medium/Hazard	Monitoring Instrument (See HEER 2009 for more information)	Monitoring Instructions	Action Levels and Applicable Actions (See OSHA for more information)
Methane	Air/Flammability	Combustible gas indicator	Take readings in excavations while work is ongoing to determine if flammable vapors are present.	<10% Lower Explosive Limit (LEL): No explosive hazard. Proceed with caution. > l0% LEL: Potential explosion hazard. Exit area immediately. Contact Health and Safety Manager (Table 2) for further direction.
TPH as gasoline TPH as diesel TPH residual Benzene Toluene Xylenes Naphthalene	Air/Inhalation	Photoionization detector(PID) with l0.6 electron volt (eV) Lamp	Monitor breathing zone while work is ongoing. Compare action thresholds to time-averaged breathing zone measurements.	<0.5 parts per million by volume (ppmv): Proceed with caution. 0.5 to 10 ppmv: Level D, use benzene-specific detector (see below).
		Draeger Benzene-specific detector tube (if necessary; see above)	Deploy benzene-specific detector tube for benzene if PID levels exceed 0.5 ppmv.	<0.5 ppmv: Level D personal protective equipment (PPE) >0.5 ppmv: Exit area and consult Health and Safety Manager (Table 2) for further direction.
	Soil(dust)/Inhalation	None (visual) – inspect workspace air for fugitive dust caused by work activities or high winds.		Evacuate area if visible fugitive dust is observed and cannot be readily mitigated. Contact Health and Safety Manager (Table 2) for further direction.

If workers experience any of the above symptoms while conducting work involving exposure to oil, oily water, and oil-impacted soil, they should stop work, leave the work area, and consult the Health and Safety Manager (Table 2).

6. PROTECTIVE CLOTHING

A minimum of Occupational Safety and Health Administration (OSHA) Level D Personal Protective Equipment (PPE) should be used for activities involving disturbance, movement, sampling, or management of oil, oily water, and oil-impacted soil. Level D PPE consists of the following:

- Safety glasses
- Hard hat
- Surgical (rubber or nitrile) gloves
- Coveralls or full-length pants
- Boots with chemical-resistant steel toe and shank.

Additional PPE may be required in response to project-specific hazards or unusual conditions, such as possible close contact of workers with oil seeping from soils or floating on groundwater.

7. EMERGENCY CONTACTS

Table 2: Emergency Contacts

Organization	Purpose	Phone
Contractor-designated Health and Safety Manager *Name*:	Hazardous work conditions	(_____) _____ - _____
For emergencies: Fire, Ambulance, or Police		**911**

8. REFERENCES

State of Hawaii Department of Health (HEER). 2009. Technical Guidance Manual for the Implementation of the Hawai'i State Contingency Plan, Interim Final. June 21.

Occupational Safety and Health Administration (OSHA), 29 *Code of Federal Regulations* (CFR) Sections 1910 and 1915.12 (b)(3).

Figure 1

Site and Hospital Map

(Insert appropriate map)

B.3

Construction Activities Release Response Plan

Prepared By: **Organization:**_____ **Name:** _____ **Signature:** _____	**Construction Activities Release Response Plan** **Environmental Hazard Management Plan Iwilei District** **Version:** **Reference:** **Date:**

Project Name: _____

Project Location: _____

Parties may use this sample as a basis for preparing their own site-specific plan.

Revise this Sample Plan by:

1. Completing Tables 1 through 3.
2. Checking to make sure the Section 7.1 notification requirements are current.
3. Including any additional specific instructions.

Implement this Plan by:

1. Warning on-site workers that they may encounter oil, oily water, oil-impacted soil, and debris-contaminated soil in belowground excavations.
2. Making the on-site workers aware of proper response procedures and familiarizing them with the contents of this plan.
3. Making sure a copy of the completed plan is present at the construction site.
4. Ensuring that on-site workers are familiar with surface drainage patterns, presence and flow directions of storm drains that could direct releases to harbor waters, locations of storm drain outlets to the harbor that may need to be protected with oil booms or other measures, potential locations for emergency storage tanks, etc. Obtain further information on these conditions from HEER, if necessary.

Additional details for completing this form are in Sections 8 and 9 of the EHMP.

Submit a copy of this form to HEER Office if contamination is encountered during subsurface activities.

Note: If you are dealing with hazardous chemicals other than oil, oily water, and oil-impacted soilor DCS, you may need additional hazardous Chemical Response Plans and Procedures not covered in this plan.

Delete this box after completing this plan.

1. INTRODUCTION

This Construction Activities Release Response Plan (Plan) describes how to proceed in the event of an unplanned or accidental release of oil, oily water, or oil-impacted soil.

On-site workers must minimize the possibility of spills and releases of oil, oily water, and oil-impacted soil during excavation by:

- Familiarizing themselves with the site conditions
- Implementing appropriate Health and Safety, Soil and Groundwater Management Plans
- Being prepared at all times to encounter and manage oil, oily water, and oil-impacted soils.

Uncontrolled releases or spills of oil, oily water, and oil-impacted soil can occur. Such releases can pose a hazard to human health and/or the environment, and require an emergency response and/or regulatory agency notification. Human health concerns include human contact with oil, oily water, and oil-impacted soil; explosive or fire hazards; and disruptions to the normal operations in the area around the construction site, particularly disruptions to traffic flow. A major environmental impact of concern is discharge of oil or oily water to the harbor water either directly or via storm drains.

The responses described here apply to incidents that may occur during construction activities and that can be controlled by on-site workers undertaking the construction work. **However, if parties undertaking the work are not able to deal with the release, the Incident Action Plan (IAP) for the Hazard Management Areas should be immediately activated.** The IAP can be implemented by notifying the State HEER Office Emergency Response Team (see first entry in Table 3).

2. TYPICAL RELEASES

The releases described below can occur during repair or replacement of deep utilities (water, sewer, electric, and fuel and communications lines) and buried utilities that require excavation and removal of oil, oily water, and oil-impacted soil and DCS.

Small incidental releases that do not spread and do not interfere with construction activities should be cleaned up as part of normal activities of the construction team.

For the following types of more significant release, respond immediately as outlined in this plan:

- Surface spillage of oil, oily water, and oil-impacted soil from excavations that actually spills, or threatens to spill, beyond the boundaries of the construction site.
- Breakages or other malfunctions of pipelines, storage facilities, groundwater treatment systems, or re- infiltration galleries/trenches used for belowground construction dewatering that continue to release oil or oily water.
- Oil-impacted soils or DCS temporarily stockpiled on the ground surface that are eroded or washed away by rain, and which continue to spread under the action of rain or other causes such as water from a water supply pipeline break.

- Spillage outside of the construction site during handling and disposal of oil, oily water, oil-impacted soils, or DCS removed from excavations.
- Release of oil from abandoned or active oil pipelines encountered and damaged during construction activities—that oil threatening to spill out of the excavation or actually doing so.

3. RELEASE RESPONSE TEAM

In the event of a release, the following team will determine the necessary response, make proper notifications, and conduct the response.

Table 1: Contractor Release Response Team

Name	Phone
Internal Contacts:	
Contractor-designated Release Response Coordinator Name:	**(_____) _____ - _____**
Contractor-designated Health and Safety Manager Name:	**(_____) _____ - _____**
On-site Construction Superintendent Name:	**(_____) _____ - _____**
Landowner Contact Name:	**(_____) _____ - _____**

4. RESPONSE PROCEDURES

4.1 General

The first priority of response action is protection of human health. The second priority is to ensure no impact on harbor water or the environment. **Immediate action is required**. Do not delay prudent response action.

In the event of a release:

- Notify the response coordinator (Table 1).
- Take immediate action to contain the release (do not wait if Release Response Coordinator is unavailable).

- In dangerous circumstances, give notice to evacuate the work area and notify persons in Table 1. If no persons listed in Table 1 are available, obtain assistance as necessary by contacting appropriate persons listed in Table 3.

Other general responses include:

- Use appropriate personal protective equipment (PPE).
- Eliminate or contain the source of the release.
- Put up signs or caution tape to let other workers know of a release and need to stay away.
- Place barriers or absorbents around the release to prevent spread of contamination.
- Secure impacted soil stockpiles by covering, repairing, or constructing containment berms around the stockpile, etc.
- Remove released material and clean all surfaces.
- Dispose of the released material as appropriate (see **Soil and Groundwater Management Plan**).
- Monitor air quality at the location of the release to assess the vapor hazards as defined in the Health and Safety Plan (HSP). Take appropriate action if hazardous conditions exist as required by the HSP.Use appropriate personal protective equipment (PPE).
- Eliminate or contain the source of the release.
- Put up signs or caution tape to let other workers know of a release and need to stay away.
- Place barriers or absorbents around the release to prevent spread of contamination.
- Secure impacted soil stockpiles by covering, repairing, or constructing containment berms around the stockpile, etc.
- Remove released material and clean all surfaces.
- Dispose of the released material as appropriate (see **Soil and Groundwater Management Plan**).

If the release occurs indoors, do the following:

- Close off vents and air ducts leading from the release area to other parts of the building.
- Use appropriate personal protective equipment (PPE).
- Eliminate or contain the source of the release.
- Put up signs or caution tape to let other workers know of a release and need to stay away.
- Place barriers or absorbents around the release to prevent spread of contamination.
- Secure impacted soil stockpiles by covering, repairing, or constructing containment berms around the stockpile, etc.
- Remove released material and clean all surfaces.

- Dispose of the released material as appropriate (see **Soil and Groundwater Management Plan**).

If electrical equipment is operating in the vicinity of the release and hydrocarbon vapors are detected near the explosivity limits (see **Health and Safety Plan**), turn off the equipment, preferably at the main breaker, to avoid sparking.

If necessary, protect nearby storm drains by use of adsorbent, booms, or drain covers; and protect potentially affected harbor water and storm drain outlets to the harbor by placing floating oil booms on the water.

5.

To deal with either the incidental or more significant releases, equipment and materials listed in Table 2 are available either at the construction site or in storage nearby.

Table 2: Response Equipment and Materials

Equipment and Materials	Purpose	Source of Equipment and Materials
Spill kits	Cleanup of small releases to land	
Trucks and loading equipment	Excavation and transport of oil-impacted soil	
Steel roll-off bins	Temporary storage of oil-impacted soil pending waste profiling or on- site relocation	
Pumps, piping, storage tanks	Transfer of impacted water and oil to on-site tanks or approved disposal trenches	
Plastic sheeting	Cover and security of soil stockpiles	
Hay bales, silt fences, wattles	Erosion control and containment materials	
Oil absorbent pads	Absorption and containment of oil or fluids released to land or within excavations	
Sand bags or equivalent	Construction of a small dike along areas of the release to prevent releases from spreading or entering storm drains	
Floating oil booms	Absorption and containment of oils released to harbor waters	
Sediment and oil filters	Connection to the end of an excavation dewatering hose to filter out sediment and oil	

6. NOTIFICATION INFORMATION

If the release meets the Section 7.1 notification requirements:

- Notify the person in the first entry in Table 3.
- If utilities are involved, notify the affected utility in Table 3.
- Notify the landowner in Table 3.

Table 3: Other Potential Contacts

Organization	Purpose	Phone
State Agency Contacts:		
Hawaii State Emergency Response Commission/the HEER Office	Any required release reporting	(808) 586-4249 (808) 247-2191 (after hours)
Fire, Ambulance, or Police	Required in the event of fire danger or injury	**911**
Underground Utility Contacts:		
Gas Utility Name:	Notification of any gas utility damage or break	(_____) _____ - _____
Electric Utility Name:	Notification of any electric utility damage or break	(_____) _____ - _____
Water Utility Name:	Notification of any water utility damage or break	(_____) _____ - _____
Landowner Contact:		
Landowner Name:	Notification of any significant release	(_____) _____ - _____
Federal Contact:		
U.S. Coast Guard Name:	Notification of any sheen on harbor waters	(_____) _____ - _____

7. RELEASE COMMUNICATIONS AND AGENCY REPORTING REQUIREMENTS

7.1 Circumstances under which agency notification is required

Pursuant to Title II, Chapter 451, *Hawaii Administrative Rules* [HAR] § 11-451-7, releases meeting ***any of the following criteria must be reported*** to the first agency contact appearing in Table 3 within 24 hours of first occurrence or observance:

- Any release causing surface water to exhibit sheen.
- Any release of petroleum or hazardous substances to navigable waters (e.g. the ocean and local canals and streams).
- Any release of oil to the environment greater than 25 gallons.
- Any release of oil less than 25 gallons that is not cleaned up within 72 hours.
- In addition, any sheens or oil or oily water releases to storm drains that have open connections to the harbor, even if contained within project boundaries and not yet impacting the harbor water.
- Sheen and oil observed in the harbor or in a storm drain should be reported to the U.S. Coast Guard and HEER Office in Table 3.
- Releases to other waters of the United States require reporting to the U.S. Coast Guard.

Sheen and oil observed in the harbor or in a storm drain should be reported to the U.S. Coast Guard and HEER Office in Table 3.

Releases to other waters of the United States require reporting to the U.S. Coast Guard.

Report the following information to agencies when notifying of a reportable release:

- Name of the person making the notification
- Location of the release
- Time and date of discovery
- Characteristics of the oil observed (color, viscosity, etc.)
- How the release occurred
- Removal actions taken and volume removed
- Whether the release poses an immediate threat to human health or the environment
- Other agencies that have been notified of the spill
- Known injuries resulting from the spill.

Provide details of actions taken consistent with Section 11 to deal with Construction Activities Release Response:

_____

_____

_____

B.4

Inactive Petroleum Pipeline and UST Management Plan

Prepared By **Organization:**_____ **Name:** _____ **Signature:** _____	**Inactive Petroleum Pipeline and UST Management Plan** **Environmental Hazard Management Plan Iwilei District** **Version:** **Reference:** **Date:**

Project Name: _____

Project Location: _____

Parties may use this sample as a basis for preparing their own site-specific plan.

Revise this Sample Plan by:

1. Reviewing the requirements of this sample plan to ensure that construction workers can comply with its requirements, and modifying the plan, if necessary.

Implement this Plan by:

1. Making sure on-site workers are aware of a plan for dealing with inactive pipelines.
2. Making sure a copy of the completed plan is present at the construction site.
3. Accessing additional guidance for completing this form in Section11 of the EHMP.
4. Keeping a copy for your records and sending a copy to the HEER Office.

Delete this box after completing this plan.

- **INTRODUCTION**

Inactive pipelines may be encountered during excavation (activities) within the Iwilei District (ID). This Plan provides procedures and guidelines for dealing with these inactive pipelines if they are encountered.

1. PREPARATORY WORK

Prior to starting any belowground construction work, undertake the following:

- Contact Hawaii One Call at (866) 423-7287 to notify them of proposed excavation activities. Underground facilities owners must be notified to mark any of their underground utilities near the proposed excavation.
- Conduct an underground utility survey using geophysical surveying equipment (e.g., toning/metal detection, ground penetrating radar) before excavation begins.

In addition to the above, identify the location of any inactive pipelines that may not be included in the above-referenced information. To do this, review the most recent available reports including the Environmental Hazard Management Plan (EHMP) to determine if pipelines could be present within the work area. Contact the Hazard Evaluation and Emergency Response (HEER) Office at (808) 586-4249 for assistance in obtaining the most current pipeline information.

2. NOTIFICATION REQUIREMENTS

If unanticipated inactive pipelines are discovered during construction activities, notify as follows:

- Contact the HEER Office via telephone within 24 hours after encountering the unanticipated petroleum pipelines.

3. PIPELINE TAPPING AND DRAINING

Inactive piping may contain residual petroleum product and may be under pressure. This could present a possible safety and spill hazard if the line is cut prior to implementation of appropriate measures. If, through the notification process described in Section 12.3, the nature and use of the piping cannot be determined, tapping may be required to determine if fluids are present or if the piping is pressurized, and to provide a means to drain residual product.

If you are performing the work, follow the procedures in Sections 5.0 through 8.0 below.

4. PIPELINE CUTTING AND CAPPING

Follow these general procedures for cutting and capping the pipelines:

1. Prior to cutting, tap the pipeline using non-sparking tools, and drain the contents of the pipeline to the extent practical and possible.
2. Cover the area below and adjacent to the cutting location with plastic sheeting and absorbent material, and place a catch basin beneath the location of the cut. Use these devices to collect residual fluid that may drain from the pipeline during and after cutting.
3. Use precautionary measures to prevent explosive hazards. For example, cut the pipeline using non-sparking tools and remove the pipeline segment.

4. Cap the cut-off ends of remaining pipeline segments to prevent any potential future leakage. Suitable capping methods include concrete plugs, blind flanges, cement plugs with rebar, or other methods that do not involve hot welding. Hot work, including welding, is not considered appropriate due to potential explosiveness of separate phase hydrocarbons (SPH) and associated vapors.

Consider the need for the presence of a vacuum truck on standby during pipeline cutting and capping.

5. PRODUCT SAMPLING

Sample the residual product that has been drained and collected during this process, and have it analyzed by a laboratory to enable proper profiling and off-site disposal.

6. INVESTIGATION-DERIVED WASTE DISPOSAL

Dispose of petroleum and other wastes in accordance with applicable laws and regulations.

7. HEALTH AND SAFETY

Comply with the following health and safety measures whether or not these are included in the **Health and Safety Plan (HSP)**.

- Personnel conducting post-discovery work on abandoned petroleum pipelines should have current 40/24-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and air-purifying respirator fit test certifications. At least one on-site worker potentially exposed to chemical or physical hazards should have basic first aid and cardiopulmonary resuscitation (CPR) training.
- Select air-purifying respirators based on the type of contaminant encountered (i.e., petroleum).
- Conduct air monitoring to monitor potential hazardous vapors and worker exposure. If petroleum is encountered, air monitoring typically includes use of a photoionization detector (PID) to monitor organic vapors for potential inhalation hazards, and a methane and oxygen/combustible gas indicator to monitor for potential explosive hazards.

8. DOCUMENTATION ACTIVITIES

Provide HEER with the following information:

- A description of where the pipeline was encountered (Global Positioning System [GPS] coordinates or location relative to prominent landmarks), number and lineal footage of pipelines encountered, size of pipelines, depth of pipelines, condition of pipelines, and actions taken following pipeline discovery such as cutting or petroleum removal
- A location map that shows where the pipeline was encountered. The map must include a north arrow and a scale
- Photographs of the exposed portion of the pipeline in the excavation
- Analytical laboratory reports for product recovered from the pipeline.

Provide details of pipeline removal activities consistent with Section 12 of the EHMP:

B.5

Soil Management Plan

Prepared By **Organization:**_____ **Name:** _____ **Signature:** _____	**Soil Management Plan** **Environmental Hazard Management Plan Iwilei District** **Version:** **Reference:** **Date:**

Project Name: _____

Project Location: _____

Parties may use this sample as a basis for preparing their own site-specific plan.

Revise this Sample Plan by:

1. Reviewing the requirements of this sample plan to ensure that the construction worker can comply with its requirements, and modifying the plan, if necessary.

Implement this Plan by:

1. Making sure on-site workers are aware of this plan and that they follow this plan.
2. Making sure a copy of the completed plan is present at the construction site.
3. Accessing additional guidance for completing this form in Section11 of the EHMP
4. Keeping a copy for your records and sending a copy to the HEER Office.

Delete this box after completing this plan.

1. INTRODUCTION

These procedures are intended to protect construction workers, the environment, and tenants in buildings from contact with oil-impacted soil where such soils are known to exist, or where people may be exposed. These procedures also comply with requirements for excavating, stockpiling, re-using, and disposing of oil-impacted soils.

2. SOIL EXCAVATION AND STOCKPILING

If the amount of excavated soil is less than 1 cubic yard (cy) (equivalent to about three 55-gallon drums), it can be re-placed in the excavation upon completion of the work without further evaluation.

If you encounter oil or oil-impacted soils, or debris-contaminated soil (DCS), do the following:

- If the amount of excavated soil is less than one cubic yard (equivalent to about three 55-gallon drums), it can be replaced in the excavation upon completion of the work without further evaluation.

- For excavation volumes exceeding 1 cy, segregate unimpacted soil from the oil-impacted soil, and stockpile these separately.
- Have a qualified environmental professional direct any necessary collection of soil samples, direct testing of the samples in the field or at an off-site laboratory, and direct segregation of oil-impacted soils from non-impacted soils.
- Place oil-impacted stockpiled soils in containers (such as 20-yard steel roll-off bins, super sacks, tri-wall boxes, or drums) or within lined containment areas (i.e., underlain by plastic sheeting). Drain anyliquid phase oil or fuel product associated with the soil prior to stockpiling. Remove and properly dispose of any oil observed in the excavation.
- Cover stockpiles of impacted soils and containerized soil with plastic sheeting or tarps to minimize dust, stormwater, and odor concerns.
- Stockpile soil near the project area prior to reuse.

3. RE-USE OF EXCAVATED SOILS

This plan provides general guidelines. For more details, consult Section 13 of this Document. Unimpacted soils can be used as backfill.

Excavated oil-impacted soil can be used as backfill only under the following conditions:

- The oil-impacted soil is placed within areas more than 100 feet from the harbor wall and up to 1 foot below surface grade.
- The oil-impacted soil does not contain any free oil, oil sheens, oil stains, or total petroleum hydrocarbon (TPH) concentrations exceeding 5000 parts per million (ppm).
- TPH concentration is determined either by an off-site laboratory or through use of a field test such as the paper towel or glove test described in Section 13.
- In the backfilling procedure, the more highly impacted soil should be placed at the bottom of the excavation above the tidally influenced high water table, and the cleanest soil at the top. If the surface is not to be paved, at least 1 foot of non-impacted soil must be placed as the final backfill at the top.

- Excavated soils can be used to backfill other excavations within proximity of the excavations with approval of the HEER Office.

Oil sampling and analysis may be necessary to determine whether soils are suitable and when they can be used as backfill. The HEER Office will determine if sampling is required.

If necessary, the following number of samples should be collected:

Less than 20 cy of soil:	1 sample
More than 20 cy of soil:	1 sample for each 20 cy up to the first 100 cubic yards
More than 100 cy of soil:	1 sample for every additional 100 cy

For further description of soil stockpile characterization, review the current HEER Office guidelines at www.hawaiidoh.org/tgm.aspx.

4. OFF-SITE DISPOSAL

If you intend to transport the excavated soil to an off-site disposal facility, confirm with the disposal facility the number of soil samples needed for laboratory testing, as well as the standards for disposal.

5. EQUIPMENT DECONTAMINATION

Equipment used in contaminated areas must be decontaminated before use in non-contaminated areas. All liquid and solid waste resulting from on-site decontamination must be collected and appropriately disposed of.

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-

The HEER Office should be notified if oil-impacted soils are excavated, segregated, and either backfilled or disposed of off-site. In some instances, the HEER Office may require that you obtain its approval for how you intend to excavate, manage, and backfill or dispose of soil.

Provide details of how petroleum-contaminated soil (PCS) was handled consistent with Section 13 of the EHMP:

B.6

Groundwater Management Plan

Prepared By	Groundwater Management Plan
Organization:_____	**Environmental Hazard Management Plan Iwilei District**
Name: _____	
Signature: _____	**Version:**
	Reference:
	Date:

Project Name: _____

Project Location: _____

Revise this Sample Plan by:

1 If you intend to place excavated groundwater back into an excavation or trench, contacting *the Hazard Evaluation and Emergency Response (HEER) Office at (808) 586-4249 to obtain* an appropriate disposal location.

2 If you intend to discharge extracted water to local surfaces (including storm drains), contacting the HEER Office to obtain all applicable permits and approvals ahead of time because authorizations could take weeks or months.

3 If you intend to discharge extracted water to a local sanitary sewer, contacting the City and County (C&C) for approval to dispose of that water into a sanitary sewer. Water discharged to a sanitary sewer or storm drain may be required to meet Water Quality Standards. These standards are specified in the Environmental Hazard Management Plan (EHMP), and are available from the HEER Office.

4 Reviewing the requirements of this sample plan to ensure that construction workers can handle groundwater possibly impacted by petroleum hydrocarbons which may be encountered during soil excavation.

5 Consulting the HEER office for answers to any questions.

6 Preparing your own site-specific plan.

7 Accessing additional guidance for completing this form in Section 14of the EHMP.

8 Keeping a copy of the completed form for your records and sending a copy to the HEER Office.

Implement this Plan by:

1. Ensuring that on-site workers are aware of this plan and that they follow it.

Note: If you are dealing with hazardous chemicals other than oil, oily water, and oil-impacted soil, you may need additional hazardous Chemical Response Plans and Procedures not covered in this plan.

Delete this box after completing this plan.

1. INTRODUCTION

These procedures are for handling groundwater encountered during excavation activities. Soil and groundwater may be impacted by petroleum hydrocarbons and/or dissolved metals, and may be encountered during soil excavation. Purposes of these procedures are to: (1) protect construction workers from contact with petroleum hydrocarbons and inhalation of associated vapors, and (2) protect the quality of the surface waters.

-

2. GRIUND WATER MANAGEMENT PROCEDURES

The following requirements apply to oil or oily water encountered in an excavation:

- If petroleum free product is present in the extracted groundwater, separate it from groundwater and dispose of it at an appropriate off-site facility prior to transfer of the groundwater into a nearby trench or excavation.
- At least once daily, remove oil observed floating on the groundwater during excavation activities using a vacuum truck, absorbent pads, or other methods approved by the HEER Office. Excavations should not be backfilled until the floating oil is removed to the extent practicable, which is when further use of vacuum trucks, absorbent pads, or other approved methods does not result in further floating oil removal.
- If you intend to dispose of the groundwater off site, collect and analyze water samples as required by the disposal facility.
- **CAUTION**: Avoid releases of affected groundwater to surface water bodies or areas beyond the work area.
- If you are disposing of treated or untreated groundwater in accordance with a method approved by the HEER Office or by the City or County, provide the necessary notifications and record the information.

Provide information consistent with Section 14 on handling contaminated groundwater:

B.7

Free Product Management Plan

Prepared By **Organization:**_____ **Name:** _____ **Signature:** _____	**Free Product Management Plan** **Environmental Hazard Management Plan Iwilei District** **Version:** **Reference:** **Date:**

Project Name: _____

Project Location: _____

Parties may use this sample as a basis for preparing their own site-specific Free Product Management Plan.

Revise this Sample Plan by:

1 Reviewing the requirements of this sample plan to ensure the construction worker can comply with its requirements, and modifying the plan, if necessary.

Implement this Plan by:

1. Making sure on-site workers are aware of this plan and the site-specific Health and Safety Plan (HSP), and that they follow both documents.
2. Making sure a copy of the completed plan is present at the construction site.
3. Accessing additional guidance for completing this form in Section15 of the EHMP.
4. Keeping a copy of the completed form for your records and sending a copy to the HEER Office.

Delete this box after completing this plan.

1. INTRODUCTION

These procedures are for handling free product encountered during excavation activities. Soil and groundwater may be impacted by petroleum hydrocarbons and may be encountered during soil excavation. Normally, free product is found floating on groundwater; however, it can also occur in oil- saturated soils. Purposes of these procedures are to: (1) protect construction workers from contact with petroleum hydrocarbons and inhalation of associated vapors, (2) protect the quality of surface water, and (3) provide guidance in the handling and disposal of free product.

2. FREE PRODUCT MANAGEMENT PROCEDURES

The following requirements apply to free product in soil or floating on groundwater encountered in an excavation:

- If free product is present in the extracted groundwater, it must be separated from groundwater and disposed of at an appropriate off-site facility prior to transfer of the groundwater into a nearby trench or excavation.
- At least once daily, remove oil observed floating on the groundwater during excavation activities using a vacuum truck, absorbent pads, or other methods approved by the HEER Office. Excavations should not be backfilled until the floating oil is removed to the extent practicable, which is when further use of vacuum trucks or absorbent pads, or other approved methods do not result in further floating oil removal.
- If free product is encountered in excavated soil, it must be separated from clean or moderately contaminated fill, profiled, and disposed of at an approved recycling/disposal site.
- Soil contaminated with free product cannot be used for backfill.
- **CAUTION**: Avoid releases of free product to the harbor or areas beyond the work area.

Provide details of how free product was managed (consistent with Section 15 of the EHMP) when encountered floating on groundwater or in soils:

B.8

Vapor Product Management Plan

Prepared By **Organization:**_____ **Name:** _____ **Signature:** _____	**Vapor Management Plan** **Environmental Hazard Management Plan Iwilei District** **Version:** **Reference:** **Date:**

Project Name: _____

Project Location: _____

Parties may use this sample as a basis for preparing their own site-specific Vapor Management Plan.

Revise this Sample Plan by:

1. Reviewing the requirements of this sample plan to ensure that the construction worker can comply with its requirements, and modifying the plan, if necessary.

Implement this Plan by:

1 Making sure on-site workers are aware of this plan and the site-specific Health and Safety Plan (HSP), and that they follow both documents.

2 Making sure a copy of the completed plan is present at the construction site.

3 Accessing additional guidance for completing this form in Section16 of the EHMP.

4 Keeping a copy of the completed form for your records and sending a copy to the HEER Office.

Delete this box after completing this plan.

1. INTRODUCTION

These procedures are for handling petroleum vapors encountered during excavation activities. Soil and groundwater may be impacted by petroleum hydrocarbons and may be encountered during soil excavation. This type of contamination may produce soil vapor that must be properly handled during and after construction activities. Purposes of these procedures are to: (1) protect construction workers from contact with petroleum hydrocarbons and inhalation of associated vapors, (2) protect the quality of the surface water, and (3) provide guidance in the handling soil vapors.

2. VAPOR MANAGEMENT PROCEDURES

If volatile organic compound (VOC) vapors are encountered during excavation, appropriate response actions will be taken, and the actions will conform to Hawaii Department of Health (HDOH) and U.S. Environmental Protection Agency (EPA) regulatory guidelines. The response actions include ensuring that on-site workers have the appropriate level of personal protective equipment (PPE) and the general public is not affected adversely. Anticipated tasks associated with managing VOC vapor exposure are summarized as follows:

If VOC vapors are encountered during excavation activities, field oversight must be provided to identify VOC vapors and provide health and safety guidance related to the potential exposure of workers to COCs.

- Air monitoring will be conducted during excavation associated with future construction activities. Air monitoring will also be conducted when workers are required to enter excavations where PCS or free product is present. The monitoring will include both workspace (on-site) and perimeter measurements of VOC vapors.
- If warranted by the air monitoring results, on-site workers will be notified of the need to upgrade PPE to include respiratory protection.
- Air monitoring required for confined space entry (if required) will be conducted by the contractor responsible for construction. Confined space entry and associated air monitoring requirements will be described in the site specific health and safety plan for construction.

Air monitoring required for confined space entry (if required) will be conducted by the contractor responsible for construction. Confined space entry and associated air monitoring requirements will be described in the site-specific health and safety plan (HSP) for construction.

3. Exposure Management Procedures

- Level D PPE will be appropriate for on-site workers under normal working conditions.
- Both workspace (on site) and perimeter (off site) air monitoring will occur.
- Air monitoring will be conducted using a conventional photoionization detector (PID) to measure total VOC vapor concentrations, and an Ultra-Rae PID, which is benzene-specific, to determine benzene concentrations.
- If VOC vapor concentrations in the workspace atmosphere exceed an 8-hour time-weighted average (TWA) of 20 parts per million (ppm) or a 15-minute short-term exposure limit (STEL) of 100 ppm, PPE requirements will be upgraded to Level C, and it may be necessary to implement a modified work schedule. These levels are based on a maximum benzene concentration in gasoline of 5 percent by volume.
- On-site workers will be notified immediately if benzene is detected in the workspace atmosphere at a concentration exceeding 0.5 ppm, and wearing respirators with organic

vapor cartridges will be recommended (i.e., recommended upgrade of respiratory protection to Level C).

- If benzene concentrations in the workspace atmosphere exceed the 8-hour TWA PEL (1 ppm) or the Occupational Safety and Health Administration (OSHA) 15-minute STEL (5 ppm), PPE requirements will be upgraded to Level C, and it may be necessary to implement a modified work schedule.
- If benzene concentrations in the workspace atmosphere exceed the TWA PEL (1 ppm), short-term exposure monitoring will be conducted. To determine short-term exposure, a minimum of five samples will be collected within a 15-minute period.
- If daily average benzene concentrations in the workspace atmosphere exceed the OSHA STEL (5 ppm) or benzene concentrations exceed the OSHA acceptable ceiling concentration (25 ppm), PPE will be upgraded to Level C, with either full-face respirators or powered air-purifying respirators and protective goggles.
- If benzene concentrations in the workspace atmosphere exceed the OSHA 8-hour TWA for a 40-hour work week (10 ppm) or benzene concentrations exceed the OSHA acceptable maximum peak for an 8-hour shift (50 ppm), work will be stopped immediately, the on-site representative will be notified, and workers will be requested to leave the work zone.
- If benzene concentrations along the site perimeter (off site) exceed the 15-minute STEL (5 ppm) or the TWA PEL (1 ppm), the exclusion zone will be extended beyond the property boundary.

If benzene concentrations along the site perimeter (off site) exceed the OSHA acceptable ceiling concentration (25 ppm), work will be stopped immediately and the project on-site representative will be notified.

Provide details of how soil vapor was managed (consistent with Section 16 of the EHMP) when encountered in groundwater or in soils:

B.9

Stormwater Management Plan

Prepared By **Organization:**_____ **Name:** _____ **Signature:** _____	**Stormwater Management Plan** **Environmental Hazard Management Plan Iwilei District** **Version:** **Reference:** **Date:**

Project Name: _____

Project Location: _____

Parties may use this sample as a basis for preparing their own site-specific Stormwater Management Plan.

Revise this Sample Plan by:

1. Reviewing the requirements of this sample plan to ensure that the construction worker can comply with its requirements, and modifying the plan, if necessary.

Implement this Plan by:

1. Making sure on-site workers are aware of this plan and that they follow it.
2. Making sure a copy of the completed plan is present at the construction site.
3. Accessing additional guidance for completing this form in Section17 of the EHMP
4. Keeping a copy of the completed form for your records and sending a copy to the HEER Office.

Delete this box after completing this plan.

1. INTRODUCTION

If contaminated soil or groundwater is encountered during excavation, appropriate response actions will be taken, and the actions will conform to Hawaii Department of Health (HDOH) and U.S. Environmental Protection Agency (EPA) regulatory guidelines. The response actions include ensuring that these media are not exposed to stormwater. Anticipated tasks associated with managing stormwater are summarized below.

- **STORMWATER MANAGEMENT PROCEDURES**

Field oversight will be provided during excavation activities conducted as part of construction. Purposes of the oversight are to identify contaminated media that could be exposed to stormwater runoff and to provide guidance related to controlling stormwater on the property. In addition, the weather will be monitored throughout each work day for signs of approaching storms and/or heavy rains.

Inspections of engineering stormwater controls will occur each day to minimize potential for exposure of contaminated media to stormwater runoff and minimize potential for contaminated stormwater to leave the construction site.

All construction will accord with the conditions of an HDOH-approved National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharge associated with construction activity. Conditions of the permit include preparation of a Construction Site Best Management Practices Plan.

2. OPEN EXCAVATIONS

In the absence of engineering and administrative controls, PCS and/or groundwater exposed in open excavations could come into contact with stormwater, thus potentially contaminating the stormwater with contaminants of concern (COC). To prevent this, the following activities will occur:

- Where possible, excavations will be backfilled as soon as practicable to limit the time they are open and potentially exposed to stormwater runoff and direct precipitation.
- Where possible, the edges of excavations will be bermed, thus minimizing potential for entry of stormwater runoff.
- Open excavations will be inspected each day to minimize potential for direct precipitation to cause the excavation to overflow.

3. SOIL STOCKPILES

In the absence of engineering and administrative controls, excavated petroleum-contaminated soil (PCS) stored in stockpiles could come into contact with stormwater, thus potentially contaminating the stormwater with COCs. To prevent this, the following activities will occur:

- Soil stockpiles will be placed on plastic sheeting, and the sheeting will be bermed at the edges, thus minimizing potential for contact with stormwater runoff.

- At the end of each day, or in the event of a storm, the soil stockpiles will be covered with plastic sheeting, thus minimizing potential for contact with direct precipitation.
- The soil stockpiles will be inspected each day to ensure that the plastic sheeting is intact.

4. DEWATERING INFILTRATION PITS

In the absence of engineering and administrative controls, water in infiltration pits used for on-site dewatering could come into contact with stormwater. To prevent this, the following activities will occur:

- Where possible, infiltration pits will be backfilled as soon as practicable to limit the time they are open and potentially exposed to stormwater runoff and direct precipitation.
- Where possible, the edges of infiltration pits will be bermed, thus minimizing potential for entry of stormwater runoff.
- Infiltration pits will be inspected each day to minimize potential for direct precipitation to cause the pit to overflow.

Erosion and sediment control measures will be in place and functional before construction activities commence. These measures will be maintained throughout the construction period. If stormwater discharge from the site is anticipated, the following preventive measures may be implemented:

- Stormwater flowing toward active construction areas will be diverted using appropriate control measures, as practicable.
- Erosion control measures will be designed to handle the size of the disturbed or drainage area in order to detain runoff and trap sediment.
- Height of the property boundary can be increased using sandbags.
- Additional silt fencing will be added at affected property boundaries, if warranted.
- Berms surrounding soil stockpiles will be increased as necessary.
- Moveable booms will be available to contain spills.
- Absorbent pads will be employed if free product is observed in stormwater runoff.

Provide details of how stormwater was managed (consistent with Section 17 of the EHMP) when a significant storm event occurred during construction:

ARTICLE XI – MOBILIZATION

11.1 GENERAL

A. Related Documents - The General Provision of the contract, including the General Provisions for Construction Projects (2016) and General Requirements of the Specifications, apply to the work specified in this Section.

B. General Requirements - Section 699 of "Hawaii Standard Specifications for Road and Bridge Construction, 2005," are hereby incorporated into and made a part of these specifications by reference unless otherwise modified hereinafter.

C. Mobilization - The Contractor shall mobilize and transport his construction plant and equipment including materials and supplies for operation to the site of work, construct temporary buildings and facilities as necessary, and assemble the equipment at the site as soon as possible after receipt of Notice to Proceed, subject to the provisions of the General Provisions.

D. Demobilization - The Contractor shall demobilize and transport his construction plant and equipment including materials, supplies and temporary buildings off the site as soon as possible after construction is completed. Demobilization shall include all cleanup required under this contract and as directed by the Engineer. Demobilization and final cleanup shall be completed prior to final acceptance.

E. Performance Bond

1. The Contractor shall file and pay for the performance and payment bonds according to Section 2.24 of the General Provisions, except that the value of the bonds shall equal one hundred percent (100%) of the amount of the contract basic bid amount plus one hundred percent (100%) of the amount of the extra work.

2. Payment for the Contractor's bond premium will be made as part of mobilization in accordance to the terms stated in Section 11.4 below.

11.2 MATERIALS (Not Applicable)

11.3 EXECUTION (Not Applicable)

11.4 MEASUREMENT AND PAYMENT

A. Method of Measurement

1. Mobilization shall not be measured for payment. The maximum bid allowed for "Mobilization" is an amount not to exceed six (6) percent of the sum of all items (excluding this item). If the proposal submitted by the

bidder indicates an amount in excess of the allowable maximum, the indicated amount or amounts shall be reduced to the allowable maximum; the "Total Amount for Comparison of Bids," in the proposal schedule shall be adjusted to reflect any such reduction. For the purposes of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the "Total Amount for Comparison of Bids" adjusted in accordance with the foregoing shall be used and the bidder's proposal shall be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith."

2. Demobilization will not be measured for payment.

B. Basis of Payment

1. Mobilization will be paid for at the contract lump sum price under Mobilization. Partial payment will be made as follows:

   i. When 2 1/2 percent of the original contract amount is earned, 50 percent of the bid amount will be paid.

   ii. When 5 percent of the original contract amount is earned, 75 percent of the bid amount will be paid.

   iii. When 10 percent of the original contract amount is earned, 100 percent of the bid amount will be paid.

   iv. Nothing herein shall be construed to limit or preclude partial payments otherwise provided by the contract.

C. Payment for Mobilization shall be made as described in Article X of these Specifications.

ARTICLE XII – TEMPORARY WATER POLLUTION, DUST, AND EROSION CONTROL
For Project NOT Subject to NPDES NOI-C Permit

12.1 DESCRIPTION - This section is required for all work, including the Contractor's storage sites. It describes the following:

A. A detailed site-specific Best Management Practice (BMP) Plan including diagrams and narratives; constructing, maintaining, and repairing temporary water pollution, dust, and erosion control measures at the project site including local material sources, work areas and access roads; removing and disposing of wastes and hazardous wastes; and control of fugitive dust (defined as uncontrolled emission of solid airborne particulate matter from any source other than combustion). Additionally, all projects at Honolulu, Kalaeloa Barbers Point, and Kahului Harbors are subject to State of Hawaii, Department of Transportation (HDOT) Harbors Division, Storm Water Management Plan (SWMP) requirements, unless exempted, and are subject to Harbors Storm Water BMP inspections. If any requirement conflicts with those administered by State of Hawaii, Department of Health (HDOH), the Contractor shall follow the more stringent requirement.

B. Compliance with applicable federal and other state permit conditions.

C. Work associated with dewatering and hydrotesting activities and compliance with conditions of the NPDES general permit coverage authorizing discharges associated with construction activity dewatering and hydrotesting.

12.2 GENERAL REQUIREMENTS - In order to provide for the control of water pollution, dust, and erosion arising from the construction activities of the Contractor and his subcontractors in the performance of this contract, the work performed shall comply with all applicable federal, state, and local laws and regulations concerning water pollution control including, but not limited to, the following regulations:

A. State of Hawaii, HDOH, Hawaii Administrative Rules (HAR) Chapter 11-54 – Water Quality Standards and Chapter 11-55 – Water Pollution Control.

B. For projects at Honolulu, Kalaeloa Barbers Point, and Kahului Harbors ONLY, HDOT Harbors Division, Storm Water Management Plan.

C. For projects at Honolulu, Kalaeloa Barbers Point, and Kahului Harbors ONLY, City and County of Honolulu (CCH), Rules Relating to Water Quality.

D. For projects at Honolulu, Kalaeloa Barbers Point, and Kahului Harbors ONLY, CCH, Storm Water BMP Manual for Construction.

E. 40 CFR Part 110, Environmental Protection Agency (EPA), Discharge of Oil.

F. 40 CFR Part 117, EPA, Determination of Reportable Quantities for Hazardous Substances.

G. 40 CFR Part 261, EPA, Identification and Listing of Hazardous Waste.

H. 40 CFR Part 302, EPA, Designation, Reportable Quantities, and Notification.

I. 49 CFR Part 171, U.S. Department of Transportation, Hazardous Materials Regulations.

12.3 MATERIALS - Materials shall conform to the following when applicable:

A. Slope Drains. Slope drains may be constructed of pipe, fiber, mats, erosion control fabric, geotextiles, rubble, Portland cement concrete, bituminous concrete, plastic sheets, or other materials acceptable to the Construction Engineer.

B. Grass. Grass shall be quick growing species such as rye grass, Italian grass, or cereal grasses. Grass shall be suitable to the area and provide a temporary cover that will not compete later with permanent cover. Alternative grasses are allowable if acceptable to the Construction Engineer.

C. Fertilizer and Soil Conditions. Fertilizer and soil conditioners shall be a standard commercial grade acceptable to the Construction Engineer.

D. Silt Fences. Silt fences shall be synthetic filter fabric mounted on posts and embedded in compacted ground in compliance with American Society for Testing and Materials (ASTM) D6462-03, Standard Practice for Silt Fence Installation.

E. Berms. Berms shall be gravel or sand wrapped with geotextile material. Alternate materials are allowable if acceptable to the Construction Engineer.

F. Alternate materials or methods to control, prevent, remove, and dispose of pollution are allowable if acceptable to the Construction Engineer.

12.4 CONSTRUCTION

A. Preconstruction Requirements.

1. Temporary Water Pollution, Dust, and Erosion Control Meeting. The contractor shall be required to submit a site-specific BMP Plan to the Construction Engineer and address all comments by the Construction Engineer. After the Plan is accepted in writing by the Construction Engineer, the Contractor shall schedule a meeting with the Construction Engineer before the start of construction work to discuss the sequence of work, and plans and proposals for water pollution, dust, and erosion control.

2. Temporary Water Pollution, Dust, and Erosion Control Submittals. The Contractor shall submit the site-specific BMP Plan to the Construction Engineer prior to the start of work for review of compliance with this Article.

   a. Written site-specific BMP Plan shall include the following as applicable:

      1) Identification of potential pollutants and their sources and other factors that may cause water pollution, dust, and erosion.

      2) A list of all material and heavy equipment to be used during construction. Vehicles and equipment shall be well maintained and free from any type of fluid leaks.

      3) Construction schedule.

      4) Name(s) of specific individual(s) designated responsible for water pollution, dust and erosion controls on the project site. Include home, business, and cellular telephone numbers, fax numbers, and e-mail addresses.

      5) Descriptions of the methods and devices used to eliminate certain pollutants (e.g., wastewater, fuels, solvents, detergents, toxic or hazardous substances) from discharging into state waters and drainage systems, and provide details of BMP(s) to be installed or utilized. Indicate approximate dates when BMP(s) will be installed and removed.

      6) Description of maintenance and subsequent removal of BMP(s).

      7) Method(s) of removal and disposal of solid and regulated hazardous wastes encountered or generated during construction. The Contractor is advised to procure regulated hazardous materials on an as-needed basis, as feasible. All excess regulated hazardous materials at the conclusion of this project shall remain the property of the Contractor and shall be removed from HDOT Harbors Division property upon the completion of the project.

      8) Method(s) of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydrodemolition water.

9) Method(s) of containing, removing and disposing of demolition dust and debris to minimize the discharge of these pollutants into state waters and drainage systems.

10) Spill kit contents and location.

11) Fugitive dust control, including dust from grinding, sweeping, or brooming off operations or combination thereof.

12) Method(s) of storing and handling of regulated hazardous materials (e.g. oils, paints) and other products used for the project. Safety Data Sheets (SDS) for all regulated hazardous materials used during construction activities shall be kept on-site throughout the duration of the project and readily available upon inspection. All containers of regulated hazardous materials should be provided with secondary containment during storage. Regulated hazardous materials not specifically needed in the execution of this project shall not be brought or stored on site. As feasible, the Contractor is encouraged to use products that do not contain any regulated constituents. The use of green products is encouraged.

13) Method(s) of concrete washout/waste control.

14) Method(s) of managing material stockpiles to minimize erosion and dust.

15) Good housekeeping practices.

a) Minimize tracking of sediment offsite from project entrances and exits.

b) Litter management. The Contractor shall have a comprehensive housekeeping policy and shall actively enforce housekeeping requirements. Housekeeping items include, but are not limited to, cups, cans, bottles and other forms of lightweight litter, unattended containers of hazardous materials, concrete debris (e.g. dust, chips, and other sweepings), and discarded articles of disposable Personal Protective Equipment (e.g., earplugs, dust masks, and gloves). Employees who are specifically tasked with housekeeping duties shall be identified by name.

c) The Contractor should provide and maintain covered waste receptacles. No construction debris or other refuse that is generated as a result of project activities is to be disposed in HDOT Harbors Division-owned waste receptacles.

16) Provide plan(s)/drawing(s) showing location of followings when applicable:

a) Boundaries of the property and the locations where construction activities will occur, including:

i. Locations where earth-disturbing activities will occur (noting any sequencing of construction activities);

ii. Approximate slopes and drainage patterns with flow arrows before and after the construction;

iii. Locations where sediment, soil, or other construction materials will be stockpiled;

iv. Locations of any contaminated soil or contaminated soil stockpiles;

v. Locations of any crossings of state waters;

vi. Designated points on the site where vehicle will exit onto paved roads;

vii. Locations of structures and other impervious surfaces upon completion of construction; and

viii. Locations of construction support activity areas.

b) Locations of all state waters, including wetlands and indicate which water bodies are listed as impaired.

c) The boundary lines of any natural buffers.

d) Topography of the site, existing vegetative cover, and features (e.g., forest, pasture, pavement, structures), and drainage pattern(s) of storm water

onto, over, and from the site property before and after major grading activities.

e) Storm water discharge locations, including locations of any storm drain inlets on-site and in the immediate vicinity of the site to receive storm water runoff from the project; and locations where storm water will be discharging to state waters (including wetlands).

f) Locations of all potential pollutant-generating activities.

g) Locations of storm water control measures; and

h) Locations where chemicals will be used and stored.

17) Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Parts 110, 117, or 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available.

18) The Contractor shall date and sign the site-specific BMP Plan.

b. The Contractor shall keep the accepted Plan on-site or at an easily accessible location throughout the duration of the project. Revisions to the Plan shall be included with the original plan. Modify contract documents to conform to revisions. Include actual date of installation and removal of BMP. Obtain written acceptance by the Construction Engineer before revising BMP. An updated Plan shall be kept on-site throughout the remainder duration of the project.

The Contractor shall follow guidelines in the "*The City and County of Honolulu Storm Water Best Management Practice Manual – Construction*," (dated November 2011) in developing, installing, and maintaining BMP for the project. Additionally, the Contractor shall follow applicable CCH *Rules Relating to Water Quality* **for all projects at Honolulu, Kalaeloa Barbers Point, and Kahului Harbors**, and use respective Soil Erosion Guidelines for other Maui, Kauai and Hawaii County projects. Information can be found at the respective County websites.

B. Construction Requirements are as follows.

1. No work shall be allowed to begin until submittals detailed in Subsection 12.4.A.2 – Temporary Water Pollution, Dust, and Erosion Control Submittals are completed and accepted in writing by the Construction Engineer. The Contractor shall prevent pollutants from entering state waters. These efforts shall address areas such as those that drain to water, are over water, or drain to storm drains adjacent and in the area of the project site. The Contractor shall design, operate, implement, and maintain the Plan to ensure that storm water discharges associated with construction activities will not cause or contribute to a violation of applicable state water quality standards.

2. All projects at Honolulu, Kalaeloa Barbers Point, and Kahului Harbors are subject to HDOT Harbors Division SWMP requirements for construction at those harbors unless the project meets a specified exemption class. The requirements include, but are not limited to, construction site BMP initial, recurring (i.e. every two weeks from October through March and every two months otherwise), and final inspections at the frequencies outlined in the SWMP. No grading or land disturbance activities are allowed until the initial BMP inspection is completed and required BMPs are found to be properly installed.

3. Address all comments received from the Construction Engineer.

4. Modify and resubmit plans and construction schedules to correct conditions that develop during construction which were unforeseen during the design and pre-construction stages.

5. Coordinate temporary control provisions with permanent control features throughout the construction and post-construction period.

6. BMP shall be in place and operational until the construction is completed and accepted by Harbors.

7. Install and maintain either or both stabilized construction entrances and wheel washes to minimize tracking of dirt and mud onto roadways. Restrict traffic to stabilized construction areas only. Clean dirt, mud, or other material tracked onto the road immediately. Modify stabilized construction entrances to prevent mud from being tracked onto roadways.

8. Chemicals may be used as soil stabilizers for either or both erosion and dust control if acceptable to the Construction Engineer.

9. Cover exposed surface of materials completely with tarpaulin or similar device when transporting aggregate, soil, excavated material or material that may be a source of fugitive dust. Protect and cover any soil stockpiles from rain and runoff including at the end of each day.

10. Cleanup and remove any pollutant that can be attributed to the Contractor.

11. Install or modify BMP due to change in the Contractor's means and methods, or for omitted condition that should have been allowed for in the accepted site-specific BMP Plan or a BMP that replaces an accepted site-specific BMP that is not satisfactorily performing.

12. Properly maintain BMP.

13. Remove, replace or relocate any BMP that must be removed, replaced or relocated due to potential or actual flooding, or potential danger or damage to the project or public.

14. The Contractor's designated representative specified in Subsection 12.4.A.2.a.4 shall address any BMP concerns brought up by the Construction Engineer within 24 hours of notification, including weekends and holidays. Should the Contractor fail to satisfactorily address these concerns, the Construction Engineer reserves the right to employ outside assistance or use the Construction Engineer's own labor forces to provide necessary corrective measures. The Construction Engineer will charge the Contractor such incurred costs plus any associated project engineering costs. The Construction Engineer will make appropriate deductions from the Contractor's monthly progress estimate. Failure to apply BMP shall result in either or both the establishment and increase in the amount of retainage due to unsatisfactory progress or withholding of monthly progress payment. Continued failure to apply BMP may result in one or more of the following: The Contractor being fully responsible for all additional costs incurred by HDOT Harbors Division including any fines levied by HDOH, suspension of the Contract, or cancellation of the Contract.

C. Hydrotesting Activities. If work includes removing, relocation or installing waterlines, and the Contractor elects to flush waterline or discharge hydrotesting effluent into state waters or drainage systems, obtain a Notice of General Permit Coverage (NGPC) authorizing discharges associated with hydrotesting waters from the HDOH Clean Water Branch (CWB). If a permit is required, prepare and submit permit application (CWB-Notice of Intent (NOI) Form F) to the HDOH CWB.

Do not begin hydrotesting activities until the HDOH CWB has issued a NGPC. Hydrotesting operations shall be in accordance with conditions in the NGPC. Submit a copy of the NPDES Hydrotesting Waters Application and Permit to the Construction Engineer.

D. Dewatering Activities. If excavation of backfilling operations requires dewatering, and the Contractor elects to discharge dewatering effluent into state waters or existing drainage systems, obtain an NGPC authorizing discharges

associated with construction activity dewatering from the HDOH CWB. If a permit is required, prepare and submit permit application (CWB-NOI Form G) to the HDOH CWB.

Do not begin dewatering activities until the HDOH-CWB has issued an NGPC. Conduct dewatering operations in accordance with the conditions in the NGPC. Submit a copy of the NPDES Dewatering Application and Permit to the Construction Engineer.

12.5 PAYMENT

Payment for Temporary Water Pollution, Dust, and Erosion Control shall not be measured and paid for separately but shall be considered incidental to the applicable items described in Article X of these Specifications.

No progress payment will be authorized until the Construction Engineer accepts in writing the site-specific BMP Plan or when the Contractor fails to maintain the project site in accordance with the accepted BMP Plan.

The Contractor shall reimburse the State of Hawaii within 30-day for the full amount of all outstanding costs incurred by the State of Hawaii for all citations or fines received as a result of the Contractor's non-compliance with regulations.

ARTICLE XIII - PVC SEWER PIPE

13.1 GENERAL

This section shall govern the furnishing and installing of the polyvinyl chloride (PVC) s e w e r piping. Unless otherwise indicated, PVC pressure pipe and fittings shall be utilized for sewer piping.

13.2 SUBMITTALS

A. Shop drawings, brochures, installation instructions, certifications, as-built drawings, and other data shall be submitted to the Engineer in accordance with GENERAL PROVISIONS Section 5.2, "Submittals."

B. Certifications shall include manufacturer's certification that all PVC pipe and fittings used for the sewer lines for the Project meet the minimum requirements set forth in the Contract Documents and in standards nationally adopted by the industry for C-900 PVC pipe and fittings, and C-907 PVC fittings for characteristics which may include, but not be limited to, PVC cell classification, elastomeric gasketed bell and spigot joint, size, shape, strength, chemical resistance, and pressure rating.

13.3 MATERIALS

A. Polyvinyl Chloride (PVC) Pipe

1) PVC Pipe

Gravity pipes shall be PVC pressure pipe in compliance with AWWA C-900. PVC pipe shall be the Cast-Iron-Pipe Equivalent O.D. type, DR 18. Pipe joints shall be bell and spigot with an elastomeric gasket.

PVC pipe for sewer shall be furnished complete with couplings of the same type and composition as the pipe, gaskets conforming to ASTM F 477, and required lubricants. All gaskets and lubricants shall be made from materials that are compatible with the plastic material and with each other when used together, are suitable for sewer systems, and will not support the growth of bacteria.

2) PVC Fittings

Fittings shall have elastomeric-gasket type joints suitable for sewer service and shall be compatible with C-900 PVC pipes.

13.4 CONSTRUCTION DETAILS

A. PVC Pipe and Fittings

1) PVC pipe and fittings for the sewer lines for this Project shall be installed according to the requirements of the pipe and fittings manufacturers, the Contract Documents, and as directed by the Engineer.

2) The Contractor shall visually inspect and test all pipes and appurtenances prior to the installation and shall assume full responsibility for the soundness of the pipes and appurtenances installed.

3) Trench excavation shall be as specified in Article XIV Trench Excavation and Backfill.

The Contractor shall provide Pipe Bedding as shown on the plans and as specified in Article XIV Trench Excavation and Backfill.

4) Inspect each pipe and fitting before and after installation; replace those found defective and remove from site.

5) Pipes shall be laid to the lines and grades as shown on the Plans and shall form continuous pipe sections, with a smooth uniform invert. Bending of PVC pipes will not be allowed. Provide batterboards not more than 16 feet apart in trenches for checking and ensuring that pipe invert elevations are as indicated. Laser beam method may be used in lieu of batterboards for the same purpose. The use of concrete blocks and wood wedges to adjust the pipe to proper line and grade is prohibited for crushed rock bedding. Laying of pipe shall commence at the lowest point, with the spigots facing in the direction of flow. Pipe shall be fitted together and matched so that when laid, it will form a sewerline with a smooth and uniform invert. Couplings of any type will not be permitted except as shown on the Plans

6) Install pipe and fittings in accordance with the requirements of Uni-Bell PVC Pipe Association (UBPPA) UNI-PUBB-6, "Installation Guide for Solid-Wall PVC Sewer Pipe" and ASTM D2321, "Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications." Make push-on joints with the elastomeric gaskets specified for this type of joint, using elastomeric-gasket bell-end pipe or, where allowed, elastomeric-gasket couplings. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel; for push-on joint connections to fittings, cut spigot end of pipe off square and bevel pipe end as recommended by the pipe and fitting manufacturers. Use an approved lubricant recommended by the pipe

manufacturer for the push-on joints. Assemble the push-on joint connections in accordance with the requirements.

All burrs and rough edges from cutting, grinding, filing or from the manufacturing process shall be sanded smooth to provide a smooth interior pipe surface. Any protrusions, abrupt changes and rough surfaces inside the pipe must be avoided to prevent accumulation of debris that leads to clogging and increased maintenance.

7) Provide proper facilities for lowering sections of pipe into trenches. Adjust spigots in bells to give a uniform space all around. Blocking or wedging between bells and spigots will not be permitted. Replace by one of the proper dimensions, pipe or fittings that do not allow sufficient space for installation of joint material. For crushed rock bedding, bell holes at each joint shall be provided in the bedding to permit the joint to be made properly.

Prior to the installation of a section of pipe, the circumference of the spigot end shall be marked to show the depth of the bell of the pipe. Upon proper embedding of the spigot end of the pipe against the bell, the pipe shall be pushed "home" to the preset mark on the pipe.

The pipe and fittings shall be laid in such a manner that the joints shall not be subjected to undue stresses. Pipes which may float during construction shall be restrained from movement as recommended by the manufacturer. In accordance with the pipe manufacturer's recommendations, the beveled end of the spigot shall be stopped short of being bottomed out in the bell to allow for sufficient gap for pipe expansion and avoid undue stresses and possible pipe breakage.

8) The interior of the pipe shall be cleared of all dirt, joint compound, and superfluous or foreign material as the work progresses. Such material shall be contained and removed. Exposed ends of sewer lines shall be closed with approved temporary covers to prevent water, earth and debris from entering the pipe before leaving the site for the night. Should water, mud, and/or any other material enter any joint after the pipe has been laid in the trench, the joints thus affected shall be opened up either by removal of the pipes or by pulling the joints apart, and the joint thoroughly cleaned and replaced. Pipes which become submerged in water during the night shall be carefully checked each morning, and pipes found "floated" from their proper positions shall be relaid by the Contractor at his own expense.

9) Because of the nature of PVC pipe and fittings, the Contractor shall exercise appropriate care in handling, loading, unloading, and storing such pipe and fittings so as to avoid damage. Before use, the pipe and fittings shall be properly stored per the manufacturer's recommendations. During

transportation, vehicles with beds long enough to allow the lengths of pipe to lay flat shall be used. Defective pipe or fittings shall not be accepted. All pipes and fittings shall be covered with a minimum of 3" of an approved backfill material within 24 hours of passing the leakage test in the trench.

10) Any pipe, fittings or appurtenances which has been installed and proved defective shall be removed and replaced by the Contractor at no additional cost to the State.

11) The Contractor shall center load pipes with sufficient backfill to prevent arching and whipping under pressure. Joints shall be left exposed for inspection by the Engineer during pressure testing.

12) Leakage Tests

All gravity sewers and fittings shall be tested for leakage by low pressure air testing per manufacturer's recommendations.

B. Structure Connections

1) PVC pipe and fittings shall conform to respective sections for those pipe types.

2) Grouted wall fitting for PVC pipe connections shall be as indicated in the Contract documents using a PVC bell X spigot gasketed manhole fitting of PVC pipe class matching the PVC sewer pipe and fabricated to length as required or a spigot x spigot nipple as required.

3) Pipe connections utilizing watertight and flexible resilient connectors per ASTM C923 shall be of manufacturer and type as approved by the Officer-In-Charge. The connector shall be suitable for the pipe being connected to the manhole or wall. Metal components shall be stainless steel.

4) All concrete surfaces shall be cleaned in accordance with the recommendations of product manufacturers for the grout to be used. All dirt, dust, unsound concrete, and other foreign materials shall be completely removed.

5) A premixed, non-shrink cement based grout consisting of hydraulic cement, graded silica aggregates, and special blend of powders and special plasticizing and accelerating agents shall be used to fill the area between the field sleeve and manhole wall. Set time (ASTM C191) shall be less than 30 minutes. One hour compressive strength (ASTM C109) shall be a minimum of 200 psi and the ultimate compressive strengths (ASTM C109) shall be a minimum of 5000 psi.

13.5 PAYMENT

Payment for PVC Sewer Pipe shall be made as described in Article X of these Specifications.

ARTICLE XIV - TRENCH EXCAVATION AND BACKFILL

14.1 GENERAL

A. Description

i) The work specified in this Section includes the minimum requirements for the design, installation, and performance of trench for the construction of the new storm drain lines as specified on the Plans (Contract Drawings) and required by the Contractor's means and methods.

ii) The Contractor shall be responsible to design, furnish, install, and maintain a full-perimeter excavation support system for each open excavation that is compatible with the site conditions. Design and construction of the open excavations and support systems shall include all bracing and associated supports to retain the excavations in a safe manner, minimize adjacent ground movements, and control groundwater inflows into the open excavations.

iii) Open excavations with temporary construction slopes are not allowed due to the presence of nearby existing roadways, utilities, facilities, structures, and private properties. No blasting will be allowed for excavations.

iv) The work shall include development of construction staging areas; verification of all existing utilities in the work areas; protection and support of existing utilities adjacent to and/or crossing the open excavations; implementation of required traffic control measures; furnishing and installation of fencing and signage; design and construction of the excavation support systems for the open excavations; implementation of groundwater control measures; disposal of uncontaminated excavated material; control and disposal of uncontaminated surface water, groundwater, and construction water; and site restoration. All open excavations and construction staging areas shall be restored to the original or better conditions acceptable to the Engineer.

v) Open excavations shall be designed and constructed to properly install the storm drain lines and associated connections in locations as shown on the Plans and in accordance with the Contract requirements.

vi) Perform open excavation construction work in accordance with all applicable permits obtained by the Contractor for the project.

vii) Take all precautions necessary to protect existing facilities and structures from damage during construction. Repair any existing facilities or structures adversely impacted and/or damaged by open excavation activities immediately, at no additional cost to the State.

B. References

i) HDOT Standard Specifications for Road and Bridge Construction:

Standard Specifications for Road and Bridge Construction, Hawaii Department of Transportation, 2005.

ii) American Society for Testing Materials (ASTM):

ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D422	Standard Test Method for Particle-Size Analysis of Soils
ASTM D1556	Density and Unit Weight of Soil in Place by the Sand Cone Method
ASTM D1557	Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft lbf/cu. ft.) (2,700 kN m/cu. m.)
ASTM D2167	Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D5035	Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
ASTM D6913	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

iii) Codes:

Occupational Safety and Health Administration (OSHA) Regulations, 29 CFR Part 1926 Subpart P – Excavations

C. Design Criteria

General: Design the excavation support systems to prevent running, raveling, and flowing subsoils from caving or flowing into the open excavations; prevent bottom instability (heave and/or boiling); adequately withstand lateral earth pressures, hydrostatic pressures, and surcharge loads to allow safe construction of the storm drain lines without undue movement or settlement of the adjacent ground; and prevent causing adverse impact and damage to adjacent buildings, structures, roadways, and utilities.

D. Quality Assurances

i) General: Prior to submitting bid, the Contractor shall make an inspection of the areas within the vicinity of the project, the immediate area of the work, and all overhead utilities; become thoroughly familiar with the natural and man-made features; and perform all necessary engineering evaluation pertaining to planning and pricing of the work.

ii) Regulations: Perform all work in accordance with applicable regulations, permits, and codes of all Federal, State, and local agencies. All muck handling, transportation, and disposal shall be performed in accordance with applicable regulations and codes of federal, state, and local authorities having jurisdiction.

iii) Permits: The Contractor shall procure and pay for all necessary permits or certificates that may be required in connection with the open excavation work.

iv) Tolerances: Location of the excavation supports shall be in accordance with the support system design requirements as shown on the shop drawings approved by the Contractor's design engineers and accepted by the Engineer, and as required to protect existing roadways, adjacent utilities, facilities, and structures, and other improvements from damage.

v) If the Contractor's construction activities are jeopardizing the integrity and stability of any existing structures or utilities, the Contractor shall stop work immediately. A new or revised plan shall be submitted for review and acceptance by the Engineer before work can resume. All costs and time delays associated with such stop work shall be the Contractor's sole responsibility.

E. Safety

All excavations and support systems for open excavations shall conform to applicable OSHA excavation, trenching, and shoring standards, which are contained in the code of Federal Regulations 29 CFR Subpart P – Excavations.

14.2 PRODUCTS

A. Materials

Satisfactory materials shall consist of material conforming to the following:

i) Bed Course Material: Section 706.13 Bed Course Material for Crushed Rock Cradle of the Standard Specifications for Road and Bridge Construction, Hawaii;
ii) Trench Backfill: Section 703.21 Trench Backfill Material of the Standard Specifications for Road and Bridge Construction, Hawaii;
iii) Geotextile: Section 716.03 Geotextiles for Underdrain Applications of the Standard Specifications for Road and Bridge Construction, Hawaii Department of Transportation, 2005;
iv) AC Pavement: Section 401 Hot Mix Asphalt Pavement of the Standard Specifications for Road and Bridge Construction, Hawaii;
v) Tack Coat: Section 407 Tack Coat of the Standard Specifications for Road and Bridge Construction, Hawaii;
vi) Base Course Material: Section 304 Aggregate Base Course of the Standard Specifications for Road and Bridge Construction, Hawaii;
vii) Warning Tape: 5 mil x 3 inch wide min., polyethylene, APWA approved color;
viii) Reinforcing Steel: Section 709 Reinforcing Steel, wire Rope and Prestressing Steel of the Standard Specifications for Road and Bridge Construction, Hawaii;
ix) Concrete: Section 601 Structural Concrete of the Standard Specifications for Road and Bridge Construction, Hawaii;
x) A-Lok/Link Seal: A-Lok: Z-Lok product; Link Seal: Link Seal BS316 product;
xi) Mortar/Grout: Section 701 Hydraulic Cement and Section 703 Aggregates of the Standard Specifications for Road and Bridge Construction, Hawaii; and
xii) Striping Paint: Section 755 Pavement Marking Materials of the Standard Specifications for Road and Bridge Construction, Hawaii.

14.3 EXECUTION

A. General Requirements

i) Notify the Engineer at least fifteen (15) working days before beginning any excavation.

ii) Begin site development of staging areas and open excavations only after submittals have been reviewed and accepted for documentation by the Engineer.

iii) Methods of construction for open excavations selected by the Contractor shall ensure the safety of the work, the Contractor's employees, the State's personnel and agents, and the public; and protect the existing roadways, adjacent utilities, facilities, structures, properties, and other improvements.

iv) Before beginning construction at any open excavation location, accurately locate all existing utilities within and 10 feet beyond the planned excavation and associated work limits using as-built drawings, potholing, or other appropriate utility location techniques. Indicate utility locations on ground surface with paint or other permanent marking material. During the work, adequately protect any existing adjacent buildings, structures, utilities, signs, trees, shrubs, and facilities from damage. Design excavation support systems to minimize deformations that could damage adjacent buildings and other structures, and utilities. The repair of or compensation for damage to existing utilities, buildings, structures, roadways, or other facilities shall be at no cost to the State.

v) Perform open excavations using hand excavation or conventional mechanical excavation techniques in accordance with accepted work plans. No blasting will be allowed.

vi) Install excavation support systems in accordance with submittals, which have been reviewed and accepted by the Engineer.

vii) Maintain existing surface drainage conditions around all open excavations.

viii) Bottom Preparation: The bottoms of open excavations and trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe or structure foundation. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing.

ix) Removal of Unstable Material: Where unstable material is encountered at the bottom of the open excavation, such material shall be removed and replaced to the proper grade with the proper material.

x) Take all precautions necessary to prevent dust and dirt nuisance to adjacent properties. Correct and repair any damage resulting from dust and dirt at no additional cost to the State.

xi) Repair and restore any damage from ground settlements and/or movements caused by open excavation and associated work at no additional cost to the State.

B. Disposal of Excavated Materials and Muck

i) Temporary stockpiling within staging areas and adjacent to open excavations is not permitted.

ii) Muck shall be disposed of at a designated site or landfill selected by the Contractor in compliance with all applicable government regulations and codes of Federal, State, and local authorities having jurisdiction.

iii) Permits: Before proceeding, the Contractor shall obtain all required permits.

iv) Dust Control: The Contractor shall minimize and control dust raised during muck handling and disposal.

v) Drainage from muck materials shall not be allowed to discharge beyond the staging areas into the public roadway drainage systems.

vi) The Contractor shall perform visual inspection of all muck or spoils excavated during the project and also screen the muck and spoils for the presence of contamination. If visual contamination is observed, use a real time HNU photoionization detector with a 10.2 electron volts (eV) lamp or equivalent that is calibrated daily in accordance with the manufacturer's recommendations and screen the truck load with the detector at least three (3) times as the truck is being loaded and notify the Engineer if any of the readings exceeds 5 ppm.

vii) The muck shall be tested as required by the acceptance policies of the approved disposal site or the owner of the approved site. Uncontaminated materials shall be taken to the disposal site and be disposed of in accordance with the requirements of the disposal site.

viii) The Contractor is responsible to immediately contain and remove all spilled dirt, washing or cleaning water from the site, and discharge in accordance with all applicable government requirements.

ix) Requirements for Haulers:

a. The Contractor shall ensure that all drivers in the hauling of muck have in their possession a valid Class One Hawaii Driver's License, required vehicle registration and licensing, and all required vehicle insurance coverage.

b. Haul trucks carrying muck shall be loaded so that the muck does not extend above the walls of the truck bed

c. Haul trucks shall be lined with a 10-mil polyethylene plastic sheeting. The muck loads will be tightly covered using a 10-mil polyethylene plastic sheet so as to prevent muck from spilling over the side and back walls of the haul trucks.

C. Backfilling and Compaction

i) Perform backfilling and compaction in accordance with Section 206 of the Standard Specifications for Road and Bridge Construction.

D. Restoration

i) Remove and dispose of all temporary utilities, temporary drainage facilities, temporary fencing, waste materials and surplus materials, and other site development facilities provided by the Contractor following backfilling of the excavation.

ii) The Contractor shall restore all existing improvements such as pavements, slabs, sidewalks, curbs, driveways, gutters, guardrails, fences, walls, conduits and cables, water lines and appurtenances, etc., removed or damaged by construction, unless otherwise noted.

E. Quality Control Testing

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the State.

i) Laboratory Technician: Testing shall be performed by a Laboratory Technician from a third-party laboratory certified by AASHTO in performing the required tests, or as approved by the Engineer.

ii) Field Density Tests: Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one (1) field density test per lift of backfill for every 100 square feet of installation shall be performed. One (1) moisture density relationship shall be determined for every 100 cubic yards or less of material used. Field in place density shall be determined in accordance with ASTM D1556, ASTM D2167, or ASTM D6938. Excavations improperly compacted shall be re-supported and re-opened to the depth directed by the Engineer, then refilled and compacted to the density specified at no additional cost to the State.

14.4 PAYMENT

Payment for Trench Excavation and Backfill shall be made as described in Article X of these Specifications.

ARTICLE XV - CONCRETE SEWER MANHOLES

15.1 GENERAL

This specification section applies to constructing 48 inch inside diameter reinforced concrete cast-in-place and pre-cast sewer manholes as indicated in the Contract documents.

15.2 REFERENCE STANDARDS

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.

A. American Society for Testing and Materials (ASTM)

ASTM A48/A48M	Standard Specification for Gray Iron Castings
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1244	Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill

B. American Water Works Association (AWWA)

AWWA C216	Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Grey-Iron Fittings
AWWA C219	Bolted, Sleeve-Type Couplings for Plain End Pipe

C. AASHTO LRFD Bridge Design Specifications, 7th Edition 2014, with subsequent interim revisions.

D. Departments of Public Works, County of Kauai, City and County of Honolulu, County of Maui, County of Hawaii of the State of Hawaii:
1. Standard Specifications for Public Works Construction, September 1986, as amended and applicable to City and County of Honolulu; with exception of paragraph "Measurement and Payment"; referred to as "Standard Specifications".

E. State of Hawaii, Department of Transportation, Highways Division, “Design Criteria for Bridges and Structures”, August 8, 2014.

15.3 SUBMITTALS

A. Shop drawings, brochures, installation instructions, certifications, as-built drawings, and other data shall be submitted to the Engineer in accordance with GENERAL PROVISIONS Section 5.2, "Submittals." The Contractor shall submit detailed information on his proposed procedures, equipment and materials to be used for sewer manhole construction for approval by the Engineer within thirty (30) calendar days after the Notice to Proceed date. Design calculations and shop drawings shall be prepared and stamped by a Civil Engineer currently registered in the State of Hawaii. Physical properties of all materials shall be detailed. Additional information shall be provided as requested by the Engineer.

A. Manufacturer certification for pre-cast manhole sections conformance to applicable ASTM requirements.

B. Manufacturer certification for pre-cast manhole section testing and conformance to design load.

C. Manufacturer shop drawings and structural analyses for pre-cast riser sections and concrete base for manholes for manhole depths greater than 15 feet. Structural analyses shall be by a registered structural engineer. Shop drawings shall be stamped by a registered structural engineer.

D. Concrete and reinforcing steel testing and conformance per Contract Specifications.

E. Manufacturer product and testing data, and installation instructions for ASTM C923 pipe connection water tight resilient connectors.

F. Manufacturer product and testing data, and installation instructions for water tight seal for adjustment rings, cover frame, risers and top of manhole concrete top riser section or slab.

G. Test data for field concrete slump tests and compressive strength tests.

H. Manufacturer catalog and testing data for cast-iron manhole frame and cover to include design and dimensions.

I. Vacuum and exfiltration testing plan and result reports. Testing plan shall include personnel and their experience and qualifications, equipment, and procedures. Test results shall include manhole identification, date and time of test, tester name, Engineer present during test.

15.4 PRODUCTS

A. Precast Reinforced Concrete Manhole

1) Precast manhole wall and cone sections shall conform to ASTM C478. Minimum wall thickness shall be 5 inches for 48 inch diameter manholes and 7 inches for 72 inch diameter manholes.

2) Precast manhole components shall be designed to support vertical AASHTO H20 truck loads plus other loads from backfill and pavement materials at and above the cone section.

3) Manhole base shall be pre-cast or cast-in-place reinforced concrete as shown on the Plans.

4) Joint sealant for precast wall sections shall be preformed flexible plastic joint sealant that conforms to ASTM C990. Approved material is RAM-NEK manufactured by the Henry Company or approved substitute.

5) Manufacturer shall request for inspection of pre-cast concrete pours made at its plant at least seven (7) calendar days prior to pour.

B. Cast-in-Place Reinforced Concrete Manhole And Manhole Base

1) Cast-in-place reinforced concrete manhole shall be as shown on the Plans.

2) Concrete shall be 5,000 psi minimum compressive strength unless otherwise indicated in the Contract documents.

3) Reinforcing steel shall be deformed bars grade 60 conforming to ASTM A615. Welded wire mesh/fabric shall conform to ASTM A1064 unless otherwise indicated in the contract documents.

4) Hydrophilic waterstops shall be installed at all construction joints below ground level to form watertight joints in accordance with the manufacturer's instructions. Waterstops shall be Adeka Ultraseal MC-2010M or approved substitute.
   a. Hardness shall be a minimum of 30.
   b. Elongation shall be a minimum of 500%.
   c. Tensile strength shall be a minimum of 100 pounds per square inch.

C. Sewer Pipe Connections

1) PVC pipe and fittings shall conform to respective sections for those pipe types.

2) Grouted wall fitting for PVC pipe connections shall be as indicated in the Contract documents using a PVC bell spigot gasketed manhole sand fitting of PVC pipe class matching the PVC sewer pipe, and fabricated to length as required or a spigot x spigot nipple as required.

3) Pipe connections utilizing watertight and flexible resilient connectors per ASTM C923 shall be of manufacturer and type as approved by the Engineer. The connector shall be suitable for the sewer pipe being connected to the manhole. Metal components shall be stainless steel. Approved resilient connectors are A-LOK Premium or A-LOK X-CEL, Kor-N-Seal I EX or Kor-N-Seal II 206 Series, or PSX-Direct Drive or approved substitute. VCP or PVC wall pipe shall be as indicated in the Contract documents.

D. Couplings for PVC Pipe Connections

1) PVC deflection couplings shall be of the same class and for the PVC sewer pipe. Couplings shall be manufactured for a minimum of 2.5 degree angle change per bell joint. Allowable field deflections shall be limited to 2.0 degrees or 80 percent of manufacturer allowable deflection as approved by the Engineer.

2) Transition Couplings for connecting pipes of different pipe outside diameters shall be cast type conforming to AWWA C219. Transition couplings shall have ductile iron sleeves and ductile iron end rings with gasketed joints. Nuts and bolt for cast couplings shall be 316 stainless steel unless otherwise indicated by the Contract documents. Ductile iron sleeves shall be epoxy coated.

E. Mortar and Non-Shrink Grout

Mortar and non-shrink grout shall conform to the requirements of the concrete section of the Standard Specifications in particular as applicable to sewer structures.

F. Frames and Covers

Frame and cover for manholes shall be cast iron conforming to ASTM A48/A48M, Class No. 30. Casting manufacturer and casting design including dimensions shall be as indicated by the Contract documents, or as approved by the Engineer.

Castings shall be tough, close-grained gray iron, sound, smooth, and clean, and free of blisters, blowholes, shrinkage, and cold shuts.

Castings shall be fabricated accurately to dimensions, pattern and markings shown in the contract documents and machined as necessary for flat and true surfaces. Bearing surfaces shall be constructed so that cover lies flat on frame with snug fit in normal position.

Castings shall, before leaving shop, be thoroughly cleaned and painted on all sides with one coat of high-grade asphalt conforming to ASTM A849, Class M, Fully Coated.

G. Exterior Wrap Seal for Adjustment Rings and Cover Frame

Exterior wrap to seal the pre-cast concrete or brick adjustment ring sections and cover frame resting on the manhole cone section as called for by the Contract documents shall conform to ASTM C923 and be of manufacturer and type as approved by the Engineer. Adhesive shall be as supplied by the manufacturer.

Approved manufacturers and products are Infi-Shield Uni-Band by Sealing Systems, Inc., and Wrapid Seal Manhole Encapsulation System by CANUSA-CPS and CCPI Pipeline Systems LCC, or approved substitute.

H. Bricks

Bricks shall be red brick conforming to ASTM C32 Grade MA or locally manufactured lava or cinder brick conforming to ASTM C55.

15.5 EXECUTION

A. General

Construct manholes as detailed in the Contract documents.

B. Excavation and Backfill

Excavation and backfill shall be in accordance with Section 02532, "Trench Excavation, Backfill and A.C. Resurfacing".

The manhole base foundation shall be prepared to provide a firm and stable foundation.

Backfilling shall not be conducted until water tightness tests are completed and the results accepted by the Engineer.

C. Concrete Work

Concrete work for cast-in-place manholes and manhole bases shall be constructed in accordance with the concrete and reinforcing section(s) of the Standard Specifications. Allow concrete to set for at least 24 hours before removing forms and constructing additional work.

D. Sealing Pre-Cast Manhole Section Joints

Pre-cast manhole sections shall be sealed water tight using approved preformed flexible joint sealant. Sealant shall be installed per manufacturer instructions and requirements.

E. Pipe Connections

Pipe connections shall be water tight to prevent ground water infiltration into the manhole. Pipe connections to manholes using PVC fittings or pipe shall be as indicated by the Contract documents.

Water tight flexible resilient connectors may be used for pipe connections to manholes as indicated by the Contract documents. Resilient connectors and pipe connections shall be installed per manufacturer instructions.

Resilient connectors shall not be grouted for joint flexibility unless specified by the manufacturer's installation instructions.

A flexible joint shall be provided at the manhole wall as indicated by the Contract Documents. A PVC deflection coupling shall be used for PVC pipe connections. A bell joint shall be used for VCP. Where pipes of different diameters are connected, transition couplings shall be used which allow for deflection on joints.

Openings made for pipe connections to existing manholes shall be thoroughly cleaned, mechanically roughened, and treated with epoxy bonding agent prior to grouting with non-shrink grout. Openings for use with resilient connectors shall be per the connector manufacturer's instructions.

F. Channelization of Manhole Inverts

Manhole inverts shall be channelized, and benches provided as indicated on the Contract Documents. Flow channels shall be smooth with steel trowel finish. Benches shall be solid with concrete, brick and grout. Grout finish over underlying concrete and/or brick shall be a minimum of 3 inches thick.

G. Water Tight Seal for Adjustment Rings and Cover Frame

Exterior flexible water tight seal shall be provided as indicated by the Contract documents. The seal shall wrap around the adjustment rings to include overlap with the manhole cone riser section and the cover frame to provide a water tight seal between the pre-cast concrete riser section and the frame and cover. The seal shall be installed per manufacturer instructions and requirements.

H. Construction of New Sewer Manhole Over Existing Sewers

New sewer manhole at existing sewers to accommodate new sewers connections, the new manhole shall be constructed over the existing sewer. The existing sewer shall be cut to clean lines after construction of the manhole base to match the new manhole channelization

I. Water Tightness

Manholes joints including at pipe connections, wall sections, and at adjustment rings and cover frame shall be water tight.

Joint seals and wrap seals shall be installed per manufacturer's instructions and recommendations.

J. Vacuum Testing

Two vacuum tests for water tightness shall be conducted for each sewer manhole. A vacuum shall be drawn and the vacuum drop over a specified time period shall be used to determine the acceptability of the sewer manholes. Initial vacuum test shall take place following construction of each sewer manhole after all connections are made, and before backfilling. If the manhole fails the initial vacuum test, necessary repairs shall be made before further construction proceeds and hinders such repairs. The manhole shall be retested until a satisfactory test is obtained. Final vacuum tests shall be performed after each sewer manhole has been channelized and backfilled.

1) Equipment for vacuum tests shall be approved by the Engineer.

   a. Manhole vacuum tester assembly shall be circular in shape with circular aluminum top plate, inverted C-section of aluminum channel, and inflatable sealing ring. The vacuum pump shall have a capacity of 18 CFM at 10" of mercury. The vacuum tester assembly and vacuum pump shall be manufactured by Cherne Industries Incorporated or approved equal.

   b. The vacuum tester shall be capable of having two pressure gages connected. The pressure gage shall be liquid filled having a 3.5-inch diameter face with a reading from zero to thirty inches of mercury.

   c. Pneumatic plugs shall be inflatable, have a sealing length equal to or greater than the diameter of the connecting pipe to be sealed and shall be manufactured by Cherne Industries Incorporated or approved equal.

2) Procedures for vacuum tests shall be as recommended by the vacuum testing assembly manufacturer and approved by the Engineer.

   a. Temporarily plug all manhole entrances and exits other than the one manhole top access using suitably sized pneumatic or mechanical pipeline plugs and follow all manufacturer's recommendations and warnings for proper and safe installation of such plugs. Plugs shall be inserted a minimum of 6" beyond manhole wall. The standard test

vacuum of 10" of mercury is equivalent to approximately 5 PSIG or 0.3 bar backpressure. Plugs shall have a minimum safety factor of two or a minimum backpressure usage rating of 10 PSIG or 0.7 bar. Brace all plugs and pipes to prevent plugs or pipes from being dislodged or drawn into the manhole.

b. Install the vacuum tester head assembly at the top access of manhole. Adjust the cross brace to insure that the inflatable sealing element inflates and seals against the straight top section of the manhole or the cast iron cover frame. The vacuum test shall include testing the seal between the cast iron frame and the concrete cone.

c. Attach the vacuum pump assembly to the proper connection on the vacuum tester assembly with the vacuum inlet/outlet valve in the close position.

d. Follow safety precautions and manufacturer's instructions, and inflate sealing element to the recommended maximum inflation pressure. Do not over inflate.

e. Start the vacuum pump and allow pre-set RPM to stabilize.

f. Open the inlet/outlet ball valve and evacuate the manhole to 10-½" of mercury. Close the valve and disconnect the vacuum line. Open the valve and adjust vacuum to 10" of mercury. (Do not pressurize manhole. This may result in manhole damage and/or result in vacuum tester dislodging from manhole inlet.)

g. With the vacuum inlet/outlet ball valve closed, monitor vacuum for specified test period of minimum 100 seconds. If vacuum does not drop in excess of 1" mercury over the test period, the manhole will be considered acceptable and the manhole shall pass the vacuum test. If the manhole fails the test, identify the leaking areas, complete necessary repairs and repeat test procedures until satisfactory results are obtain.

h. Repeat the above test procedures after channelizing and backfilling each manhole for final acceptance test. All plugs and equipment shall be removed after completion of the vacuum tests.

K. Final Cleaning

Manholes shall be thoroughly cleaned after completion. Sewer pipes shall be protected to prevent debris and other foreign matter from entering.

15.6 PAYMENT

Payment for Sewer Manholes shall be made as described in Article X of these Specifications.

ARTICLE XVI - WETWELL LINING

16.1 GENERAL

The Contractor shall provide all labor, supervision, tools, materials, equipment, traffic control measures, and necessary sewage flow control to provide for all aspects of rehabilitation of existing pump station wetwells using procedures indicated on the Plans and specified herein.

Pump station wetwell rehabilitation shall include the following work:

A. Unlined interior areas of the pump station wetwell structure (entire below grade structure) shall be rehabilitated by stopping active leaks, patching holes, cracks, and spalls and applying a two-step corrosion protection lining system consisting of an underlayment material beneath an epoxy topcoat. The time delay between underlayment and the epoxy topcoat should be per manufacturer's recommendations.

B. Wetwell bench repair and/or channel reconstruction (if required).

C. Inspection and testing of the work to ensure compliance with plans and specifications.

D. Repair of cracks or spalls caused by the demolition process.

16.2 SUBMITTALS

The materials used shall be designed, manufactured, and intended for sewer wetwell rehabilitation, particularly for the specific application for which these documents and the plans require.

Provide qualification of products and materials to be used for pump station wetwell rehabilitation, as well as applicator qualifications for Engineer’s review and approval.

Submit no later than 30 calendar days after the contract Notice-to-Proceed date, the following listed items. No reconstruction work shall be started prior to acceptance of the product data by the Engineer.

A. Products and Materials Qualifications

1) Underlayment Product

Provide the underlayment manufacturer’s product description, application, installation and testing instructions, recommended shelf life, and written

evidence, in the form of a letter, that the underlayment product has a minimum ten (10) year history of being manufactured and used successfully for rehabilitation or new sewer structures. Written evidence shall be in the form of a letter from the underlayment product manufacturer. In addition, the manufacturer or Contractor shall provide a list of at least three (3) reference sewer projects using the underlayment product having a minimum of ten (10) years of service life, including contractor's name, owner's name with contact person/telephone number, date, location, number of sewer structures coated, product used, and application method. All projects performed in Hawaii shall be included on this list. The product is required to have at least one project performed in Hawaii.

2) Epoxy Coating Product

Provide the epoxy coating manufacturer's product description, application, installation and testing instructions, recommended shelf life, and written evidence, in the form of a letter, that the epoxy coating product has a minimum ten (10) year history of being manufactured and used successfully for rehabilitation or new sewer structures. Written evidence shall be in the form of a letter from the epoxy coating product manufacturer. In addition, the manufacturer or Contractor shall provide a list of at least three (3) reference sewer projects using the epoxy coating product having a minimum of ten (10) years of service life, including contractor's name, owner's name with contact person/telephone number, date, location, number of sewer structures coated, product used, and application method. All projects performed in Hawaii shall be included on this list. The product is required to have at least one project performed in Hawaii.

A predecessor underlayment or epoxy coating product number/name that has been modified into a newer version will be accepted in determining the minimum 10 years of service.

3) Letter from the epoxy coating manufacturer indicating that the underlayment products and epoxy coating to be used for the Project work under this section are compatible.

4) Material Safety Data Sheets (MSDS) for each product used.

B. Applicator Qualifications

1) For epoxy coatings, the Contractor shall provide a copy of a current certificate or written evidence from the epoxy coating manufacturer acknowledging successful training of each individual applicator to be

utilized on this Project. The training certificate shall be renewed annually throughout the duration of the Project structure application work. The certificate or written evidence shall indicate the date(s) and location of the training, and description of items covered during the training. Training items shall include, but not be limited to, proficiency in: surface preparation, application, testing, coating repair, operation and maintenance of application equipment, and handling and storing of materials. Training certification shall match the proposed method of application (trowel or spray) that will be used by the Contractor for this Project.

2) For each individual applicator, submit a list of at least three (3) reference projects successfully completed in the United States within the past five (5) years, involving a minimum total of ten (10) sewer structures successfully coated directly by the applicator using the same approved epoxy coating, same approved underlayment product, and same application method (trowel or spray) to be used on this Project. For each reference project, provide the owner's name, contact person, and telephone number; the applicator's employer's name, contact person, and telephone number; date, location, number of sewer structures rehabilitated, products used, application method, and the applicator's responsibilities (surface preparation, application of epoxy coating, testing, etc.). All projects performed in Hawaii shall be included on this list.

Should the Contractor's proposed applicator(s) fail to meet the minimum experience requirements indicated above, the State will accept applicators who have successfully completed the manufacturer's training and will perform the work with direct and constant field assistance and supervision from a currently certified trainer of the epoxy coating manufacturer. The Contractor shall submit the name and credentials of the certified trainer to the Enginer for approval.

Unless otherwise approved by the State, the certified trainer's credentials shall include a list of at least five (5) reference projects successfully completed in the United States, within the past ten (10) years, involving a minimum total of fifteen (15) sewer structures successfully directly coated or directly supervised by the certified trainer of the epoxy coating manufacturer, using the same approved epoxy coating, same approved underlayment product, and same application method (trowel or spray) to be used on this Project. For each reference project, provide the owner's name, contact person, and telephone number; the trainer's employer's name, contact person, and contact telephone number; date, location, number of sewer structures coated, products used, application method, and the trainer's responsibilities (surface preparation, application of epoxy coating, testing, etc.). All projects performed in Hawaii shall be included on this list.

The supervision period by the certified trainer shall be for both pump station wetwells, and shall cover the surface preparation, epoxy coating, and testing phases.

3) Submit certification or other written evidence from the epoxy coating manufacturer that the equipment to be used on this Project for applying the products has been approved and the applicator personnel have been trained and certified for proper use, operation and maintenance of the equipment.

16.3 MATERIALS

A. Products

The materials used shall be designed, manufactured, and intended for sewer structure rehabilitation and particularly for the specific application for which these documents and the plans require. The materials, especially the underlayment product and epoxy coating, shall have a proven history of performance in sewer structure rehabilitation.

The materials shall be delivered to the job site in original unopened packaging and clearly labeled with the manufacturer's identification, printed instructions, lot number, and product manufactured date. The product shall not be used after the manufacturer's recommended shelf life has been exceeded. All materials shall be stored and handled in accordance with the recommendations of the manufacturer. Storage and handling of cementitious materials shall also comply with the applicable requirements of the American Concrete Institute (ACI). All materials shall be mixed and applied in accordance with the manufacturer's written instructions.

1) For sealing of active leaks:

Note that the wetwells extend into the groundwater and are located in proximity to the ocean. A rapid setting hydraulic water plug for sealing leaks shall be used. The compatibility of the product with the cementitious underlayment product, cementitious bench repair mortar, and epoxy coating to be used on this project shall be verified. The water plug shall be Sauereisen Instaplug No. F-180, Webac 151, or an approved substitute for this specific project.

2) Patching, Repointing, Filling, and Repairing Non-Leaking Holes, Cracks, and Spalls in Concrete and Masonry Structures.

A premixed, non-shrinking cement based patching material consisting of hydraulic cement, graded silica aggregates, and special blend of powders

and special plasticizing and accelerating agents which has been formulated for vertical or overhead use. It shall not contain chlorides, gypsums, plasters, iron particles, aluminum powder or gas forming agents, or any other agents and components that promote the corrosion of the steel that it may come in contact with. Set time (ASTM C191) shall be less than 30 minutes. One hour compressive strength (ASTM C109) shall be a minimum of 200 psi and the ultimate compressive strengths (ASTM C109) shall be a minimum of 5000 psi.

Bond strengths (ASTM C882-modified) shall be a minimum of 1700 psi.

3) For repairing the benches/channel (if required):

A quick setting, high strength Portland cement based repair mortar prior to applying epoxy coating shall be used. The mortar shall be one of the following mortar products, or an approved substitute for this specific project. The Contractor shall submit a letter from the epoxy coating manufacturer indicating that the bench repair mortar, cementitious underlayment and epoxy coating to be used on this project are compatible.

Alternative 1 – SikaTop 122 Plus: The 28-day compressive strength (ASTM C109) shall be a minimum of 7,000 psi. The 28-day flexural strength (ASTM C293) shall be a minimum of 2,000 psi. The 28-day tensile strength (ASTM C496) shall be a minimum of 750 psi. The 28-day bond strength (ASTM C882) shall be to a minimum of 2,200 psi.

Alternative 2 – Sauereisen Restokrete Substrate Resurfacer No. F-121: See Paragraph 15.3.A.4 below for physical properties.

4) Underlayment Material:

A fast setting, high strength Portland cement based underlayment material that has been formulated for vertical or overhead use by trowel application shall be used as an underlayment for a protective epoxy coating. It shall not contain any agents and components that would promote the corrosion of steel. The underlayment product shall be one of the following or an approved substitute. The Contractor shall submit a letter from the epoxy coating manufacturer indicating that the cementitious underlayment product and epoxy coating to be used on this project are compatible.

Alternative 1 – Sauereisen Restokrete Substrate Resurfacer No. F-121: Initial set time at seventy (70) degrees F shall not exceed eight (8) hours. The 24-hour compressive strength (ASTM C109) shall be a minimum of 3,900 psi. The 28-day compressive strength (ASTM C109) shall be a minimum 7,000 psi. The 7-day tensile strength (ASTM C307) shall be a

minimum of 800 psi. The 7-day flexural strength (ASTM C580) shall be a minimum of 1,500 psi. The 7-day bond strength (ASTM C882) shall be a minimum of 2,200 psi. The minimum wet film thickness shall be 250 mils.

Alternative 2 – Raven 755: Initial set time at seventy-two (72) degrees F shall not exceed eight (8) hours. The 24-hour compressive strength (ASTM C109) shall be a minimum of 3,000 psi. The 28-day compressive strength (ASTM C109) shall be a minimum of 9,000 psi. The 7-day splitting tensile strength (ASTM C496) shall be a minimum of 800 psi. The 7-day flexural strength (ASTM C580) shall be a minimum of 1,500 psi. The 7-day bond strength (ASTM C882) shall be a minimum of 2,000 psi. The minimum wet film thickness shall be 500 mils.

5) Epoxy coatings for corrosion protection of concrete and/or masonry structures:

An epoxy coating suitable for application over damp or dry concrete surfaces and on vertical and overhead surfaces shall be used. When cured, the coating shall provide an impermeable, high strength lining for sewer structures resistant to infiltration and attack from hydrogen sulfide and acid generated by microbiological sources known to exist in the sewer environment. The epoxy coating shall be one of the following epoxy coating systems, or an approved substitute for this specific project.

Alternative 1 – Raven 405: A high strength, 100% solids, solvent-free two-component epoxy resin system for spray application. The coating material shall be thixotropic in nature and filled with select fillers to minimize permeability and provide sag resistance in conformance with these specifications. Flexural strength (ASTM D790) shall be a minimum of 13,000 psi. Compressive strength (ASTM D695) shall be a minimum of 18,000 psi. Tensile strength (ASTM D638) shall be a minimum of 7,600 psi. Bond strength (ASTM D7234) shall be to concrete substrate failure. The minimum wet film thickness shall be 90 mils.

Alternative 2 – Sauereisen SewerGard Trowelable No. 210: An impermeable, high strength, three-component system consisting of a two-component application. Flexural strength (ASTM C580) shall be a minimum of 4,900 psi. Compressive strength (ASTM D695) at twenty-eight (28) days shall be a minimum of 10,000 psi. Tensile strength (ASTM C307) shall be a minimum of 2,000 psi. Bond strength (ASTM D4541) shall be to concrete substrate failure. The minimum wet film thickness shall be 125 mils.

Alternative 3 – Sauereisen SewerGard Spray Applied No. 210S: An impermeable, high strength, two-component fiber filled spray applied

lining. Flexural strength (ASTM C580) shall be a minimum of 4,600 psi. Compressive strength (ASTM C579) shall be a minimum of 6,800 psi. Tensile strength (ASTM C307) shall be a minimum of 2,500 psi. Bond strength (ASTM D4541) shall be to concrete substrate failure. The minimum wet film thickness shall be 90 mils.

Alternative 4 – Neopoxy NPR-5305 (trowelable): A high strength, high corrosion resistant modified epoxy resin designed for hand application to repair structures. Flexural strength (ASTM D790) shall be a minimum of 11,500 psi. Compressive strength (ASTM C579) shall be a minimum 14,000 psi. Tensile strength (ASTM D638) shall be a minimum 7,000 psi. Bond strength (ASTM D4541) shall be to concrete substrate failure. The minimum wet film thickness shall be 125 mils.

Alternative 5 – Neopoxy NPR-5304 (spray): A high strength, high corrosion resistant modified epoxy resin designed for spray application. Flexural strength (ASTM D790) shall be minimum of 14,000 psi. Compressive strength (ASTM C579) shall be a minimum of 13,500 psi. Tensile strength (ASTM D638) shall be minimum 7,500 psi. Bond strength (ASTM D7234) shall be concrete substrate failure. The minimum wet film thickness shall be 125 mils.

16.4 CONSTRUCTION DETAILS

1) Sewer Flow Control: Contractor shall bypass/divert existing sewage flows from the existing wetwells to be rehabilitated.

2) Safety: The Contractor shall perform all work in strict accordance with all applicable OSHA standards, especially with respect to those safety requirements regarding confined space entry. Precautions shall be taken to detour activity away from work zones and to prevent falling debris from damaging the structure through manhole openings.

3) Cleaning: All concrete and masonry surfaces to be rehabilitated shall first be cleaned in accordance with the recommendations of manufacturers of the repair and rehabilitation products and epoxy coatings to be used on this project. All grease, oil, laitance, loose bricks and mortar, unsound concrete, and other foreign materials shall be completely removed. Cleaning shall provide a concrete surface profile of 4-6 (per the International Concrete Repair Institute) in order to achieve effective adhesion between the substrate and the epoxy topcoat. Exposed reinforcing steel shall be ground or sandblasted to shiny metal. Debris from cleaning operations shall be collected and disposed of in an environmentally safe manner. Where there are conflicts in the level of cleaning or procedures between this specification and the epoxy coating

manufacturer, the more stringent shall apply unless otherwise approved by the Engineer.

The Contractor shall conduct pH tests on the walls and bench to ensure that the pH of the substrate is seven (7) or higher prior to applying any repair, rehabilitation and underlayment products. A minimum of two (2) pH tests shall be conducted per ten (10) vertical feet of structure at representative locations with damaged concrete. All pH testing shall be conducted in the presence of the Engineer. Additional cleaning will be required if the pH of the substrate is below 7. The Contractor shall notify the Engineer in writing at least twenty-four (24) hours prior to the testing. The Engineer shall be given the opportunity to specify the location of the tests.

4) Infiltration: After the surface has been prepared, and prior to the application of mortar products, underlayment products and epoxy coatings, all infiltration shall be stopped by either plugging, chemical grout sealing, or installation of channels through "bleed" pipes at the bottom of the structure. Prior to placing water plug, place a mechanical key by undercutting an abrupt edge completely around the area to be plugged. After plugging the leaks, structure walls shall be dry and ready for structural rehabilitation.

5) Patching: A non-shrink patching mortar shall be used to patch all large holes/voids around removed rungs, joints, or pipes, spalled areas, and holes due to missing or broken bricks, and to repoint all missing mortar. All cracked or disintegrated material shall be removed from the area to be patched or repointed after exposing the sound subbase. All cracks not subject to movement and greater than 1/16 inch in width shall be routed out to a minimum width and depth of 1/2 inch and patched with non-shrink patching mortar.

6) Repair and resurfacing of surface irregularities: Portland cement underlayment product shall be used to fill, repair, and resurface smaller cracks, voids, pockmarks, bug holes, and other surface irregularities to provide the epoxy coating with a suitable smooth, even, high-strength substrate and to prevent subsequent pinholes and holidays in the epoxy coating. Underlayment product shall be provided with a broom finish or other suitable finish recommended by the epoxy coating manufacturer. The minimum and maximum thicknesses of the underlayment product shall be in accordance with the underlayment product and epoxy coating manufacturers' recommendations.

An approved underlayment product, as aforementioned described above is required on all surfaces to which epoxy coating will subsequently be

applied. At no time shall epoxy coating be directly applied to concrete surfaces or repair, patching, sealing and bench repair products without first applying underlayment product.

7) Epoxy Coating: The Contractor applying the epoxy coating shall inspect all surfaces specified to be coated prior to application of the coating. The Engineer shall be notified a minimum of three (3) days prior to the date of the epoxy coating application to provide the option of inspecting the prepared surface and observe the epoxy coating application. The Contractor shall address any concerns with the surface that may interfere with proper application, testing or performance of the coating.

The epoxy coating shall be applied in accordance with the manufacturer's recommendations. Surfaces to be coated shall include the structure walls, top of wetwell, benches, and portions of the channels.

The minimum wet film epoxy coating thicknesses are applicable to properly prepared smooth surfaces with a broom finish. Thicker coatings, as recommended by the coating manufacturer and as approved by the Engineer, shall be provided if a smooth broom finish surface is not provided.

During application of the epoxy coating, a wet film thickness gauge similar to the gauges described in ASTM D4414 shall be used by the Contractor to verify that the minimum thickness requirements are being met as part of the Contractor's own quality control procedures. A wet film test shall be performed for every 25 square feet, or less, of coating.

Where the epoxy coating terminates at the edge of a concrete structure, the edge of the epoxy coating shall be provided with an edge seal along the edge of the coating. The edge seal shall consist of an epoxy filled embedded thickened edge created by filling a minimum 1/4–inch wide by minimum 1/4-inch deep groove cut into concrete.

8) Coating work shall be performed and completed without interruptions that may render previously cleaned, prepared or coated surfaces to be unacceptable. If interruptions should occur, the surfaces shall undergo additional cleaning or preparation as recommended by the manufacturer of the sewer structure rehabilitation products.

9) Testing: All testing described below shall be conducted in the presence of the Engineer. The Contractor shall notify the Engineer in writing at least twenty-four (24) hours prior to the testing.

After the epoxy coating has set hard to the touch and completion of all project work affecting the rehabilitated structures, the coating shall be tested for holidays with high-voltage holiday detection equipment. Testing shall be in accordance with the applicable high voltage testing requirements of NACE SP0188-2006, "Standard Practice, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates" or ASTM D 4787, "Standard Practice, for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates."

An induced holiday shall be made on to the coated concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays. A 1/16-inch diameter hole shall be drilled into the coating at a location 6-inches to 12-inches above the bench, or at a location approved by the Engineer. The spark testing equipment shall be grounded to the manhole cover frame or other location approved by the Engineer. The spark tester shall be initially set at 100 volts per 1 mil (25 micron) of film thickness applied but may be adjusted as necessary to detect the induced holiday. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other approved hand tooling method. After abrading, clean with a solvent wipe to ensure no dust or debris on the surface, let the surface dry and then add additional protective coating material to the repair area. All touch-up/repair procedures shall follow the epoxy coating manufacturer's recommendations. The holidays and other defects shall be repaired by the Contractor at no additional cost to the State.

Adhesion tests shall be performed on each rehabilitated structure. One adhesion test shall be performed on the structure wall for every ten (10) vertical feet, measured from the top of cover to invert. For structures less than ten (10) vertical feet, at least one adhesion test shall be performed on the structure wall. In addition, one (1) adhesion test shall also be performed on the bench. The Engineer shall determine the specific locations of the tests. Adhesion testing shall be conducted after the epoxy coating has cured per the manufacturer's instructions and in accordance with ASTM D4541 as modified herein.

The adhesive used to attach the dolly to the epoxy coating shall be rapid setting with tensile strength in excess of the coating product and permitted to cure in accordance with the manufacturer's recommendations. The coating and dolly shall be adequately prepared to receive the adhesive. Prior to the pull test, the Contractor shall utilize a scoring device to cut through the coating until the substrate is reached. Extreme care shall be required while scoring to prevent micro cracking in the coating, since cracks may cause failures at diminished strengths. Failure due to improper dolly adhesive or scoring shall require retesting. The pull test shall meet

and/or exceed 200 psi and shall include substrate adhered to the back of the dolly or no visual signs of coating product in the test hole. Pull tests with results between 150 psi and 200 psi shall be acceptable if more than fifty-percent (50%) of the substrate is adhered to the back of the dolly. If the initial adhesion test fails, a minimum of three (3) additional locations within the structure shall be tested, as directed by the Engineer. If any of the retests fail, all loosely adhered or un-adhered coating in the failed area, as determined by the Engineer, shall be removed and replaced at the Contractor's expense. After each adhesion test is completed, the Engineer shall verify the adhesion tester reading.

All adhesion test locations shall be repaired by the Contractor in accordance with coating manufacturer's recommendations, at no additional cost to the State.

16.5 PAYMENT

Payment for Lining Pump Station Wetwell shall be made as described in Article X of these Specifications.

ARTICLE XX – CONCRETE WORK

20.1 GENERAL

A. Work under this Article includes furnishing all labor, materials, and equipment necessary to perform concrete work. In general, the work includes, but is not necessarily limited to the following:

1. Construction of the concrete slab.

2. Patching existing anchors.

B. All work shall be in accordance with the following sections of the Standard Specifications except as modified or supplemented herein:

Section 203 Excavation and Embankment
Section 503 Concrete Structures
Section 601 Structural Concrete
Section 602 Reinforcing Steel
Section 711 Concrete Curing Materials and Admixtures

Sections on Materials referenced in the above sections are hereby incorporated.

20.2 MATERIALS

A. Concrete - Concrete shall have a 28-day compressive strength of f'c = 4,000 psi. The maximum water to cementitious materials ratio shall be 0.40 and the mix water shall be reduced as necessary to account for the admixture.

B. Reinforcing Steel - Reinforcing steel shall be ASTM A615, Grade 60.

C. Reinforcing Steel Anti-Corrosion Coating – Anti-corrosion coating with a minimum 7-day open time for reinforcing steel shall be Sika Armatec 110 Epocem by Sika Corp or approved equal.

D. Patching Compound for patching existing anchors on horizontal surfaces shall be SikaRepair 222 by Sika Corp or approved equal.

E. Curing Compound for concrete repairs shall be acceptable to the Harbors Construction Engineer.

F. Snap ties and inserts shall be plastic or stainless steel. All loose reinforcing steel shall be secured with ties at all intersections with adjacent reinforcing steel.

20.3 CONSTRUCTION METHODS

A. Subgrade Preparation – Prepare subgrade per drawings.

B. Placing Concrete - All surfaces including forms shall be thoroughly washed with clean water and remain in a saturated surface dry condition prior to placing concrete. Surfaces shall be clean and free of loose and other bond-inhibiting materials. Concrete shall be vibrated, rodded, or tamped during placement to consolidate the pour and fill all corners of the form and beneath the reinforcing. There shall be no cold joints in the concrete pad extension.

C. Finish - Concrete finish shall match the existing adjacent concrete finish.

D. Concrete Curing – Concrete repairs shall be cured by covering the surface with a curing compound approved by and acceptable to the Harbors Construction Engineer.

E. Patching Existing Anchors – Existing anchors shall be cut and coated with anti-corrosion coating per manufacturer's recommendation. The Contractor shall follow the manufacturer's recommendations for mixing and placing patching compound, including application of a slurry coat to prime the substrate.

20.4 PAYMENT - Payment for concrete work shall be made as described in Article X of these Specifications.

ARTICLE XXI – STRUCTURAL STEEL

21.1 GENERAL

A. Work under this Article includes furnishing all labor, materials and equipment necessary to furnish and install structural steel framing related to electrical work.

B. All work shall be in accordance with the following sections of the Standard Specifications except as modified or supplemented herein:

Section 501 Steel Structures

Sections on Materials referenced in the above sections are hereby incorporated.

21.2 MATERIALS

A. Structural Steel

1. Structural steel shall conform to ASTM A36 unless otherwise noted.

2. Cold formed hollow structural sections shall conform to ASTM A500/A500M, Grade C.

3. Welding electrodes shall be E70xx.

4. All structural steel shall be hot-dipped galvanized, unless noted otherwise.

B. Cold Galvanizing Compound – Cold galvanizing compound shall conform to ASTM A780.

21.3 CONSTRUCTION METHODS

A. Fabrication and erection of structural steel shall conform to The American Institute of Steel Construction Manual of Steel Construction, Fifteenth Edition.

B. The Contractor shall verify dimensions prior to fabrication of structural steel.

C. Welds and welding procedures shall conform to the Structural Welding Code AWS D1.1 of the American Welding Society.

D. Welding shall be performed by welders prequalified for welding procedures to be used.

E. Field welds and steel surfaces damaged during construction shall be coated with cold galvanizing compound.

F. Structural steel shall be installed in accordance with the drawing.

21.4 PAYMENT - Payment structural steel work shall be made as described in Article X of the Specifications.

ARTICLE XXX - PACKAGED ABOVEGROUND PUMP STATION AND PIPING

30.1 GENERAL REQUIREMENTS - Work under this section includes, but is not limited to, demolishing the existing pump stations and furnishing and installing a factory built above ground, automatic pump station at Pier 21 and Pier 27 as indicated on the project drawings, herein specified, as necessary for proper and complete performance.

30.2 REFERENCES

A. Publications listed below form part of this specification to extent referenced in thetext by basic designation only. Consult latest edition of publication unless otherwise noted.

1. American National Std. Institute (ANSI) / American Water Works Assoc.(AWWA)

   a. ANSI B16.1: Cast iron pipe flanges and flanged fittings.

   b. ANSI/AWWA C115/A21.51: Cast/ductile iron pipe with threadedflanges.

   c. ANSI 253.1: Safety Color Code for Marking Physical Hazards.

   d. ANSI B40.1: Gages, Pressure and Vacuum.

   e. AWWA C508: Single Swing Check Valves.

2. American Society for Testing and Materials (ASTM)

   a. ASTM A48: Gray Iron Castings.

   b. ASTM A126: Valves, Flanges, and Pipe Fittings.

   c. ASTM A307: Carbon Steel Bolts and Studs.

   d. ASTM A36: Structural Steel.

3. Institute of Electrical and Electronics Engineers (IEEE)

   a. ANSI/IEEE Std 100: Standard Dictionary of Electrical Terms.

   b. ANSI/IEEE Std 112: Test Procedure for Polyphase InductionMotors

   c. IEEE Std 242: Protection of Industrial and Control Power Systems.

4. National Electric Code (NEC) / National Electrical Manufacturers Assoc.(NEMA)

   a. NEC: National Electric Code.

   b. NEMA Std MG1: Motors and Generators.

5. Miscellaneous References

   a. Ten-State Standards: Recommended Standards for Sewage Works.

   b. Hydraulic Institute: Std for Centrifugal, Rotary and ReciprocatingPumps.

   c. ISO 9001 International Organization for Standardization.

   d. ISO 14001: International Organization for Standardization.

30.3 SYSTEM DESCRIPTION

A. Contractor shall furnish and install factory built above ground, automatic pump stations, Gorman Rupp or approved equal. The stations shall be complete with all equipment specified herein, factory assembled in a fiberglass reinforcedpolyester resin enclosure.

B. In addition to the station enclosure, principal items of equipment shall include two horizontal, self-priming, centrifugal sewage pumps, V-belt drives, motors, internalpiping, valves, motor control panel, automatic liquid level control system, and internal wiring.

C. Factory built pump station design, including materials of construction, pump features, valves and piping, and motor controls shall be in accordance with requirements listed under the following subsections.

30.4 PERFORMANCE CRITERIA

A. Pumps must be designed to handle raw, unscreened, domestic sanitary sewage.Pumps shall have 4" suction connection, and 4" discharge connection. Each pump shall be selected to perform under following operating conditions.

		Pier 21	Pier 27
1.	Capacity (GPM)	180	180
2.	Total Dynamic Head (FT)	26.5	54.7
3.	Total Dynamic Suction Lift (FT)	15.1	14.2
4.	Maximum Repriming Lift (FT)	16	16
5.	Maximum Static Suction Lift (FT)	15.6	14.8
6.	Total Discharge Static Head (FT)	11.4	40.5
7.	Minimum Submergence Depth (FT)	2	2
8.	Minimum TDH (FT)	20	20
9.	Maximum TDH (FT)	40	70

B. Site power furnished to pump station shall be 3 phase, 60 hertz, 208 volts, 3 wire, maintained within industry standards. Voltage tolerance shall be plus or minus 10percent. Phase-to-phase unbalance shall not exceed 1% average voltage as set forth in NEMA Standard MG-1. Control voltage shall not exceed 132 volts.

30.5 SUBMITTALS

A. Product Data

1. Prior to fabrication, pump station manufacturer shall submit seven (7)copies of submittal data to the Engineer for review and approval.

2. Submittal shall include shop drawings, electrical ladder logic drawings, and support data as follows: Catalog cuts sheets reflecting characteristicsfor major items of equipment, materials of construction, major dimensions, motor and v-belt drive data, pump characteristic curves showing the design duty point capacity (GPM), head (FT), net positive suction head required (NPSHr), and hydraulic brake horsepower (BHP). Electrical components used in the motor branch and liquid level control shall be fully described.

B. Shop drawings

1. Shop drawings shall provide layout of mechanical equipment and anchor bolt locations for station. Pipe penetrations and station access clearances shall be dimensioned relative to the station centerline. The electrical ladder logic drawings shall illustrate motor branch and liquid level controlcircuits to extent necessary to validate function and integration of circuits to form a complete working system.

2. The Contractor shall submit shop drawings for approval in accordance with Article X – PROJECT DESCRIPTION, 10.8 SUBMITTALS and of these Technical Provisions.

C. Operations and Maintenance Manuals

1. Operation shall be in accordance with written instructions provided by thepump station manufacturer. Comprehensive instructions supplied at time of shipment shall enable personnel to properly operate and maintain all equipment supplied. Content and instructions shall assume operating personnel are familiar with pumps, motors, piping and valves, but lack experience on exact equipment supplied.

2. Documentation shall be specific to the pump station supplied and collatedin functional sections. Each section shall combine to form a complete system manual covering all aspects of equipment supplied by the station manufacturer. Support data for any equipment supplied by others, even ifmounted or included in overall station design, shall be provided by those supplying the equipment. Instructions shall include the following as a minimum:

   a. Functional description of each major component, complete withoperating instructions.

   b. Instructions for operating pumps and pump controls in all modes ofoperation.

   c. Calibration and adjustment of equipment for initial start-up, replacement of level control components, or as required for routinemaintenance.

   d. Support data for commercially available components not producedby the station manufacturer, but supplied in accordance with the specifications, shall be supported by literature from the prime manufacturer and incorporated as appendices.

   e. Electrical schematic diagram of the pump station circuits shall be in accordance with NFPA 79. Schematics shall illustrate, to the extent of authorized repair, pump motor branch, control and alarm system circuits including interconnections. Wire numbers and legend symbols shall be shown. Schematic diagrams for individualcomponents, not normally repairable by the station operator, need not be included. Details for such parts shall not be substituted for an overall system schematic. Partial schematics, block diagrams, and simplified schematics shall not be provided in lieu of an overall system diagram.

   f. Mechanical layout drawing of the pump station and components, prepared in accordance with good commercial practice, shall

provide installation dimensions and location of all pumps, motors,valves and piping.

3. Operation and maintenance instructions which rely on vendor cut-sheetsand literature which include general configurations, or require operatingpersonnel to selectively read portions of the manual shall not be acceptable. Operation and maintenance instructions must be specific to equipment supplied in accordance with these specifications.

30.6 QUALITY ASSURANCE

A. The pumps and pump station manufacturer must be ISO 9001: 2008 revision certified, with scope of registration including design control and service after sales activities.

B. The pumps and pump station manufacturer must be registered to the ISO 14001 Environmental Management System standard and as such is committed to minimizing the impact of its activities on the environment and promoting environmental sustainability by the use of best management practices, technological advances, promoting environmental awareness and continual improvement.

C. Upon request from the Engineer, the pump station manufacturer shall prove financial stability and ability to produce the station within the specified deliveryschedules. Evidence of facilities, equipment and expertise shall demonstrate themanufacturer's commitment to long term customer service and product support.

D. Manufacturer must show proof of original product design and testing. Products violating intellectual property regulations shall not be allowed, as they may violate international law and expose the user or engineer to unintended liabilities. “Reverse-engineered” products fabricated to substantially duplicate the design of original product shall not be allowed, as they may contain substantial differences in tolerances and material applications addressed in the original design, which may contribute to product failure.

E. Pump Performance Certifications

1. Solids Management System designed for management of sanitary wipes, plastic bags, feathers, hair, sludge, and all other types of stringy solids.

2. All internal passages, impeller vanes, and recirculation ports shall pass a 3” spherical solid. Smaller internal passages that create a maintenance nuisance or interfere with priming and pump performance shall not be

permitted. Upon request from the Engineer, manufacturer's certified drawings showing size and location of the recirculation port(s) shall be submitted for approval.

3. Reprime Performance

a. Consideration shall be given to the sanitary sewage service anticipated, in which debris is expected to lodge between the suction check valve and its seat, resulting in the loss of the pump suction leg, and siphoning of liquid from the pump casing to the approximate center line of the impeller. Such occurrence shall beconsidered normal, and the pump must be capable of automatic, unattended operation with an air release line installed.

b. During unattended operation, the pump shall retain adequate liquidin the casing to insure automatic repriming while operating at its rated speed in a completely open system. The need for a suction check valve or external priming device shall not be required.

c. Pump must be capable of repriming 16 vertical feet at the specifiedspeed and impeller diameter. Reprime lift is defined as the static height of the pump suction above the liquid, while operating with only one-half of the liquid remaining in the pump casing. The pump must reprime and deliver full capacity within five minutes after the pump is energized in the reprime condition. Reprime performance must be confirmed with the following test set-up:

1) A check valve to be installed down stream from the pumpdischarge flange. The check valve size shall be equal (or greater than) the pump discharge diameter.

2) A length of air release pipe shall be installed between pumpand the discharge check valve. This line shall be open to atmosphere at all times duplicating the air displacement rate anticipated at a typical pump station fitted with an air release valve.

3) The pump suction check valve shall be removed. No restrictions in the pump or suction piping will prevent the siphon drop of the suction leg. Suction pipe configuration for reprime test shall incorporate a 2 feet minimum horizontal run, a 90^{o} elbow and vertical run at the specifiedlift. Pipe size shall be

equal to the pump suction diameter.

4) Impeller clearances shall be set as recommended in thepump service manual.

5) Repeatability of performance shall be demonstrated bytesting five consecutive reprime cycles. Full pump capacity (flow) shall be achieved within five minutes during each cycle.

6) Liquid to be used for reprime test shall be water.

7) Upon request from the Engineer, certified reprime performance test results, prepared by the manufacturer, and certified by a registered professional engineer, shall be submitted for approval prior to shipment.

F. Factory System Test

1. All internal components including the pumps, motors, valves, piping and controls will be tested as a complete working system at the manufacturer'sfacility. Tests shall be conducted in accordance with Hydraulic Institute Standards at the specified head, capacity, rated speed and horsepower. Factory operational test shall simulate actual performance anticipated for the complete station.

2. Upon request from the engineer, the operational test may be witnessed by the engineer, and/or representatives of his choice, at the manufacturer's facility.

G. The manufacturer’s technical representative shall inspect the completed installation, correct or supervise the correction of any defect or malfunction, and instruct operating personnel in the proper operation and maintenance of the equipment.

30.7 MANUFACTURER'S WARRANTY

A. The pump station manufacturer shall warrant all equipment to be of quality construction, free of defects in material and workmanship. A written warranty shall include specific details described below.

1. In addition to defects in material and workmanship, fiberglass reinforced polyester station enclosures are warranted for sixty (60) months to be resistant to rust, corrosion, corrosive soils, effects of airborne contamination or physical failures occurring in normal

service for the period of the pump station warranty.

2. All other equipment, apparatus, and parts furnished shall be warranted for sixty (60) months, excepting only those items that are normally consumed in service, such as light bulbs, oils, grease, packing, gaskets, O rings, etc. The pump station manufacturer shall be solely responsible for warranty of the station and all components.

B. Components failing to perform as specified by the engineer, or as represented by the manufacturer, or as proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the manufacturer.

C. It is not intended that the station manufacturer assume liability for consequential damages or contingent liabilities arising from failure of any vendor supplied product or part which fails to properly operate, however caused. Consequential damages resulting from defects in design, or delays in delivery are also beyond the manufacturer's scope of liability.

D. Equipment supplied by others and incorporated into a pump station or enclosure is not covered by this limited warranty. Any warranty applicable to equipment selected or supplied by others will be limited solely to the warranty, if any, provided by the manufacturer of the equipment.

E. The warranty shall become effective on the date of acceptance by the purchaser or the purchaser's authorized agent, or sixty (60) days after installation, or ninety (90) days after shipment from the factory, whichever occurs first.

30.8 PACKAGE SYSTEM

A. In order to unify responsibility for proper operation of the complete pumping station, it is the intent of these Specifications that all system components be furnished by a single supplier (unitary source). The pumping station must be of standard catalog design, totally warranted by the manufacturer. Under no circumstances will a system consisting of parts compiled and assembled by a manufacturer's representative or distributor be accepted.

30.9 MANUFACTURER

A. The pump station system integrator must be ISO 9001: 2000 revision certified,with scope of registration including design control and service after sales activities.

B. The specifications and project drawings depict equipment and materials

manufactured by The Gorman-Rupp Company which are deemed most suitable for the service anticipated. It is not intended, however, to eliminate other products of equal quality and performance. The contractor shall submit a substitution request prior to bid opening based on the specified equipment for purposes of determining low bid. Award of a contract shall constitute an obligation to furnish the specified equipment and materials.

C. After execution of the contract, the contractor shall not offer substitutions to the specified equipment for consideration. The equipment proposed for substitution must be proposed to prior bid opening to that specified in the contract.

D. In event the contractor obtains Engineer's approval for equipment substitution, the contractor shall, at his own expense, submit a substitution request prior to bid opening in order to make all resulting changes to the enclosures,buildings, piping or electrical systems as required to accommodate the proposed equipment. Revised detail drawings illustrating the substituted equipment and submitted to the Engineer prior to acceptance for tentative approval. Contractor shall submit a set of stamped shop drawings along with other corresponding changes for the final approval after award.

E. It will be assumed that if the cost to the contractor is less for the proposed substitution, then the contract price shall be reduced by an amount equal to thesavings.

30.10 STATION ENCLOSURE

A. The station enclosure shall contain and protect all pumps, interior piping, valvesand associated controls. Enclosure shall incorporate the following design and service features:

1. Access panels must be supplied on all sides. Location and size shall permit access for routine maintenance functions such as pump and motor inspection, drive belt adjustment, and pump clean out. Non-hinged panelsshall be secured with stainless steel tamper-proof hardware.

2. A continuous hinge and latch shall be installed on at least two access panels. The hinged panels shall allow easy access to the electrical controlsfor frequent adjustments and inspections. A two-point mechanical latch assembly shall secure the panel at top and bottom. Latch handle locks shall be match keyed, requiring only one key toopen all access panels.

3. A vent in one access panel shall allow free air flow for enclosureventilation.

4. The complete station enclosure, less base, must be completely removable

after disengaging reusable hardware. After disassembly, no portion of the enclosure (except electrical service entrance) shall project above the base surface to interfere with maintenance or endanger personnel.

5. Disassembly and removal of the enclosure shall require no more than two people working without assistance of lifting equipment.

B. The station enclosure shall be manufactured of molded reinforced orthophthalic polyester resins with a minimum of 30% fiberglass, and a maximum of 70% resin.Resin fillers or extenders shall not be used.

1. Chopped glass fibers of 1 1/4 inch average length shall be sprayed and rolled. Major design consideration shall be given to structural stability, corrosion resistance, and watertight integrity. The polyester laminates shall provide a balance of mechanical, chemical, and electrical properties to insure long life. They must be impervious to micro organisms, mildew,mold, fungus, corrosive liquids, and gases which are expected to be present in the environment surrounding the wet well.

2. All interior surfaces of the housing shall be coated with a polyester resinrich finish providing maintenance free service, abrasion resistance, and protection from sewage, greases, oils, gasoline, and other common chemicals.

3. Outside surfaces of the enclosure shall be coated with gel-coat pigmentedresin to insure long maintenance free life and UV protection. Color used shall de-emphasize the presence of dirt, grease, etc. and be coordinated with the Construction Engineer.

C. Station base shall be constructed of pre-cast, reinforced concrete encapsulated in afiberglass mold. The design shall resist deformation of the structure during shipping, lifting, or handling. Base shall incorporate drainage provisions, and an opening sized to permit installation of piping and service connections to the wet well. After installation, the opening shall serve as a grout dam to be utilized by the contractor to seal each pipe to base joint against the entrance of hazardous gases from the wet well. The base shall incorporate anchor bolt recesses for securing the complete station to a concrete pad (supplied by the contractor) in accordance with the project plans.

D. A blower mounted in the station roof shall be sized to exchange station air volumeat least once every two minutes. Blower motor shall energize automatically at approximately 70 degrees F, and turned off at 55 degrees F. The blower motor control circuit shall incorporate a thermal magnetic circuit breaker providing overcurrent and overload protection. Exhaust and inlet locations shall prevent theentrance of rain, snow, or debris.

E. Pump station shall be provided with a 100 watt, 115 volt AC vapor tight hand lamp with 25 feet of cord and grounding plug. Hand lamp shall be constructed of corrosion resistant materials, and shall be equipped with a guard and a clear globe. Ungrounded hand lamps may be supplied if provided with an effective means of double insulation.

30.11 PUMP DESIGN

A. Pumps shall be horizontal, self-priming centrifugal type, designed specifically forhandling raw, unscreened, domestic sanitary sewage. Pump solids handling capability and performance criteria shall be in accordance with requirements listed under Section 6.4.

B. The pump manufacturer must be ISO 9001: 2008 revisioncertified, with scope of registration including design control and service after sales activities.

C. Materials and Construction Features

1. Pump casing: Casing shall be cast iron Class 30 with integral volutescroll. Casing shall incorporate following features:

   a. Mounting feet sized to prevent tipping or binding when pump iscompletely disassembled for maintenance.

   b. Fill port coverplate, 3 1/2" diameter, shall be opened after loosening a hand nut/clamp bar assembly. In consideration for safety, hand nut threads must provide slow release of pressure, andthe clamp bar shall be retained by detente lugs. A Teflon gasket shall prevent adhesion of the fill port cover to the casing.

   c. Casing drain plug shall be at least 1 1/4" NPT to insure completeand rapid draining.

   d. Liquid volume and recirculation port design shall be consistent with performance criteria listed under Section 6.4.

2. Coverplate: Coverplate shall be cast iron Class 30. Design mustincorporate following maintenance features:

   a. A lightweight inspection coverplate, retained by acorn nuts, for access to pump interior for removal of stoppages. Designs that require removal of complete coverplate assembly for access to the impeller will not be accepted.

   b. Retained by acorn nuts for complete access to pump interior.

Back coverplate removal must allow service to the impeller, seal, wear plate or check valve without removing suction or discharge piping. Back coverplate shall incorporate an obstruction free flow path by combining four support posts into a two-point "webbed" plate design for increased durability, reduced clogging, and increased operational efficiency.

c. Aggressive Self-Cleaning Wear Plate

1) A replaceable wear plate secured to the back cover plate by studs and nuts. Wear plate shall be self-cleaning design ensuring that debris is cleared away and does not collect on the impeller vanes.

2) The nature of the conveyed medium poses significant challenges to the continuous operation of the pump. Of particular concern is the clogging of the impeller by debris in the pumped medium including but not limited to long rags, fibers, and like debris which are able to wrap around the impeller vanes, stick to the center of the vanes or hub, or lodge within the spaces between the impeller and the housing.

3) The aggressive self-cleaning wear plate shall have integral laser cut notches and grooves in combination with a "tooth" designed to disturb and dislodge any solids which might otherwise remain on the impeller in dynamic operation. Wear plate is designed to constantly and effectively clear the eye of the impeller without the use of blades or cutters.

d. In consideration for safety, a pressure relief valve shall be supplied in the inspection coverplate. Relief valve shall open at 75-200 PSI.

e. One O-ring of Buna-N material shall seal inspection coverplate to back coverplate.

f. Two O-rings of Buna-N material shall seal back coverplate to pump casing.

g. Pusher bolt capability to assist in removal of inspection coverplate or back coverplate. Pusher bolt threaded holes shall be sized to accept same retaining capscrews as used in rotating assembly.

h. Easy-grip handle shall be mounted to face of inspection coverplate.

3. Rotating Assembly: A rotating assembly, which includes impeller, shaft,mechanical shaft seal, lip seals, bearings, seal plate and bearing housing, must be removable as a single unit without disturbing the pump casing orpiping. Design shall incorporate following features:

a. Seal plate and bearing housing shall be cast iron Class 30. Separateoil filled cavities, vented to atmosphere, shall be provided for shaftseal and bearings. Cavities must be cooled by the liquid pumped. Three lip seals will prevent leakage of oil.

1) The bearing cavity shall have an oil level sight gauge andfill plug check valve. The clear sight gauge shall provideeasy monitoring of the bearing cavity oil level and condition of oil without removal of the fill plug check valve. The check valve shall vent the cavity but prevent introduction of moist air to the bearings.

2) The seal cavity shall have an oil level sight gauge and fill/vent plug. The clear sight gauge shall provide easy monitoring of the seal cavity oil level and condition of oilwithout removal of the fill/vent plug.

3) Double lip seal shall provide an atmospheric path providingpositive protection of bearings, with capability for external drainage monitoring.

b. Impeller shall be ductile iron, two-vane, semi-open, non-clog, withintegral pump out vanes on the back shroud. Impeller shall thread onto the pump shaft and be secured with a lockscrew and conical washer.

c. Shaft shall be AISI 17-4 pH stainless steel shall be supplied.

d. Bearings shall be anti-friction ball type of proper size anddesign towithstand all radial and thrust loads expected during normal operation. Bearings shall be oil lubricated from a dedicated reservoir. Pump designs which use the same oil to lubricate the bearings and shaft seal shall not be acceptable.

e. Shaft seal shall be oil lubricated mechanical type. The stationary and rotating seal faces shall be tungsten titanium carbide alloy. Each mating surface shall be lapped to within three light bands flatness (35 millionths of an inch), as measured by an optical flat under monochromatic light. The stationary seal seat shall be

double floating by virtue of a dual O-ring design; an external O-ring secures the stationary seat to the sealplate, and an internal O- ring holds the faces in alignment during periods of mechanical or hydraulic shock (loads which cause shaft deflection, vibration, andaxial/radial movement). Elastomers shall be viton. Cage and spring to be AISI 316 stainless steel. Seal shall be oil lubricated from a dedicated reservoir. The same oil shall not lubricate both shaft seal and shaft bearings. Seal shall be warranted in accordance with requirements listed under Section 30.7.

f. Pusher bolt capability to assist in removal of rotating assembly. Pusher bolt threaded holes shall be sized to accept same capscrews as used for retaining rotating assembly.

4. Adjustment of the impeller face clearance (distance between impeller and wearplate) shall be accomplished by external means.

a. Clearances shall be maintained by a four point external shimless coverplate adjustment system, utilizing a four collar and four adjusting screw design allowing for incremental adjustment of clearances by hand as required. Each of the four points shall be lockable to prevent inadvertent clearance increases or decreases due to equipment vibration or accidental operator contact. The four point system also allows for equal clearance gaps at all points between the impeller and wear plate. Requirement of realignment of belts, couplings, etc., shall not be acceptable. Coverplate shall be capable of being removed without disturbing clearance settings. Clearance adjustment systems that utilize less than four points will not be considered.

b. There shall be provisions for additional clearance adjustment in theevent that adjustment tolerances have been depleted from the coverplate side of the pump. The removal of stainless steel shims from the rotating assembly side of the pump shall allow for furtheradjustment as described above

c. Clearance adjustment which requires movement of the shaft only,thereby adversely affecting seal working length or impeller back clearance, shall not be acceptable.

5. Suction check valve shall be molded Neoprene with integral steel and nylon reinforcement. A blow-out center shall protect pump casing from hydraulic shock or excessive pressure. Removal or installation of the check valve must be accomplished through the coverplate opening,

without disturbing the suction piping. Sole function of check valve shall be to save energy by eliminating need to reprime after each pumping cycle. Pumps requiring a suction check valve to assist reprime will not be acceptable.

6. Spool flanges shall be one-piece cast iron, class 30 fitted to suction and/or discharge ports. Each spool shall have one 1-1/4" NPT and one 1/4" NPT tapped hole with pipe plugs for mounting gauges or other equipment.

D. Serviceability

1. The pump manufacturer shall demonstrate to the Engineer's satisfactionthat consideration has been given to reducing maintenance costs.

2. No special tools shall be required for replacement of any componentswithin the pump.

30.12 VALVES AND PIPING

A. Check Valve: Each pump shall be equipped with a full flow type check valve capable of passing a 3" spherical solid. Valve shall be constructed with flanged ends and fitted with an external lever and torsional spring. Valve seat shall be constructed of stainless steel, secured to the body to ensure concentricity, sealed by an O ring, and shall be replaceable. The valve body shall be cast iron incorporating a clean out port large enough to allow removal and/or replacement of the valve clapper without removing valve or piping from the line. Valve clapper shall have a molded neoprene seating surface incorporating low pressure sealing rings. Valve hinge pin and internal hinge arm shall be stainless steel supported on each end in brass bushings. Shaft nut shall have double O rings which shall be shall be easily replaceable without requiring access to interior of valve body. All internal hardware shall be stainless steel. Valve shall be rated at 175 PSI water working pressure, 350 PSI hydrostatic test pressure. Valves other than full flow type or valves mounted in such a manner that prevents the passage of a 3" spherical solid shall not be acceptable.

B. Plug Valve: A 3 way plug valve must allow either or both pumps to be isolated from the force main. The plug valve shall be non-lubricated, tapered type. Valve body shall be cast iron with flanged end connections drilled to 125 pound standard. The drip tight shutoff plug shall be mounted in stainless steel bearings, and shall have a resilient facing bonded to the sealing surface. Valve shall be operated with a single lever actuator providing lift, turn, and reseat action. The lever shall have a locking device to hold the plug in the desired position.

C. Automatic air release valves:

1. An automatic air release valve shall be furnished for each pump designed to permit the escape of air to the atmosphere during initial priming or unattended repriming cycles. Upon completion of the priming cycle or repriming cycle, the valve shall close to prevent recirculation. Valves shall provide visual indication of valve closure, and shall operate solely on discharge pressure. Valves which require connection to the suction line shall not be acceptable.

2. All valve parts exposed to sewage shall be constructed of cast iron, stainless steel, or similar corrosion resistant materials. Diaphragms, if used, shall be of fabric reinforced neoprene or similar inert material.

3. A cleanout port, three inches in diameter, shall be provided for ease of inspection, cleanout, and service.

4. Valves shall be field adjustable for varying discharge heads.

5. Connection of the air release valves to the station piping shall include stainless steel fittings.

D. Gauge Kit

1. A gauge kit shall be supplied for each pump. Suction pressure must be monitored by a glycerin-filled compound gauge, and discharge pressure by a glycerin-filled pressure gauge. Gauges to be at least 4 inches in diameter, graduated in feet water column. Rated accuracy shall be 1% of full scale reading. Compound gauge shall be graduated -34 to +34 feet water column minimum. Pressure gauge to be graduated 0 to 140 feet water column minimum.

2. Gauges to be factory mounted on a resilient panel with frame assembly secured to pumps or piping. Gauge installations shall be complete with all hoses and stainless steel fittings, including a shutoff valve for each gauge line at the point of connection to suction and discharge pipes.

E. Piping

1. Flanged header pipe shall be centrifugally cast, ductile iron, complying with ANSI/AWWA A21.51/C115 and class 53 thickness.

2. Flanges shall be cast iron class 125 and Comply with ANSI B16.1.

3. Pipe and flanges shall be threaded and suitable thread sealant applied before assembling flange to pipe.

4. Bolt holes shall be in angular alignment within 1/2 degree between flanges. Flanges shall be faced with a gasket finish having concentric grooves a minimum of 0.01 inch deep by approximately 0.03 inch wide, with a minimum of three grooves on any given surface spaced a maximum of 1/4 inch apart.

5. Suction pipes shall be fabricated of Type 316 stainless steel in accordancewith ASTM A-312.

F. Contractor must insure all pipes connected to the pump station are supported to
prevent piping loads from being transmitted to pumps or station piping.

30.13 DRIVE UNIT

A. Motors

1. Pump motors shall be horizontal ODP, NEMA design B with cast iron frame with copper windings, induction type, with class F insulation and 1.15 Service Factor for normal starting torque and low starting current characteristics, suitable for continuous service with HP and RPM as shown on equipment schedules. The motors shall not overload at the design condition or at any head in the operating range as specified. Motors shall be suitable for operation using the utility power available specified in part 1 of this section.

2. Motors shall be tested in accordance with provisions of ANSI/IEEE Std112, Method B.

30.14 DRIVE TRANSMISSION

A. Power to pumps transmitted V-belt drive assemblies. The sheave/belt combination shall provide the speed ratio needed to achieve the specified pumpoperating conditions.

B. Each drive assembly shall utilize at least two V-belts providing minimum a combined safety factor of 1.5. Single belt drives or systems with a safety factor of less than 1.5 are not acceptable. Computation of safety factors shall be based on performance data published by the drive manufacturer.

C. Precise alignment tolerances of the drive assemblies shall be achieved by means of a belt/sheave laser alignment system resulting in the reduction of vibration, accelerated wear, and premature failure.

D. The pump manufacturer shall submit power transmission calculations

whichdocument the following:

1. Ratio of pump/motor speed.

2. Pitch diameter of driver and driven sheaves.

3. Number of belts required per drive.

4. Theoretical horsepower transmitted per belt, based on vendor's data.

5. Center distance between pump and motor shafts.

6. Arc-length correction factor applied to theoretical horsepower transmitted.

7. Service factor applied to established design horsepower.

8. Safety factor ratio of power transmitted/brake horsepower required.

E. Pump drives to be enclosed on all sides by a guard constructed of fabricated steel or combination of materials including expanded, perforated, or solid sheet metal. No opening to a rotating member shall exceed 1/2 inch.

1. Guards must be completely removal without interference from any unitcomponent, and shall be securely fastened and braced to the unit base.

2. Metal to be free from burrs and sharp edges. Structural joints shall becontinuously welded. Rivet spacing on panels shall not exceed five inches. Tack welds shall not exceed four inch spacing.

3. The guard shall be finished with one coat of gray W.R. non lift primer andone coat of orange acrylic alkyd W.R. enamel in accordance with section 3, Color Definitions of ANSI 253.1; Safety Color Code for Marking Physical Hazards.

30.15 FINISH

A. Pumps, piping and exposed steel framework shall be cleaned prior to coating using an approved solvent wipe or phosphatizing cleaner. The part must thoroughly dry before paint application. Open joints shall be caulked with an approved polyurethane sealant. Exposed surfaces to be coated with two coats of a semi gloss white 2-component epoxy/polyamide to a dry film thickness of a minimum of 10 mils (5 mils minimum per coat). Coating shall be a high solids, 2 component epoxy/polyamide semi-gloss white coating for optimum illumination enhancement. The coating shall be corrosion, moisture, oil, and

solvent resistant when completely dry. The factory finish shall allow for over-coating and touch-up for 6 months after coating. Thereafter, it will generally require sanding to accept a topcoat or touch-up coating. See Product Data Sheet for additional information.

30.16 ELECTRICAL CONTROL COMPONENTS

A. The pump station control panel will be tested as an integral unit by the pump station manufacturer. The control panel shall also be tested with the pump stationas a complete working system at the pump station manufacturer's facility.

B. Panel Enclosure

1. Electrical control equipment shall be mounted within a common NEMA 1 stainless steel, dead front type control enclosures. Doors shall be hinged and sealed with a neoprene gasket and equipped with captive closing hardware. Control components shall be mounted on removable steel back panels secured to enclosure with collar studs.

2. ll control devices and instruments shall be secured to the sub-plate with machine screws and lockwashers. Mounting holes shall be drilled and tapped; self-tapping screws shall not be used to mount and component. All control devices shall be clearly labeled to indicate function.

C. Branch Components

1. All motor branch and power circuit components shall be of highest industrial quality. The short circuit current rating of all power circuit devices shall be a tested combination or evaluated per the National Electrical Code Article 409. the lowest rated power circuit component shall be the overall control panel short circuit rating and shall not be less than the fault current available. The minimum control panel rating shall not be less than 10 kA, rms symmetrical. Control assemblies operating at 120 volts nominal or less may be provided with transformers which limit the fault current and may be rated less than the minimum required short circuit rating.

2. Circuit Breakers and Operating Mechanisms

a. A properly sized heavy duty circuit breaker shall be furnished for each pump motor. The circuit breakers must be sealed by the manufacturer after calibration to prevent tampering.

b. An operating mechanism installed on each motor circuit breaker shall penetrate the control panel door. A padlockable operator handle shall be secured on the exterior surface.

Interlocks must prevent opening the door until circuit breakers are in "OFF" position. An additional mechanism(s) shall be provided on the circuit breaker permitting the breaker to be operated and/or locked with the control panel door in the open position.

3. Motor Starters

a. An open frame, across the line, NEMA rated magnetic starter with under voltage release, and overload protection on all three phases, shall be furnished for each pump motor. Starters of NEMA size 1 and above shall allow addition of at least two auxiliary contacts. Starters rated "O", "OO", or fractional size are not acceptable. Power contacts to be double break type made of cadmium oxide silver. Coils to be epoxy molded for protection from moisture and corrosive atmospheres. Contacts and coils shall be easily replaceable without removing the starter from its mounted position. Each starter shall have a metal mounting plate for durability.

4. Overload Relays

a. Overload relays shall be solid state block type, having visual trip indication with trip-free operation. Electrically resetting the overload will cause one (1) normally open and one (1) normally closed isolated alarm/control contact to reset, thus re-stablishing a control circuit. Trip setting shall be governed by solid state circuitry and adjustable current setting. Trip classes shall be 10, 15 and 20. Additional features to include phase loss protection, selectable jam/stall protection and selectable ground fault protection.

b. A reset pushbutton, mounted through the control panel door, shall permit resetting the overload relays without opening the door.

D. Phase Monitor: The control panel shall be equipped to monitor the incoming power and shut down the pump motors when required to protect the motor(s) from damage caused by phase reversal, phase loss, voltage unbalance, high voltage, and low voltage. An adjustable time delay shall be provided to minimize nuisance trips. The motor(s) shall automatically restart, following an adjustable time delay, when power conditions return to normal.

E. Panel Heater: The control panel shall be equipped with a panel heater to minimizethe effects of humidity and condensation. The heater shall include a thermostat.

F. Control Circuit

1. A normal duty thermal magnetic circuit breaker shall protect all controlcircuits by interrupting control power.

2. Pump mode selector switches shall permit manual start or stop of each pump individually, or permit automatic operation under control of the liquid level control system. Manual operation shall override all shutdown systems, except the motor overload relays. Selector switches to be oil tight design with contacts rated NEMA A300 minimum.

3. Pump alternation shall be integral to the liquid level controller. Provisionsfor automatic alternation or manual selection shall also be integral to the liquid level controller.

4. Six digit elapsed time meter (non reset type) shall be connected to each motor starter to indicate total running time of each pump in "hours" and "tenths of hours". An integral pilot light shall be wired in parallel to indicate that the motor is energized and should be running.

5. A high pump temperature protection circuit shall override the level control and shut down the pump motor(s) when required to protect the pump from excessive temperature. A thermostat shall be mounted on each pump casing and connected to a high pump temperature shutdown circuit. If casing temperature rises to a level sufficient to cause damage, the thermostat causes the pump shutdown circuit to interrupt power to the motor. A visible indicator located on the control panel door shall indicate motor stopped due to high pump temperature. The motor shall remain locked out until the pump has cooled and circuit has been manually reset. Automatic reset of this circuit is not acceptable.

6. A duplex ground fault receptacle providing 115 VAC, 60 Hz, single phase current, will be mounted on the side of the control enclosure. Receptacle circuit shall be protected by a 15 ampere thermal magnetic circuit breaker.

7. The lift station shall be equipped with a 3 KVA stepdown transformer to supply 115 volt, AC, single phase for the control and auxiliary equipment. The primary and secondary side of the transformer to be protected by a thermal magnetic circuit breaker, sized to meet the power requirements of the transformer. An operating mechanism shall penetrate the control panel door. And a padlockable operator handle shall be secured on the exterior surface. Interlocks must prevent opening the door until circuit breakers are in "OFF" position. An additional mechanism(s) shall be provided on the circuit breaker permitting the breaker to be operated and/or locked with the control panel door in the

open position.

8. Wiring

a. The pump station, as furnished by the manufacturer, shall be completely wired, except for power feed lines to the branch circuit breakers and final connections to remote alarm devices.

b. All wiring, workmanship, and schematic wiring diagrams shall comply with applicable standards and specifications of the National Electric Code (NEC).

c. All user serviceable wiring shall be type MTW or THW, 600 volts, color coded as follows:

1) Line and Load Circuits, AC or DC power. ..... Black

2) AC Control Circuit Less Than Line Voltage ..... Red

3) DC Control Circuit..... Blue

4) Interlock Control Circuit, from External Source..... Yellow

5) Equipment Grounding Conductor. ..... Green

6) Current Carrying Ground ..... White

7) Hot With Circuit Breaker Open. ..... Orange

d. Control circuit wiring inside the panel, with exception of internal wiring of individual components, shall be 16 gauge minimum, type MTW or THW, 600 volts. Power wiring to be 14 gauge minimum. Motor branch wiring shall be 10 gauge minimum.

e. Motor branch and other power conductors shall not be loaded above the temperature rating of the connected termination. Wires must be clearly numbered at each end in conformance with applicable standards. All wire connectors in the control panel shall be ring tongue type with nylon insulated shanks. All wires on the sub-plate shall be bundled and tied. All wires extending from components mounted on door shall terminate at a terminal block mounted on the back panel. All wiring outside the panel shall be routed through conduit.

f. Control wires connected to door mounted components must be tied and bundled in accordance with good commercial practice.

Bundles shall be made flexible at the hinged side of the enclosure. Adequate length and flex shall allow the door to swing full open without undue stress or abrasion. Bundles shall be held on each side of hinge by mechanical fastening devices.

9. Factory installed conduit shall conform to following requirements:

   a. All conduit and fittings to be UL listed.

   b. Liquid tight flexible metal conduit to be constructed of smooth, flexible galvanized steel core with smooth abrasion resistant, liquidtight polyvinyl chloride cover.

   c. Conduit to be supported in accordance with articles 346, 347, and350 of the National Electric Code.

   d. Conduit shall be sized according to the National Electric Code.

10. Grounding

   a. Station manufacturer shall ground all electrical equipment inside the pump station to the control panel back plate. All paint must be removed from the grounding mounting surface before making final connection.

   b. The contractor shall provide an earth driven ground connection to the pump station at the main grounding lug in accordance with the National Electric Code (NEC).

11. Equipment Marking

   a. Permanent corrosion resistant name plate(s) shall be attached to thecontrol and include following information:

      1) Equipment serial number

      2) Control panel short circuit rating

      3) Supply voltage, phase and frequency

      4) Current rating of the minimum main conductor

      5) Electrical wiring diagram number

      6) Motor horsepower and full load current

      7) Motor overload heater element

8) Motor circuit breaker trip current rating

9) Name and location of equipment manufacturer

b. Control components shall be permanently marked using the same identification keys shown on the electrical diagram. Labels shall be mounted adjacent to device being identified.

c. Switches, indicators, and instruments mounted through the control panel door shall be labeled to indicate function, position, etc. Labels shall be mounted adjacent to, or above the device.

30.17 LIQUID LEVEL CONTROL (EPS AIR BUBBLER TYPE)

A. The manufacturer of the liquid level control system must be ISO 9001:2000 revision certified, with scope of registration including design control and service after sales activities.

B. The level control system shall start and stop the pump motors in response tochanges in wet well level, as set forth herein.

C. The level control system shall be capable of operating as either an air bubbler type level control system, submersible transducer type system, or ultrasonic transmitter type system.

D. The level control system shall utilize alternation to select first one pump, then the second pump, to run as lead pump for a pumping cycle. Alternation shall occur at the end of a pumping cycle, or in the event of excessive run time.

E. The level control system shall utilize an electronic pressure switch which shall continuously monitor the wet well level, permitting the operator to read wet well level at any time. Upon operator selection of automatic operation, the electronic pressure switch shall start the motor for one pump when the liquid level in the wet well rises to the "lead pump start level". When the liquid is lowered to the "lead pump stop level", the electronic pressure switch shall stop this pump. These actions shall constitute one pumping cycle. Should the wet well level continue to rise, the electronic pressure switch shall start the second and/or third pump (if required) when the liquid reaches the "lag pump start level", or “standby pump start level” so that all pumps are operating. These levels shall be adjustable as described below.

1. The electronic pressure switch shall include integral components to perform all pressure sensing, signal conditioning, EMI and RFI suppression, DC power supply and 120 volt outputs. Comparators shall be solid state, and shall be integrated with other components to perform

as described below.

2. The electronic pressure switch shall be capable of operating on a supply voltage of 12-24Vdc in an ambient temperature range of 10 degrees C (14 degrees F) through 55 degrees C (131 degrees F). Ingress Protection of IP56 for indoor use with closed cell neoprene blend gasket material. Evaluated by Underwriters Laboratories for Pollution Degree 2 device for U.L. and cU.L. Control range shall be 0 to 33.3 feet of water with an overall repeat accuracy of (plus/minus) 0.1 feet of water. Memory shall be non volatile. A Battery backed real time clock shall be standard.

3. Eleven optically isolated, user defined digital inputs for pump and alarm status. Rated at 10mA at 24Vdc. Eight digital output relays (mechanical contacts), configurable for pump start/stop or alarms. Three relays rated at 12 Amp @ 28Vdc and 120Vac, five relays rated at 3 Amp @ 30Vdc and 120Vac. The electronic pressure switch shall consist of the following integral components: pressure sensor, display, electronic comparators, digital inputs and digital output relays.

   a. The internal pressure sensor shall be a strain gauge transducer and shall receive an input pressure from the air bubbler system. The transducer shall convert the input to a proportional electrical signal for distribution to the display and electronic comparators. The transducer output shall be filtered to prevent control response to level pulsations or surges. The transducer range shall be 0 14.5 PSI, temperature compensated from 40 degrees F through 85 degrees, with a repeat accuracy of (plus/minus) 2.5% full scale about a fixed temperature. Transducer overpressure rating shall be 3 times full scale.

   b. The electronic pressure switch shall incorporate a digital back lighted LCD panel display which, upon operator selection, shall indicate liquid level in the wet well, and pump status indication for up to 3 pumps. The display shall include a 128 x 64 bit resolution LCD to read out directly in feet of water, accurate to within one tenth foot (0.1 foot), with a full scale indication of not less than 12 feet. The display shall be easily convertible to indicate English or metric units.

   c. Level adjustments shall be electronic comparator set points to control the levels at which the lead, lag and standby pumps start and stop. Each of the level settings shall be easily adjustable with the use of membrane type switches, and accessible to the operator without opening any cover panel on the electronic pressure switch. Controls shall be provided to permit the operator to read the selected levels on the display. Such

adjustments shall not require hard wiring, the use of electronic test equipment, artificial level simulation or introduction of pressure to the electronic pressure switch.

d. Each digital input can be programmed as pump run, pump HOA, pump high temp, pump moisture/thermal, starter failure (FVNR, RVSS, VFD), and phase failure. Inputs are used for status and alarm indication.

e. Each output relay in the electronic pressure switch shall be hard contact mechanical style. Each relay input shall be optically isolated from its output and shall incorporate zero crossover switching to provide high immunity to electrical noise. Each output relay shall have an inductive load rating equivalent to one NEMA size 3 contactor. A pilot relay shall be incorporated for loads greater than a size 3 contactor.

4. The electronic pressure switch shall be equipped with alarm banners with time and date history for displaying alarm input notification. Alarm history will retain a 16 of the most recent alarm events.

5. The electronic pressure switch shall be equipped with pump start/stop and alarm input delay(s) that have an adjustable delay set points.

6. An Antiseptic function with a built in timer shall be incorporated in the electronic pressure switch to prevent the well from becoming septic.

7. The electronic pressure switch shall be capable of jumping to next available pump if current pump is out of service due to pump failure or manual selection. Circuit design in which application of power to the lag pump motor starter is contingent upon completion of the lead pump circuit shall not be acceptable.

8. The electronic pressure switch shall be equipped with a simulator system capable of performing system cycle testing functions.

9. The electronic pressure switch shall be capable of calculating and displaying pump elapse run time. The elapse run time is resettable and adjustable.

10. The electronic pressure switch shall have internal capability of providing automatic simplex, duplex, and triplex alternation, manual selection of pump sequence operation, and alternation in the event of 1-24 hours of excessive run time.

11. The electronic pressure switch shall be equipped with a security access code to

prevent accidental set up changes and provide liquid level set point lock out. The supervisor access code is adjustable.

12. The electronic pressure switch shall be equipped with one (1) 0 33 ft. W.C. input, one (1) scalable analog input of either 0 5Vdc, or 4 20mA, and one (1) scalable analog output of either 0-5Vdc, 0-10Vdc or 4-20mA. Output is powered by 10-24Vdc supply. Load resistance for 4 20mA output shall be 100 1000 ohms.

13. The electronic pressure switch shall include a DC power supply to convert 120Vac control power to 12 or 24Vdc power. The power supply shall be 500 mA (6W) minimum and be UL listed Class II power limited power supply.

14. The electronic pressure switch shall be equipped with an electronic comparator and mechanical output relay to alert maintenance personnel to a high liquid level in the wet well. An alarm banner, visible on the front of the controller, shall indicate that a high wet well level exists. The alarm signal shall be maintained until the wet well level has been lowered and the circuit has been manually reset. High water alarm shall be furnished with a dry contact wired to terminal blocks.

15. The electronic pressure switch shall be equipped with an electronic comparator and mechanical output relay to alert maintenance personnel to a low liquid level in the wet well. An alarm banner, visible on the front of the controller, shall indicate that a low wet well level exists. The alarm signal shall be maintained until the cause for the low wet well level has been corrected and the circuit has been manually reset. A low liquid level condition shall disable all pump motors. When the wet well rises above the low level point, all pump motors shall be automatically enabled. Low water alarm shall be furnished with a dry contact wired to terminal blocks.

F. An alarm silence pushbutton and relay shall be provided to permit maintenance personnel to de energize the audible alarm device while corrective actions are under way. After silencing the alarm device, manual reset of the alarm condition shall clear the alarm silence relay automatically. The pushbutton shall be a membrane style button integral to the Integrinex Standard level controller.

G. Air Bubbler System

1. The level control system shall be the air bubbler type, containing air bubbler piping which extends into the wet well. A pressure sensor contained within the electronic pressure switch shall sense the air pressure in this piping to provide wet well level signals for the remainder of the level control system.

2. Two vibrating reed, industrial rated, air pumps shall be furnished to deliver free air at a rate of approximately 5 cubic feet per hour and a pressure not to exceed 7 psi. Liquid level control systems utilizing air compressors delivering greater quantities of air at higher pressures, requiring pressure reducing valves, air storage reservoirs, and other maintenance nuisance items will not be acceptable. A selector switch shall be furnished to provide manual alternation of the air pumps. The switch shall be connected in such a manner that either pump may be selected to operate continuously. The selector switch shall be oil tight design with contacts rated NEMA A300 minimum.

3. An air bell constructed of PVC 3 inches in diameter shall be provided for installation at the outlet of the air bubbler line in the wet well. The air bell shall have a 3/8" NPT tapped fitting for connection to the bubbler line.

4. An air flow indicator gauge shall be provided and connected to the air bubbler piping to provide a visual indication of rate of flow in standard cubic feet per hour.

H. Alarm Light (External): Station manufacturer will supply one 115 VAC alarm light fixture with vapor-tight shatter resistant red globe, conduit box, and mounting base. The design must prevent rain water from collecting in the gasketed area of the fixture, between the base and globe. The alarm light will be shipped loose for installation by the contractor.

I. Alarm Horn (External): Station manufacturer will supply one 115 VAC weatherproof alarm horn with projector, conduit box, and mounting base. The design must prevent rain water from collecting in any part of the horn. The alarm horn will be shipped loose for installation by the contractor.

30.18 EXAMINATION

A. Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Station manufacturer shall provide written instruction for proper handling. Immediately after off-loading, contractor shall inspect complete pump station and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all station serial numbers and parts lists with shipping documentation. Notify the manufacturer's representative of any unacceptable conditions noted with shipper.

30.19 INSTALLATION

A. Install, level, align, and lubricate pump station as indicated on project drawings.Installation must be in accordance with written instructions supplied by the manufacturer at time of delivery. The manufacturer's technical representative shall be present onsite during the installation of the lift station.

B. Suction pipe connections must be vacuum tight. Fasteners at all pipe connectionsmust be tight. Install pipe with supports and thrust blocks to prevent strain and vibration on pump station piping. Install and secure all service lines (level control, air release valve or pump drain lines) as required in wet well.

C. Check motor and control data plates for compatibility to site voltage. Install and test the station ground prior to connecting line voltage to station control panel.

D. Prior to applying electrical power to any motors or control equipment, check all wiring for tight connection. Verify that protective devices (fuses and circuit breakers) conform to project design documents. Manually operate circuit breakers and switches to ensure operation without binding. Open all circuit breakers and disconnects before connecting utility power. Verify line voltage, phase sequence and ground before actual start-up.

E. After all anchor bolts, piping and control connections are installed, completely fillthe grout dam in the pump station base with non-shrink grout.

30.20 FIELD QUALITY CONTROL

A. Operational Test

1. Prior to acceptance by owner, an operational test of all pumps, drives, and control systems shall be conducted to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating characteristics.

2. After construction debris and foreign material has been removed from the wet well, contractor shall supply clear water volume adequate to operate station through several pumping cycles. Observe and record operation of pumps, suction and discharge gage readings, ampere draw, pump controls, and liquid level controls. Check calibration of all instrumentation equipment, test manual control devices, and automatic control systems. Be alert to any undue noise, vibration or other operational problems. The manufacturer's technical representative shall be present onsite during testing.

B. Coordinate station start-up with manufacturer's technical representative. The representative or factory service technician will inspect the completed installation. They will calibrate and adjust instrumentation, correct or supervise correction of defects or malfunctions, and instruct operating personnel in proper operation and maintenance procedures.

C. Prior to acceptance, inspect interior and exterior of pump station for dirt, splashed material or damaged paint. Clean or repair accordingly. Remove from the job site all tools, surplus materials, scrap and debris.

D. The pump station should be placed into service immediately. If operation is delayed, drain water from pumps and piping. Open motor circuit breakers and protect station controls and interior equipment from cold and moisture. Station is to be stored and maintained per manufacturer's written instructions.

30.21 LIST OF RECOMMENDED SPARE PARTS FOR STOCK

A. Pump Assembly:

Item Number	Part Name	Quantity	Remarks
1	Wear Plate Assembly	1	
2	O-Ring	2	Different O-Ringe part number
3	O-Ring Fluorocbn	2	Different O-Ringe part number
4	O-Ring Fluorocbn	1	Different O-Ringe part number
5	Press Relief Valve	1	
6	4in FV Assembly BC VIT	1	
7	Gasket Viton	1	Different Gasket Viton part number
8	Gasket Viton	1	Different Gasket Viton part number
9	Cover Gasket TEF	1	

B. Repair Rotating Assembly:

Item Number	Part Name	Quantity	Remarks
1	Impeller CD4	1	
2	1.50 Seal Assembly	1	
3	Gasket Viton	1	
4	Oil Seal	3	
5	Ball Bearing	1	
6	Ball BRG DBL-Row	1	
7	BRG Cap Gasket Viton	1	
8	Key SST	1	
9	Impeller Shaft SST	1	
10	Impeller Washer SST	1	
11	SOC HD Capscr SST	1	

12	O-Ring Buna	1	Different O-Ringe part number
13	O-Ring Fluorocbn	1	Different O-Ringe part number

30.22 PAYMENT

Payment for the Packaged Abovegroupd Pump Station and Piping shall be made as described in Article X of these Specifications.

ARTICLE XL - ELECTRICAL WORK

40.1 GENERAL

A. Description. The work under this article of the specifications consists of the furnishing and installation of all labor and materials required to complete all electrical work as indicated on the drawings and/or specified herein. The work includes but is not limited to the following:

1. Complete electrical system wiring including electrical apparatus, overcurrent protection devices, luminaires, wiring devices and branch circuiting.

2. As-built drawings.

3. Testing.

B. Coordination with Other Trades. During pricing and construction, Contractor shall coordinate his work with other trades to avoid omissions and overlapping of responsibilities.

C. Special Conditions.

1. Contractor shall arrange for Harbors inspection and acceptance of new work.

2. The Harbors Construction Engineer shall witness all tests. The Contractor shall schedule all testing, in writing, with the Harbors Construction Engineer, a minimum of two (2) weeks prior to testing.

3. Coordinate secondary service outages with Hawaiian Electric and the Harbors Construction Engineer as required.

D. Rules and Permits. The entire installation shall be done in strict accordance with the latest rules and regulations of the National Electrical Code (NEC), National Electrical Safety Code (NESC) and any applicable local electrical ordinances.

E. Symbols. The standard electrical symbols, together with the special symbols, notes and instructions indicated on the drawings, describe the work required and are to be included as a part of these specifications.

F. Drawings and Coordination of Work. These specifications are accompanied by drawings indicating the location of work to be performed.

1. The drawings and these specifications are complementary, each to the other, and what is called for by one shall be as binding as if called for by both.

2. Every effort has been made to indicate clearly and specifically all work required to be performed by the Contractor; however, any item of material, equipment or work not specifically called for herein or on the drawings but which is required to complete the installation so that it will conform to the NEC, NESC, local laws, and the intent and meaning of the plans and specifications, shall be furnished and installed by the Contractor at no additional cost to the State.

3. Before installing, verify all dimensions and sizes of equipment at the job site. Conduit routing is typical and may be altered in any logical manner. However, all changes shall be approved by the Harbors Construction Engineer and shown on "as-built" drawings.

4. Cut, break, drill and patch as required to install electrical system. Repair any surface damaged or marred by notching, drilling or any other process necessary for installation of electrical work. Patch any damaged surfaces to match the existing surface.

5. During pricing and construction, Contractor shall coordinate his work with other trades to avoid omissions and overlapping of responsibilities.

6. Electrical Contractor shall provide conduit, wiring and all electrical connections from service equipment to motors and other equipment, including all switches, motor protection devices, etc. as specified by other trades.

7. All wiring and overcurrent devices for equipment furnished by other trades are sized for a contemplated equipment size. If equipment other than contemplated and indicated on the plan is provided, the Contractor shall be responsible for providing the required wiring, switches, and overcurrent devices at no cost to the State. The Contractor shall submit the proposed revisions to the electrical design to the Harbors Construction Engineer for acceptance.

8. All control devices and control wiring shall be provided as described in the installation manuals of equipment and/or the Drawings and Specifications of other trades and disciplines.

40.2 SUBMITTALS

A. The Contractor shall submit product data for review.

1. Circuit breakers.

2. Safety switches.

3. Luminaires.

4. Wireways.

5. Heavy-duty receptacles.

6. Wiring devices.

7. Coating system for conduits and plywood backboards.

B. Shop drawings and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Approval of shop drawings and catalog cuts shall not release Contractor from complying with intent of specifications and drawings. Any deviations from approved shop drawings shall have prior approval by the Harbors Construction Engineer.

40.3 MATERIALS AND EQUIPMENT

A. General.

1. Materials and equipment shall be new (unless otherwise specified herein) and shall bear the inspection label of the Underwriter's Laboratories, Inc. where such inspection and labeling service is rendered for the materials and equipment in question.

2. Brand names and catalog numbers used herein to specify materials and equipment (unless otherwise noted) are to indicate the standards of design and quality required. Materials and equipment of equal quality of other manufacturers will be accepted subject to the approval of the Harbors Construction Engineer.

3. Electrical distribution equipment and luminaires shall be supplied through a locally-based manufacturer's designated representative by a local distributor.

4. Where two or more similar type items are furnished, all shall be of the same manufacture, e.g., safety switches shall be of the same manufacturer unless otherwise noted.

B. Circuit Breakers

1. Circuit breakers, unless otherwise shown, shall be molded case, toggle mechanism operated, with no-fuse ambient-compensated thermal-magnetic overload automatic trip units for overcurrent and short-circuit protection, interchangeable trip units when available and contacts rated to interrupt short-circuit currents as specified on Drawings. Multi-pole breakers shall have single, common operating handle for all poles. Toggle positions "ON", "OFF" and "TRIPPED" and breaker rating engraved or embossed on body and visible without removing enclosure cover.

2. Enclosures to be NEMA 4X stainless steel, Type 316.

C. Safety Switches.

1. Safety switches shall be heavy-duty grade, double throw to include 2 interlocked switches with a common connection, sized as indicated.

2. Enclosures to NEMA 4X stainless steel, Type 316.

D. Luminaires.

1. Provide luminaires specifically engineered for LED light sources and drivers. Use of linear or screw-base retrofit LED light sources is not acceptable. LED luminaires shall carry a minimum manufacturer's warranty of 5 years. The Surety shall not be held liable beyond two (2) years of the project acceptance date.

2. LED Light Sources.

a. Correlated Color Temperature (CCT) shall be in accordance with NEMA ANSLG C78.377: Nominal CCT: 4000 degrees K, unless otherwise specified.

b. Color Rendering Index (CRI) shall be greater than or equal to 80 unless otherwise indicated.

c. Color Consistency: Manufacturer shall utilize a maximum 4-step MacAdam ellipse binning tolerance for color consistency of LEDs used in luminaires.

3. LED Luminaire Power Supply Units (Drivers). UL 1310. LED Power Supply Units (Drivers) shall meet the following requirements:

a. Minimum efficiency shall be 85 percent.

b. Shall be rated to operate between ambient temperatures of minus 22 degrees F and 104 degrees F.

c. Shall be designed to operate on the voltage system to which they are connected, typically ranging from 120V to 277V nominal.

d. Operating frequency shall be: 60 Hz.

e. Power Factor (PF) shall be greater than or equal to 0.90.

f. Total Harmonic Distortion (THD) current shall be less than or equal to 20 percent.

g. Shall be mounted integral to luminaire. Remote mounting of power supply is not allowed unless noted.

h. Power supplies in luminaires shall be UL listed with a sound rating of "A".

i. Shall be equipped with over-temperature protection circuit that turns light source off until normal operating temperature is achieved.

4. A warranty must be provided for full replacement of LED luminaires, due to any failure for a period of 5 years. The warranty shall provide for the repair or replacement of the luminaire and LED power components (LED driver, light source thermal control device and surge protector).

E. Boxes and Enclosures.

1. Outlet and Small Junction Boxes (Dimension Less than 6-inches). Small junction boxes shall be die-cast aluminum with threaded hubs. Nominal 4-inches square by 2-inches deep.

2. Boxes and Wireway Larger than 4 Inches Square. NEMA 4X, Type 316 stainless steel with threaded hubs.

F. Heavy-Duty Receptacles.

1. Industrial, heavy-duty type, circuit breaking type. High impact strength, copper-free aluminum housing with cast aluminum backbox and spring loaded door. Epoxy powder coat finish.

2. Non-metallic receptacle, fiberglass-reinforced insulation, pin and sleeve type with grounding pole. Rating as indicated.

G. Wiring Devices.

1. Toggle Switches. Ivory, 20A, double pole, 120/277V, non-mercury quiet type, specification grade with nylon body.

2. Provide weatherproof, gasketed flip open cover, cast aluminum, pad-lockable.

H. Raceways.

1. Polyvinyl chloride (PVC) Schedule 40. All underground ductlines shall be concrete encased.

2. Rigid Steel Conduit: Rigid steel, zinc-coated inside and outside, for use with threaded fittings. ANSI C80.1. Provide sealing fittings as specified.

I. Wire and Cable.

1. Conductors. All conductors shall be copper, No. 12 AWG minimum. No. 8 AWG and larger diameter shall be stranded; No. 10 AWG and smaller shall be solid. Do not provide wires and cables manufactured more than 12 months prior to the date of delivery to the site. Aluminum conductors shall not be provided.

2. Color Coding. Provide for feeder and branch circuit conductors. Color shall be green for grounding conductors and white for neutral conductor. Color of ungrounded conductors shall be as follows:

   a. 208/120 volt, three phase and 240 volt, three phase:

      a) Phase A - black
      b) Phase B - red
      c) Phase C - blue

3. Insulation. Type XHHW or RHW-2 unless otherwise specified.

4. Bonding Conductors. Solid bare copper wire for sizes No. 8 AWG and smaller diameter; Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

J. Splices. Any splices necessary shall be compression type, mechanically firm and made only in wireway, pull boxes or handholes. Splices shall be sufficiently taped and coated to provide a completely waterproof permanent joint. An approved plastic electrical tape and waterproof coating shall be used. A minimum of two layers of tape shall be applied.

K. Electrical Tapes.

1. Insulating Tape. UL 510, plastic insulating tape, capable of performing in a continuous temperature environment of 80 degrees C.

2. Other Tapes. Tapes shall be UL listed for electrical insulation and other purposes in wire and cable splices. Terminations, repairs and miscellaneous purposes, electrical tapes shall comply with UL 510.

L. Warning Tape: Pre-printed polyethylene tape marked with "CAUTION BURIED ELECTRICAL LINE BELOW," 4 mil thick, detectable foil backed, 3" minimum width.

M. Duct Seal. Pliable, non-toxic material used for application around and in conduits and to minimize moisture and rodent/insect infiltration. Must be re-enterable material allowing form removal/reapplication after initial installation. Non-drying, non-cracking, non-corrosive material that will not adversely affect raceways and conductors. Provide duct seal at all conduit entries in apparatus.

N. Hardware, Supports, Backing, Etc. All hardware, supports, conduit supports and mounting hardware, backing and other accessories necessary to install electrical equipment shall be provided. Materials shall be stainless steel Type 316, unless otherwise indicated.

40.4 CONSTRUCTION METHODS

A. General.

1. Workmanship subject to approval of Harbors Construction Engineer and inspectors of the utilities who shall be afforded every opportunity to determine skill and competency.

2. Construction shall conform to construction practices as recommended by American Electricians practices as recommended by American Electricians Handbook by Croft (latest edition), National Electrical Code, National Electrical Safety Code, and applicable instructions of manufacturers of equipment and materials supplied for project.

3. Electrical outages shall be granted at the convenience of Harbors. Requests for electrical outages shall be submitted, in writing, a minimum of two (2) weeks prior to the requested outage date and shall be approved by the Harbors Construction Engineer. The request shall indicate the date and time of the requested outage, and the proposed outage duration. Contractor shall advise and/or coordinate work with the Harbors Construction Engineer, Harbors Oahu District, and all users and tenants a minimum of two (2) weeks in advance.

B. Wiring System. Unless otherwise indicated or specified herein, wiring shall consist of single conductor cables installed in conduit in areas where permitted by the National Electrical Code.

C. Concrete: Concrete for electrical requirements shall be at least 3000 psi concrete with one-inch maximum aggregate conforming to the requirements of ARTICLE XX – CONCRETE WORK.

D. Earthwork: Excavation, backfilling, and pavement for repairs for electrical requirements shall conform to the requirements of ARTICLE XIV–TRENCH EXCAVATION AND BACKFILL.

E. Underground Duct with Concrete Encasement:

1. Construct underground duct lines of individual conduits encased in concrete. The conduit shall be of PVC. The concrete encasement surrounding the bank shall be rectangular in cross-section and shall provide at least 3 inches of concrete cover for ducts. Separate conduits by a minimum concrete thickness of 2 inches.

2. Except at conduit risers, accomplish changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, by long sweep bends having a minimum radius of curvature of 25 feet. Sweep bends may be made up of one or more curved or straight sections or combinations thereof. Manufactured bends shall have a minimum radius of 18 inches for use with conduits of less than 3 inches in diameter and a minimum radius of 36 inches for ducts of 3 inches in diameter and larger.

3. Separators shall be of precast concrete, high impact polystyrene, steel, or any combination of these. Stagger the joints of the conduits by rows and layers so as to provide a duct line having the maximum strength. During construction, protect partially completed duct lines from the entrance of debris such as mud, sand and dirt by means of suitable conduit plugs. Draw a brush through having the same diameter of the duct, and having stiff bristles until the conduit is clear of all particles of earth, sand, and gravel.

F. Installation of Aboveground Conduit.

1. Conduits with respect to size shall be installed exactly as shown on the drawings. No deviation from the plan shall be permitted except to increase the size of conduits, if necessary, to accommodate the required size and number of conductors to be installed therein.

2. Conduits shall be installed approximately where shown. The exact location of conduits and conduit supports shall be determined after careful

consideration has been given to the location of other existing electrical, civil and mechanical work.

3. Conduit system shall be continuous from fitting to fitting so that electrical continuity is obtained between all conduits of the system.

4. Cap conduits during construction with plastic bushings to prevent entrance of dirt or moisture. Swab all conduits and dry before installing wires.

5. Surface mounted raceway shall be galvanized rigid steel. Run exposed raceway parallel with, or at right angles to structural elements.

G. Aboveground Conductors.

1. Mechanical means for pulling shall be torque-limiting type and not used for #2 AWG and smaller wires.

2. Pulling tension shall not exceed wire manufacturer's recommendations.

3. Where necessary, powdered soapstone or water-based wire pulling lubricant may be used as a lubricant for drawing wires through conduit. No other means of lubricating will be allowed.

4. Form neatly in enclosures for minimum of crossovers.

5. Splicing of Wire and Cable.

a. Wires shall be formed neatly in enclosures and boxes.

b. Splice in accordance with the National Electrical Code (NEC). Make splices in conductors #10 AWG and smaller with insulated, pressure type connector. Splice conductors #8 through #4/0 with high pressure compression (indent) copper sleeve connectors. Do not use bolt-on connectors. Reinsulate splices and waterproof splices. Reinsulate splices according to wire manufacturer's instructions. Splice insulation shall be 200% in thickness of original wire insulation and of same electrical and mechanical characteristics. Tape shall be 7 mil minimum thickness vinyl plastic.

H. Cable Pulling:

1. Pull cables down grade with the feed-in point at the equipment of the highest elevation. Use flexible cable feeds to convey cables through the handhole opening and into the duct runs. Cable slack shall be accumulated at each junction box where space permits by training the

cable around the interior to form one complete loop. Minimum allowable bending radii shall be maintained in forming such loops.

2. Lubricants for assisting in the pulling of jacketed cables shall be those specifically recommended by the cable manufacturer. The lubricant shall not be deleterious to the cable sheath, jacket, or outer coverings.

3. Cable pulling tensions shall not exceed the maximum pulling tension recommended by the cable manufacturer.

I. Grounding.

1. Ground service, metallic enclosures, raceways and electrical equipment according to requirements of National Electrical Code (NEC), Article 250. Install 3/4 inch x 10' copperclad ground rod with top at 12-inches below finished grade. Provide additional ground rods spaced minimum six feet apart as required. Connect ground rods to service equipment and nearest cold-water pipe with grounding electrode conductor per NEC. Final connection to equipment, raceways, and other metallic parts directly exposed to ungrounded electric conductors shall be No. 12 AWG minimum, copper, NEC type TW, green insulation.

2. Ground connections to equipment, raceways, motors, and other metallic parts directly exposed to ungrounded conductors by insulated conductors, No. 12 minimum, AWG copper, Type TW, green insulation. Provide insulated ground wires to all wiring devices and apparatus.

3. Install green-insulated equipment grounding conductor in all conduits. Conductor sizes per Article 250 of the National Electrical Code.

J. Finishing.

1. All cutting that may be required for the complete installation of the electrical work shall be carefully performed and all patching shall be finished to match existing conditions.

2. Close unused knockouts in boxes or enclosures with metal cap.

3. Wipe clean all new exposed enclosures with rag and solvent.

K. Painting.

1. Coat new surface mounted galvanized steel conduit and existing plywood backboards. Coating manufacturer’s recommendations shall be followed for cleaning, surface preparation, and coating all surfaces to be painted.

2. Surfaces to be coated must be dry, clean, free of oil, grease, dust, wax, soaps, powdery residue, form release agents, curing compounds, laitance, and other foreign matter and be structurally sound. Remove mortar splatter, mill scale and rust.

3. Color shall match the existing coating color of surrounding finishes.

4. All field coatings shall be applied by roller and/or brush applications. No spraying will be allowed.

5. The prime coat shall be applied on the same day that the surface is prepared. It may take more than a single application to obtain the required thickness. If a coat requires more than a single application, it shall be done no later than the following day.

6. The time interval between each coat shall be no more than 24 hours or as recommended by the manufacturer. For intervals exceeding 24 hours, all surfaces shall be rinsed with fresh water or tested for acceptable chloride levels by the technical representative of the product manufacturer. Each coat shall be of a lighter color than the later coat to be coated upon it.

7. Finish work shall be uniform and of approved color. The finish shall completely cover, be smooth and be free from runs, sags, drips, waves, laps or brush marks. Edges of coating adjoining other surfaces of materials shall be sharp and clean without overlapping.

8. Coating shall be allowed to cure completely. Any marred surfaces or damages to the coating finish shall be corrected by proper preparation and recoating.

9. All methods and procedures shall comply with OSHA and HIOSH requirements and be approved by the Construction Engineer.

10. All coatings shall be delivered to the site in the manufacturer's sealed containers. Each container shall be labeled by the manufacturer with the label showing the name, brand, type of coating, color of coating, and the manufacturer's instructions for reducing consistency. The coating materials shall be the following or approved equal.

    a. Water Based Cleaner – Water based cleaner shall be Prep 88 manufactured by PPG Protective and Marine Coatings.

    b. High Solids Epoxy Coating – High Solids Epoxy Coating shall be Amerlock 400 manufactured by PPG Protective and Marine Coatings.

c. Engineered Siloxane Coating – Engineered Siloxane Coating shall be PSX 700 manufactured by PPG Protective and Marine Coatings.

11. Surfaces to be coated shall be cleaned, prepared and coated as follows:

a. Surfaces to be painted shall be cleaned with Prep 88 water based cleaner.

b. Apply two (2) coats of Amerlock 400 at a dry film thickness of 4-6 mils per coat.

c. Apply one (1) coat of PSX 700 at a dry film thickness of 5-7 mils.

12. Clean-up of coatings shall be as follows.

a. All coating, oil, etc. shall be cleaned off the pavement, concrete, vehicle bollards, electrical apparatus and surrounding items where coating has splashed or been spilled. The Contractor shall take precautions to prevent coating from being splashed on equipment, vehicles, or cargo in the project area.

b. All unused rags, waste and empty containers shall be removed from the work area at the end of each work day and precautions shall be taken to avoid the danger of fire.

c. The Contractor shall maintain the job site in a neat and orderly condition during the progress of the work. Upon completion, the Contractor shall remove all surplus material, debris, equipment, tools, etc. belonging to it and leave the premises in a neat and orderly condition.

L. Miscellaneous Details. Cut, drill and patch as required to install electrical system. Repair any surface damaged or marred by notching, drilling or any other process necessary for installation of electrical work. Cutting, repairs and refinishing subject to the approval of the Harbors Construction Engineer. Need for remedial work determined by Harbors Construction Engineer as attributable to poor coordination and workmanship shall be cause for reconstruction to the satisfaction of the Harbors Construction Engineer.

1. Repair holes left by removal of electrical equipment to match existing.

2. Furnish necessary test equipment and make all tests necessary to check for unspecified grounding, shorts, and wrong connections. Correct faulty conditions, if any.

M. Cleaning and Repairing. During the progress of work, all rubbish, waste lumber, displaced materials, etc. shall be removed as soon as possible and upon completion of the work, Contractor shall remove from the State's property and from all public and private property, at his own expense, all temporary structures, rubbish, and waste material resulting from his operations.

40.5 TESTING AND INSPECTION - All testing shall be witnessed by the Harbors Construction Engineer. The Contractor shall schedule all testing with the Harbors Construction Engineer, in writing, a minimum of two (2) weeks prior to testing.

A. If the Harbors Construction Engineer (or his representative) shall discover any of the following errors, the Contractor, at his own expense, shall go over all similar portions of the entire job, taking the necessary or directed remedial action.

1. Impaired clearances.

2. Improper finish.

3. Improper adjustment.

B. Furnish necessary test equipment and make all tests necessary to check for unspecified grounding, shorts and wrong connections. Correct faulty conditions, if any.

C. The Contractor shall show by demonstration in service that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times.

D. Measure resistance of grounding system at service equipment and furnish 3 copies of results to the Harbors Construction Engineer.

E. Wherever test or inspection reveals faulty materials or installation, the Contractor shall take corrective action, at his own expense, repairing or replacing materials or installation as directed. The materials or installation shall then be retested.

40.6 COMPLETION AND GUARANTEE

A. Completion. The entire electrical installation shall be complete in every detail as specified, ready for use and tested, free of all accidental grounds and short circuits. The installation shall not be considered complete until "As-Built" drawings have been submitted and approved.

B. Guarantee. The Contractor shall submit a written warranty stating that all parts of the electrical system be free from defects of material and workmanship. Any defects occurring within one year after final acceptance shall be corrected by the Contractor at no cost to the State.

40.7 MEASUREMENT AND PAYMENT - Payment for Electrical Work shall be made as described in Article X of these Specifications.

Requirements of Chapter 104, HRS
Wages and Hours of Employees on Public Works Law

Chapter 104, HRS, applies to every public works construction project over $2,000, regardless of the method of procurement or financing (purchase order, voucher, bid, contract, lease arrangement, warranty, SPRB).

Rate of Wages for Laborers and Mechanics

- Minimum prevailing wages (basic hourly rate plus fringe benefits), as determined by the Director of Labor and Industrial Relations and published in wage rate schedules, shall be paid to the various classes of laborers and mechanics working on the job site. [§104-2(a), (b), Hawaii Revised Statutes (HRS)]

- If the Director of Labor determines that prevailing wages have increased during the performance of a public works contract, the rate of pay of laborers and mechanics shall be raised accordingly. [§104-2(a) and (b), HRS; §12-22-3(d) Hawaii Administrative Rules (HAR)]

Overtime

- Laborers and mechanics working on a Saturday, Sunday, or a legal holiday of the State or more than eight hours a day on any other day shall be paid overtime compensation at not less than one and one-half times the basic hourly rate plus the cost of fringe benefits for all hours worked. If the Director of Labor determines that a prevailing wage is defined by a collective bargaining agreement, the overtime compensation shall be at the rates set by the applicable collective bargaining agreement [§§104-1, 104-2(c), HRS; §12-22-4.1, HAR]

Weekly Pay

- Laborers and mechanics employed on the job site shall be paid their full wages at least once a week, without deduction or rebate, except for legal deductions, within five working days after the cutoff date. [§104-2(d), HRS]

Posting of Wage Rate Schedules

- Wage rate schedules with the notes for prevailing wages and special overtime rates, shall be posted by the contractor in a prominent and easily accessible place at the job site. A copy of the entire wage rate schedule shall be given to each laborer and mechanic employed under the contract, except when the employee is covered by a collective bargaining agreement. [§104-2(d), HRS]

Withholding of Accrued Payments

- If necessary, the contracting agency may withhold accrued payments to the contractor to pay to laborers and mechanics employed by the contractor or subcontractor on the job site any difference between the wages required by the public works contract or specifications and the wages received. [§104-2(e), HRS]

Certified Weekly Payrolls and Payroll Records

- A certified copy of all payrolls shall be submitted weekly to the contracting agency. [§104-3(a), HRS; §12-22-10, HAR]

- The contractor is responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates listed are not less than the applicable rates contained in the applicable wage rate schedule, and that the classifications for each laborer or mechanic conform with the work the laborer or mechanic performed. [§104-3(a), HRS; §12-22-10, HAR]

- Payroll records shall be maintained by the contractor and subcontractors for three years after completion of construction. The records shall contain: [§104-3(b), HRS; §12-22-10, HAR]
  - the name and home address of each employee
  - the last four digits of social security number
  - a copy of the apprentice's registration with DLIR
  - the employee's correct classification
  - rate of pay (basic hourly rate + fringe benefits)
  - itemized list of fringe benefits paid
  - daily and weekly hours worked
  - weekly straight time and overtime earnings
  - amount and type of deductions
  - total net wages paid
  - date of payment

- Records shall be made available for examination by the contracting agency, the Department of Labor and Industrial Relations (DLIR), or any of its authorized representatives, who may also interview employees during working hours on the job. [§§104-3(c), 104-22(a), HRS; §12-22-10, HAR]

Termination of Work on Failure to Pay Wages

- If the contracting agency finds that any laborer or mechanic employed on the job site by the contractor or any subcontractor has not been paid prevailing wages or overtime, the contracting agency may, by written notice to the contractor, terminate the contractor's or subcontractor's right to proceed with the work or with the part of the work in which the required wages or overtime compensation have not been paid. The contracting agency may complete this work by contract or otherwise, and the contractor or contractor's sureties shall be liable to the contracting agency for any excess costs incurred. [§104-4, HRS]

Apprentices

- Apprentice wage rates apply to contractors who are a party to a bona fide apprenticeship program which has been registered with the DLIR. In order to be paid apprentice rates, apprentices must be parties to an agreement either registered with or recognized as a USDOL nationally approved apprenticeship program by the DLIR, Workforce Development Division, (808) 586-8877, and the apprentice must be individually registered by name with the DLIR. [§12-22-6(1) and (2), HAR]

- The number of apprentices on any public work in relation to the number of journeyworkers in the same craft classification as the apprentices employed by the same employer on the same public work may not exceed the ratio allowed under the apprenticeship standards registered with or recognized by the DLIR. A registered or recognized apprentice receiving the journeyworker rate will not be considered a journeyworker for the purpose of meeting the ratio requirement. [§12-22-6(3), HAR]

Enforcement

- To ensure compliance with the law, DLIR and the contracting agency will conduct investigations of contractors and subcontractors. If a contractor or subcontractor violates the law, the penalties are: [§104-24, HRS]

  - First Violation — Equal to 25% of back wages found due or $250 per offense up to $2,500, whichever is greater.
  - Second Violation — Equal to amount of back wages found due or $500 for each offense up to $5,000, whichever is greater.
  - Third Violation — Equal to two times the amount of back wages found due or $1,000 for each offense up to $10,000, whichever is greater; and
    Suspension from doing any new work on any public work of a governmental contracting agency for three years.

  ▪ A violation would be deemed a second violation if it occurs within two years of the **first notification of violation**, and a third violation if it occurs within three years of **the second notification of violation**. [§104-24, HRS; §12-22-25(b), HAR]

  ▪ **Suspension**: For a first or second violation, the department shall immediately suspend a contractor who fails to pay wages or penalties until all wages and penalties are paid in full. For a third violation, the department shall penalize and suspend the contractor as described above, **except that if the contractor continues to violate the law, then the department shall immediately suspend the contractor for a mandatory three years. The contractor shall remain suspended until all wages and penalties are paid in full.** [§§104-24, 104-25, HRS]

- **Suspension**: Any contractor who fails to make payroll records accessible or provide requested information within 10 days, or fails to keep or falsifies any required record, shall be assessed a penalty including suspension as provided in Section 104-22(b) and 104-25(a)(3), HRS. [§104-3(c), HRS; §12-22-26, HAR]

- If any contractor interferes with or delays any investigation, the contracting agency shall withhold further payments until the delay has ceased. Interference or delay includes failure to provide requested records or information within ten days, failure to allow employees to be interviewed during working hours on the job, and falsification of payroll records. The department shall assess a penalty of $10,000 per project, and $1,000 per day thereafter, for interference or delay. [§104-22(b), HRS; §12-22-26, HAR]

- Failure by the contracting agency to include in the provisions of the contract or specifications the requirements of Chapter 104, HRS, relating to coverage and the payment of prevailing wages and overtime, is not a defense of the contractor or subcontractor for noncompliance with the requirements of this chapter. [§104-2(f), HRS]

For additional information, visit the department's website at *http://labor.hawaii.gov/wsd*
or contact any of the following DLIR offices:

Oahu (Wage Standards Division) .....(808) 586-8777
Hawaii Island.....(808) 974-6464
Maui and Kauai .....(808) 243-5322

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HONOLULU, HAWAII

PROPOSAL

PROPOSAL TO THE STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS

PROJECT:	REPAIR LIFT STATIONS AT PIERS 21 AND 27 HONOLULU HARBOR, OAHU, HAWAII
JOB NO:	S10849
CONTRACT TIME:	All work shall be completed within ONE HUNDRED EIGHTY (180) CALENDAR DAYS from the date indicated in the Notice to Proceed from the Department.
LIQUIDATED DAMAGES:	THREE HUNDRED AND NO/100 DOLLARS ($300.00) for each and every calendar day which the Contractor has delayed the completion of this project.
DESIGN PROJECT MANAGER:	MR. GREGG HIROKAWA DEPARTMENT OF TRANSPORTATION HARBORS HALE AWA MOKU 79 S. NIMITZ HIGHWAY HONOLULU, HAWAII 96813 PHONE: (808) 587-1985 EMAIL: gregg.hirokawa@hawaii.gov
ELECTRONIC SUBMITTAL:	**Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall refer to SPECIAL PROVISIONS 2.8 PREPARATION AND DELIVERY OF BID for complete details. FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.**

Director of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned Bidder declares the following:

1. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.

2. It has not been assisted or represented on this matter by any individual who has, in a State capacity, been involved in the subject matter of this contract within the past two years.

3. It has not and will not, either directly or indirectly offered or given a gratuity (i.e. an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.

The undersigned Bidder further agrees to the following:

1. If this proposal is accepted, it shall execute a contract with the Department to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the time therein prescribed in the contract, and that it shall accept in full payment therefore the sum of the unit and/or lump sum prices as set forth in the attached proposal schedule for the actual quantities of work performed and materials furnished and furnish satisfactory security in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Transportation may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 103D-323, Hawaii Revised Statutes.

2. That the quantities given in the attached proposal schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.

3. That the Department does not either expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Director of Transportation, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached proposal schedule except as provided for in the specifications.

4. In case of a discrepancy between unit prices and the totals in said Proposal Schedule, the unit prices shall prevail.

5. Agrees to begin work within 10 working days after the date of notification to commence with the work, which date is in the notice to proceed, and shall finish the entire project within the time prescribed.

6. The Director of Transportation reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.

The Bidder acknowledges receipt of and certifies that it has completely examined the following listed items: the Hawaii Department of Transportation, Air and Water Transportation Facilities Division General Provisions for Construction Projects dated 2016, the Notice to Bidders, the Special Provisions, if any, the Technical Provisions, the Proposal, the Contract and Bond Forms, and the Project Plans.

In accordance with Section 103D-323, Hawaii Revised Statutes, this proposal is accompanied with a bid security in the amount of 5% of the total amount bid, in the form checked below. (Check applicable bid security submitted with bid.)

_____ Surety Bid Bond (Use standard form),

_____ Cash,

_____ Cashier's Check,

_____ Certified Check, or

_____ _____.
(Fill in other acceptable security.)

The undersigned Bidder acknowledges receipt of any addendum issued by the Department by recording in the space below the date of receipt.

Addendum No. 1 _____ Addendum No. 3 _____

Addendum No. 2 _____ Addendum No. 4 _____

In accordance with Section 103D-302, Hawaii Revised Statutes, the undersigned as Bidder, has listed the name of each person or firm, who will be engaged by the Bidder on the project as a Subcontractor or Joint Contractor and the nature of work to be done by each. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Subcontractor or Joint Contractor. For each listed firm, the Bidder declares the respective firm is a Subcontractor or Joint Contractor and is subject to evaluation as a Subcontractor or Joint Contractor. It is understood that failure to comply with the aforementioned requirements may be cause for rejection of the bid submitted.

Name of Subcontractor	Nature and Scope of Work
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Name of Joint Contractor	Nature and Scope of Work
1.	
2.	
3.	

("None" or if left blank indicates no Subcontractor or Joint Contractor; if more space is needed, attach additional sheets.)

The undersigned hereby certifies that the bid prices contained in the attached proposal schedule have been carefully checked and are submitted as correct and final.

This declaration is made with the understanding that the undersigned is subject to the penalty of perjury under the laws of the United States and is in violation of the Hawaii Penal Code, Section 710-1063, unsworn falsification to authorities, of the Hawaii Revised Statutes, for knowingly rendering a false declaration.

_____
Bidder (Company Name)

By_____
Authorized Signature

_____
Print Name and Title

_____

_____
Business Address

_____
Business Telephone

_____
Date

_____
Contact Person (If different from above)

Phone:_____ Email:_____

NOTE:

If Bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts for the corporation. Please attach to this page current (not more than six months old) evidence of the authority of the officer(s) to sign for the corporation.

If Bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above, with the signature(s) of the general partner(s). Please attach to this page current (not more than six months old) evidence of the authority of the partner authorized to sign for the partnership.

If Bidder is an INDIVIDUAL, the bidder's signature shall be placed above.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department before opening bids or submitted with the bid. Otherwise, the Department may reject the bid as irregular and unauthorized.

PREFERENCES

Bidders agree that preferences shall be taken into consideration to determine the low bidder in accordance with said Sections and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive of any preferences.

A. HAWAII PRODUCTS PREFERENCE

In accordance with ACT 174, SLH 2022, effective June 27, 2022, Hawaii Products Preference shall not apply to solicitations for public works construction. Therefore, the Hawaii Products Preference shall not apply to this project.

B. APPRENTICESHIP PROGRAMS PREFERENCE

In accordance with ACT 17, SLH 2009 – Apprenticeship Program, a 5% bid adjustment for bidders that are parties to apprenticeship agreements pursuant to Hawaii Revised Statutes (HRS) Section 103-55.6 may be applied to the bidder's price for evaluation purposes.

Any bidder seeking this preference must be a party to an apprenticeship agreement registered with the Department of Labor and Industrial Relations at the time the offer is made for each apprenticeable trade the bidder will employ to construct the public works projects for which the offer is being made.

The bidder is responsible for complying with all submission requirements for registration of its apprenticeship program before requesting the preference.

( ) Yes, I wish to be considered for the Apprenticeship Programs Preference. I have included Certification Form(s) 1 with my bid.

C. RECYCLED PRODUCT PREFERENCE

Recycled product preference shall not apply to this proposal.

REPAIR LIFT STATIONS AT PIERS 21 AND 27
HONOLULU HARBOR, OAHU, HAWAII
JOB S10849

PROPOSAL SCHEDULE

Item No.	Item Description	Approx. Quantity (a)	Unit	Unit Price (b)	Amount Bid (a x b)
1	Mobilization (Not to exceed 6% sum of all Items, excluding this Item)	LS	LS	LS	$ _____
2	Remove Existing Pump Station at Pier 21	LS	LS	LS	$ _____
3	Remove Existing Pump Station at Pier 27	LS	LS	LS	$ _____
4	Install New Pump Station at Pier 21	LS	LS	LS	$ _____
5	Install New Pump Station at Pier 27	LS	LS	LS	$ _____
6	Electrical Work at Pier 21	LS	LS	LS	$ _____
7	Electrical Work at Pier 27	LS	LS	LS	$ _____
8	New 8" Sewerline	70	LF	$ _____	$ _____
9	New 4" Sewer Force Main	22	LF	$ _____	$ _____
10	Sewerline Trench Work	70	LF	$ _____	$ _____
11	Sewer Manhole	1	EA	$ _____	$ _____
12	Line Pump Station Wetwell at Pier 21	LS	LS	LS	$ _____
13	Line Pump Station Wetwell at Pier 27	LS	LS	LS	$ _____
14	Replace Manhole Frame & Cover at Pier 21	1	EA	$ _____	$ _____
15	Replace Manhole Frame & Cover at Pier 27	1	EA	$ _____	$ _____
16	Site Improvements at Pier 21	LS	LS	LS	$ _____
17	Site Improvements at Pier 27	LS	LS	LS	$ _____
18	Portable ADA Toilets at Pier 21	2	EA	$ _____	$ _____
19	Portable ADA Toilets at Pier 27	4	EA	$ _____	$ _____
20	Hazardous Material Handling and Disposal	70	CY	$ _____	$ _____
21	Air Monitoring of Methane and Hydrogen Sulfide	LS	LS	LS	$ _____
		TOTAL AMOUNT FOR COMPARISON OF BIDS $ _____			

NOTES:

1. Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Do not include confidential and/or proprietary documents with the proposal. The record of each bidder and respective bid shall be open to public inspection. Original (wet ink, hard copy) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between the specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified.

2. Bid shall include all Federal, State, County and other applicable taxes and fees.

3. The TOTAL AMOUNT FOR COMPARISON OF BIDS shall be used to determine the lowest responsible bidder.

4. Bidders shall complete all unit prices and amounts. Failure to do so shall be grounds for rejection of bid.

5. If a discrepancy occurs between unit bid price and the bid price, the unit bid price shall govern.

6. If the lowest TOTAL AMOUNT FOR COMPARISON OF BIDS exceeds the funds available for this project, the State reserves the right to negotiate with the lowest responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes, as amended, to reduce the scope of work and award a contract.

7. Submission of Proposal is a warranty that the bidder has made an examination of the project site and is fully aware of all conditions to be encountered in performing the work and the requirements of the plans and specifications.

8. No additional compensation will be paid by the State for losses, including overhead and profit, resulting from reduced scope of work.

9. Contract time shall remain the same whether or not the overall scope of work is decreased.

SURETY BID BOND

Bond No. .....

KNOW TO ALL BY THESE PRESENTS:

That we,_____
(full name or legal title of offerer)

as Offeror, hereinafter called the Principal, and

_____
(name of bonding company)

as Surety, hereinafter called Surety, a corporation authorized to transact business as a Surety in the State of Hawaii, are held and firmly bound unto

_____
(State/county entity)

as Owner, hereinafter called Owner, in the penal sum of

_____
(required amount of bid security)

Dollars($_____),lawful money of the United States of America, for the payment of which sum well and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS:

The Principal has submitted an offer for

_____
(project by number and brief description)

NOW, THEREFORE:

The condition of this obligation is such that if the Owner shall reject said offer, or in the alternate, accept the offer of the Principal and the Principal shall enter into a contract with the Owner in accordance with the terms of such offer, and give such bond or bonds as may be specified in the solicitation or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof as specified in the solicitation then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed this _____ day of _____ _____

_____
Name of Principal (Offeror) (Seal)

_____
Signature

_____
Title

_____
Name of Surety (Seal)

_____
Signature

_____
Title

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HONOLULU, HAWAII

SAMPLE FORMS

Contents:

CONTRACT

THIS AGREEMENT, made this day of _____, by and between the STATE OF HAWAII, by its Director of Transportation, hereinafter referred to as "STATE", and «CONTRACTOR», «STATE_OF_INCORPORATON», whose business/post office address is «ADDRESS», hereinafter referred to as CONTRACTOR";

WITNESSETH: That for and in consideration of the payments hereinafter mentioned, the CONTRACTOR hereby covenants and agrees with the STATE to complete in place, furnish and pay for all labor and materials necessary for "«PROJECT_NAME_AND_NO»", or such a part thereof as shall be required by the STATE, the total amount of which labor, material and construction shall be computed at the unit and/or lump sum prices set forth in the attached proposal schedule and shall be the sum of «BASIC»----DOLLARS ($«BASIC_NUMERIC») as follows:

TOTAL AMOUNT FOR COMPARISON OF BIDS……$«BASIC_NUMERIC»

which sum shall be provided from State funds, all in accordance with the specifications, the special provisions, if any, the notice to bidders, the instructions to bidders, the proposal and plans for «PROJECT_NO_ONLY», and any supplements thereto, on file in the office of the Director of Transportation. These documents, together with all alterations, amendments, and additions thereto and deductions therefrom, are attached hereto or incorporated herein by reference and made a part of this contract.

The CONTRACTOR hereby covenants and agrees to complete such construction within «WORKING_DAYS» from the date indicated in the Notice to Proceed from the State subject, however, to such extensions as may be provided for in writing under the specifications.

For and in consideration of the covenants, undertakings and agreements of the CONTRACTOR herein set forth and upon the full and faithful performance thereof by the CONTRACTOR, the STATE hereby agrees to pay the CONTRACTOR the sum of «BASIC»---DOLLARS ($«BASIC_NUMERIC») in lawful money, but not more than such part of the same as is actually earned according to the STATE's determination of the actual quantities of work performed and materials furnished by the CONTRACTOR at the unit or lump sum prices set forth in the attached proposal schedule. Such payment, including any extras, shall be made, subject to such additions or deductions hereto or hereafter made in the manner and at the time prescribed in the specifications and this contract.

An additional sum of «EXTRAS»-----DOLLARS ($«EXTRA_NUMERIC») is hereby provided for extra work.

All words used herein in the singular shall extend to and include the plural. All words used in the plural shall extend to and include the singular. The use of any gender shall extend to and include all genders.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed the day and year first above written.

STATE OF HAWAII

_____
Director of Transportation

«CONTRACTOR» (Seal)

_____
Signature

_____
Print name

_____
Print Title

_____
Date

PERFORMANCE BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

_____
(Name and Street Address of Bonding Company)

as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____
DOLLARS ($_____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed a Contract with Obligee on _____, for the following project:_____
_____
_____
_____
_____
_____
hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that:

If the Principal shall promptly and faithfully perform, and fully complete the Contract in strict accordance with the terms of the Contract as said Contract may be modified or amended from time to time; then this obligation shall be void; otherwise to remain in full force and effect.

Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

In the event of Default by the Principal, of the obligations under the Contract, then after written Notice of Default from the Obligee to the Surety and the Principal and subject to the limitation of the penal sum of this bond, Surety shall remedy the Default, or take over the work to be performed under the Contract and complete such work, or pay moneys to the Obligee in satisfaction of the surety's performance obligation on this bond.

Signed this _____ day of _____, _____.

(Seal) _____
Name of Principal (Contractor)

* _____
Signature

_____
Title

(Seal) _____
Name of Surety

* _____
Signature

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

PERFORMANCE BOND

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto the

_____
(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount

_____DOLLARS $_____),
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

☐ **Legal Tender;**

☐ **Share Certificate** unconditionally assigned to or made payable at sight to _____
Description:_____;

☐ **Certificate of Deposit**, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Cashier's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Teller's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Treasurer's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Official Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Certified Check** No. _____, dated _____ accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project:_____

_____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The Condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, and shall deliver the Project to the Obligee, or to its successors or assigns, fully completed as in the Contract specified and free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder.

Signed and sealed this _____ day of _____, _____.

(Seal)_____
Name of Contractor

_____
Signature*

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

_____,
(Name and Street Address of Bonding Company)
as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____
_____ Dollars ($_____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed Contract with the Obligee on _____ for the following project:_____
_____
_____
_____
_____
hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to any Claimant, as hereinafter defined, for all labor and materials supplied to the Principal for use in the performance of the Contract, then this obligation shall be void; otherwise to remain in full force and effect.

1. Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

2. A "Claimant" shall be defined herein as any person who has furnished labor or materials to the Principal for the work provided in the Contract.

Every Claimant who has not been paid amounts due for labor and materials furnished for work provided in the Contract may institute an action against the Principal and its Surety on this bond at the time and in the manner prescribed in Section 103D-324, Hawaii Revised Statutes, and have the rights and claims adjudicated in the action, and judgment rendered thereon; subject to the Obligee's priority on this bond. If the full amount of the liability of the Surety on this bond is insufficient to pay the full amount of the claims, then after paying the full amount due the Obligee, the remainder shall be distributed pro rata among the claimants.

Signed this _____ day of _____, _____.

(Seal) _____
Name of Principal (Contractor)

* _____
Signature

_____
Title

(Seal) _____
Name of Surety

* _____
Signature

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto _____
(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount

_____DOLLARS ($_____)
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

☐ **Legal Tender;**

☐ **Share Certificate** unconditionally assigned to or made payable at sight to_____
Description:_____

☐ **Certificate of Deposit**, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Cashier's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Teller's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Treasurer's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Official Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Certified Check** No. _____, dated _____ accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project:_____

_____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

AND IT IS HEREBY STIPULATED AND AGREED that this bond shall inure to the benefit of any and all persons entitled to file claims for labor performed or materials furnished in said work so as to give any and all such persons a right of action as contemplated by Sections 103D-324(d) and 103D-324(e), Hawaii Revised Statutes.

The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payments of mechanics' liens which may be filed of record against the Project, whether or not claim for the amount of such lien be presented under and against this bond..

Signed this _____ day of _____, _____.

(Seal)_____
Name of Contractor

_____
Signature*

_____
Title

ALL SIGNATURES MUST BE ACKNOWLEDGED BY A NOTARY PUBLIC

CHAPTER 104, HRS COMPLIANCE CERTIFICATE

The undersigned bidder does hereby certify to the following:

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.

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.

DATED at Honolulu, Hawaii, this _____ day of _____, 20___.

_____ «CONTRACTOR»
Name of Corporation, Partnership, or Individual

_____
Signature and Title of Signer

Notary Seal
NOTARY ACKNOWLEDGEMENT

Subscribed and sworn before me this
_____day of_____
Notary signature_____
Notary public, State of _____
My Commission Expires:_____

Notary Seal
NOTARY CERTIFICATION

Doc. Date: _____ #Pages: ____
Notary Name: _____ _____Circuit
Doc. Description: _____
_____
Notary signature_____
Date _____

PROVISIONS TO BE INCLUDED IN CONSTRUCTION PROCUREMENT SOLICITATIONS

1. Definitions for terms used in HRS Chapter 103B as amended by Act 192, SLH 2011:

   a. "Contract" means contracts for construction under 103D, HRS.

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

   c. "Construction" has the same meaning as in Section 103D-104, HRS.

   d. "General Contractor" means any person having a construction contract with a governmental body.

   e. "Procurement Officer" has the same meaning as in Section 103D-104, HRS.

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

   g. "Shortage trade" means a construction trade in which there is a shortage of Hawai'i residents qualified to work in the trade as determined by the Department of Labor and Industrial Relations.

2. HRS Chapter 103B as amended by Act 192, SLH 2011–Employment of State Residents Requirements:

   a. A Contractor awarded a contract shall ensure that Hawai'i residents comprise not less than 80% of the workforce employed to perform the contract work on the project. The 80% requirement shall be determined by dividing the total number of hours worked on the contract by Hawai'i residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees within shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

EXHIBIT 1

b. Prior to award of a contract, an Offeror/Bidder may withdraw an offer/bid without penalty if the Offeror/Bidder finds that it is unable to comply with HRS Chapter 103B as amended by Act 192, SLH 2011.

c. Prior to starting any construction work, the Contractor shall submit the subcontract dollar amount for each of its Subcontractors.

d. The requirements of this section shall apply to any subcontract of $50,000 or more in connection with the Contractor; that is, such Subcontractors must also ensure that Hawai'i residents comprise not less than 80% of the Subcontractor's workforce used to perform the subcontract.

e. The Contractor and any Subcontractor whose subcontract is $50,000 or more shall comply with the requirements of HRS Chapter 103B as amended by Act 192, SLH 2011.

1) Certification of compliance shall be made in writing under oath by an officer of the General Contractor and applicable Subcontractors and submitted with the final payment request.

2) The certification of compliance shall be made under oath by an officer of the company by completing a "Certification of Compliance for Employment of State Residents" form and executing the Certificate before a licensed notary public.

3) In addition to the certification of compliance as indicated above, the Contractor and Subcontractors shall maintain records such as certified payrolls for laborers and mechanics who performed work at the site and time sheets for all other employees who performed work on the project. These records shall include the names, addresses and number of hours worked on the project by all employees of the Contractor and Subcontractor who performed work on the project to validate compliance with HRS Chapter 103B as amended by Act 192, SLH 2011. The Contractor and Subcontractors shall retain these records and provide access to the State for a minimum period of four (4) years after the final payment, except that if any litigation, claim, negotiation, investigation, audit or other action involving the records has been started before the expiration of the four-year period, the Contractor and Subcontractors shall retain the records until completion of the action and resolution of all issues that arise from it, or until the end of the four-year period, whichever occurs later. Furthermore, it shall be the Contractor's responsibility to enforce compliance with this provision by any Subcontractor.

f. A General Contractor or applicable Subcontractor who fails to comply with this section shall be subject to any of the following sanctions:

1) With respect to the General Contractor, withholding of payment on the contract until the Contractor or its Subcontractor complies with HRS Chapter 103B as amended by Act 192, SLH 2011.

2) Proceedings for debarment or suspension of the Contractor or Subcontractor under Hawai'i Revised Statues §103D-702.

3. Conflict with Federal Law: This section shall not apply if the application of this section is in conflict with any federal law, or if the application of this section will disqualify the State from receiving Federal funds or aid.

CERTIFICATION OF COMPLIANCE
FOR
EMPLOYMENT OF STATE RESIDENTS
HRS CHAPTER 103B, AS AMENDED BY ACT 192, SLH 2011

Project Title: _____

Agency Project No: _____

Contract No.: _____

As required by Hawai'i Revised Statutes Chapter103B, as amended by Act 192, Session Laws of Hawaii 2011–Employment of State Residents on Construction Procurement Contracts, I hereby certify under oath, that I am an officer of _____ and
(Name of Contractor or Subcontractor Company)

for the Project Contract indicated above, _____ was in
(Name of Contractor or Subcontractor Company)

compliance with HRS Chapter 103B, as amended by Act 192, SLH 2011, by employing a workforce of which 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 a **Subcontractor** for this contract.

CORPORATE SEAL

_____
(Name of Company)

_____
(Signature)

_____
(Print Name)

_____
(Print Title)

Subscribed and sworn to me before this
_____ day of _____, 2011.

_____
Notary Public, 1st Circuit, State of Hawai'i
My commission expires: _____

Doc. Date: _____ # of Pages_____ 1st Circuit
Notary Name: _____
Doc. Description: _____

_____
_____

_____
Notary Signature Date
NOTARY CERTIFICATION

EXHIBIT 2