State of Hawaii
DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
Honolulu, Hawaii

BOARD OF AGRICULTURE

Phyllis Shimabukuro-Geiser
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

Job No. DOAH26A
Kamuela Vacuum Cooling Plant
Food Safety Modernization Act Improvements
Lalamilo Ahupua'a, South Kohala, Hawai'i Island

Civil Engineer:	SSFM International, Inc.
Structural Engineer:	SSFM International, Inc.
Geotechnical:	Geolabs Inc.
Architect:	INK Arch. LLC
Mechanical/Electrical Engineer:	Inatsuka Engineering LLC
Environmental:	Myounghee Noh and Associates LCC

May 2020

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DEPARTMENT OF AGRICULTURE
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Honolulu, Hawaii

CONTRACT SPECIFICATIONS AND PLANS

Job No. DOAH26A
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Brian Kau, P.E.
Administrator and Chief Engineer
Agricultural Resource Management Division

May 2020

NOTICE TO BIDDERS
(Chapter 103D, HRS)

COMPETITIVE BIDS for Job No. DOAH26A, Kamuela Vacuum Cooling Plant, Food Safety Modernization Act Improvements, Lalamilo Ahupua'a, South Kohala, Hawai'i Island shall be submitted to the Department of Agriculture, Agricultural Resource Management Division, on the specified date and time through the Hawaii State e-Procurement (HIePRO). HIePRO is accessible through the State Procurement Office website at www.spo.hawaii.gov.

The Department of Land and Natural Resources Interim General Condition, dated October 1994, as amended, and the General Conditions –AG008, latest revision, shall be made part of the specifications.

The project is located at Waimea (Kamuela), Big Island, Hawaii.

The basic scope of work is to provide improvements to an existing warehouse for compliance to Food Safety Modernization Act. This work will include seal warehouse openings, painting, remove/dispose hazardous material, install septic system, abandon/fill existing cesspool, install drinking fountain, and hand washing sink.

Due to the nature of work contemplated, bidders must possess a valid State Contractor's license, classification "A". The contractor or its sub-subcontractor must possess any additional State Contractor Specialty "C" license to perform the work.

A voluntary pre-bid telephone conference will be held, on May13, 2020, at 9:30 am. If you are interested in joining the telephone conference, please contact Janice Fujimoto at Janice.fujimoto@hawaii.gov, or by phone at 808-973-9473, by 12:00 pm on Tuesday, May 12, 2020 for the telephone conference dial-in number.

All interested parties are invited to attend a site visit. Additional information about the site visit will be provided during the pre-bid conference. The site visit will be held at the project site on May 15, 2020, at 9:30 am. Due to current pandemic considerations, all attendees will be required to wear a face mask (or shield) and observe social distancing.

The estimated cost of construction is $180,000.

The award of the contract, if it be awarded, will be subject to the availability of funds.

This project is subject to preference to Hawaii Products established by Section 103D, Hawaii Revised Statutes. The Hawaii Product List may be examined at the State Procurement Office website.

Should there be any questions, please refer to the HIePRO solicitation.

INFORMATION AND INSTRUCTIONS TO BIDDERS

CONTENTS

INFORMATION AND INSTRUCTIONS TO BIDDERS

A. PROJECT LOCATION AND SCOPE OF WORK: The project location and scope of work shall be as generally described in the Notice to Bidders.

B. PROPOSALS**:** Bidders shall submit their bid, including the completed proposal form, bid bond, and any other documents required by the solicitation, as part of their bid through the State of Hawaii e-Procurement System (HIePRO). See Item D, PROPOSAL FORM.

C. GENERAL CONDITIONS: The Department of Land and Natural Resources Interim General Conditions dated October 1994, as amended, shall be made a part of these contract specifications and are referred to hereafter as the General Conditions.

D. PROPOSAL FORM: **The Bidders shall fill out and upload the electronic copy of the proposal form to the HIePRO website when submitting the bid. Bid Proposals shall not be mailed, faxed or delivered to the State, unless requested to do so after the designated closing date. The successful Bidder shall fill out and print a hard copy of the proposal form, sign and submit the form with the contract award package.**

E. OMISSIONS OR ERASURES: Any proposal which contains any omission or erasure or alteration not properly initialed, or conditional bid, or other irregularity may be rejected by the Department of Agriculture (Department).

F. NOTICE OF INTENT TO BID AND QUESTIONNAIRE:
A Notice of Intent to Bid is not required for this project. In compliance with HRS Section 103D-310, the lowest responsive and responsible bidder may be required to complete a questionnaire. When requested by the State, the completed questionnaire shall be submitted to the Chief Engineer for evaluation. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.

G. BID SECURITY: A bid security will be furnished by each bidder as provided in sub-section 2.7 of the General Conditions. The successful bidder's bid security will be retained until Contract execution and furnished a performance and payment bond in an amount equal to one hundred percent (100%) of the total Contract price, including an amount estimated to be required for extra work, is furnished.

The Department reserves the right to hold the bid securities of the four lowest bidders until the successful bidder has entered into a contract and has furnished the required performance bond. All bid securities will be returned in accordance with sub-section 3.5 of the General Conditions.

Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond within the time stated in the proposal, the bid security shall be forfeited as required by law.

H. CONTRACTOR'S LICENSE REQUIRED: The Department will reject all bids received from contractors who have not been licensed by the State Contractors License Board in

accordance with Chapter 444, HRS; Title 16, Chapter 77, Hawaii Administrative Rules; and statutes amendatory thereto.

I. IRREGULAR BIDS: No irregular bids or propositions for doing the work will be considered by the Department.

J. WITHDRAWAL OF BIDS: No bidder may withdraw his bid between the time of the opening thereof and the award of contract.

K. SUCCESSFUL BIDDER TO FILE PERFORMANCE AND PAYMENT BONDS: The successful bidder will be required to file performance and payment bonds each; in the amount equal to the total contract price, including amounts estimated to be required for extra work, as provided in sub-section 3.6 of the General Conditions.

L. NUMBER OF EXECUTED ORIGINAL COUNTERPARTS OF CONTRACT DOCUMENTS: If requested by the Department, six copies of the Contract, performance and payment bonds shall be executed.

M. CHANGE ORDERS: No work of any kind in connection with the work covered by the plans and specifications shall be considered as change order work, or entitle the Contractor to extra compensation, except when the work has been ordered in writing by the Chief Engineer (Engineer) and in accordance with sub-section 4.2 of the General Conditions.

The Contractor shall clearly identify and inform the Engineer in writing of any deviations from the contract documents at the time of submission and shall obtain the Engineer's written approval to the specified deviation prior to proceeding with any work.

N. WAGES AND HOURS: In accordance with sub-sections 7.3 to 7.9 of the General Conditions relative to hours of labor, minimum wages and overtime pay, the current minimum wage rates promulgated by the Department of Labor and Industrial Relations (DLIR) shall be paid to the various classes of laborers and mechanics engaged in the performance of this contract on the job site. The minimum wages shall be increased during the performance of the contract in an amount equal to the increase in the prevailing wages for those kinds of work as periodically determined by the DLIR.

The Department will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the said minimum wage rates. The possibility of wage increase is one of the elements to be considered by the Contractor in determining his bid, and will not, under any circumstances, be considered as the basis of a claim against the Department under this Contract.

No work shall be done on Saturdays, Sundays, legal State holidays, and/or in excess of eight (8) hours each day without the written consent of the Engineer. Should permission be granted to work at such times, the Contractor shall pay for all inspection administrative costs thereof. No work shall be done at night unless authorized by the Engineer.

O. PERMITS: The State will process permit applications whenever possible, and the Contractor shall procure the pre-processed permits and pay the required fees. If permit applications are not processed by the State, the Contractor shall process the permit applications, permits and

licenses, and pay all charges and fees. In all cases, the Contractor shall give all notices necessary and incident to the due and lawful prosecution of the work.

P. PROPERTY DAMAGE: It shall be the responsibility of the contractor to respect State property and to prevent damage to existing improvements. The Contractor will be responsible for damages resulting from construction operations. Immediately upon discovery, the Contractor shall repair such damage to the satisfaction of the Engineer.

All trees and shrubbery outside the excavation, embankment or construction limits shall be fully protected from injury.

Q. TIME: The time of completion is specified in the Proposal. It is the Department's intention to insist the Contractor diligently prosecute the work to completion within the specified time.

Prospective bidders are reminded that the State has the option to proceed with or abandon a project depending on whether the project can be completed for occupancy in the specified time.

It is the bidder's responsibility to check the availability of all materials before bidding. The bidder shall select sub-contractors and suppliers who can warrant availability and delivery of all specified or qualified materials to assure project completion within the specified time.

The successful bidder must assume all risks for completing the project by the specified date. There shall be no extension of time for any reason except for delays caused by acts of God, labor disputes involving unions, or actions of the State. If for any reason the project falls behind schedule, the Contractor shall at its own cost, take necessary remedial measures to get the project back on schedule, i.e., working overtime, air freighting all materials, etc. In addition, if the Contractor fails to fully complete the project by the completion date, Contractor will be required to make the facility usable at its own cost.

R. BIDDER'S RESPONSIBILITY TO PROVIDE PROPER SUPERINTENDENCE: The successful low bidder shall designate in writing to the Engineer the name of its authorized superintendent (Superintendent), who will be present at the job site whenever any work is in progress. The Superintendent shall be responsible for all work, receiving and implementing instructions from the Engineer in a timely manner. The cost for superintendence shall be considered incidental to the project.

If the Superintendent is not present at the site of work, the Engineer shall have the right to suspend the work as described under sub-section 5.5 c. and 7.20 - Suspension of Work of the General Conditions.

S. LIQUIDATED DAMAGES: Liquidated damages in the amount specified in the Proposal will be assessed for each and every calendar day from and after the expiration of the time period stated in the Contract for the completion of the project.

T. HIRING OF HAWAII RESIDENTS: The Contractor shall comply with Act 68, SLH 2010, in the performance and for the duration of this contract. The Contractor shall ensure that Hawaii residents compose not less than eighty percent of the workforce employed to perform the contract work on the project. The eighty percent requirement shall be determined by

dividing the total number of hours worked on the contract by Hawaii 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 with shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

The requirements shall apply to any subcontract of $50,000 or more in connection with the Contractor, that is, such Subcontractors must also ensure that Hawaii residents compose not less than eighty percent of the Subcontractor's workforce used to perform the subcontract.

U. WATER AND ELECTRICITY: The Contractor shall make all necessary arrangements and pay all expenses for water and electricity used in the construction of this project.

V. PUBLIC CONVENIENCE AND SAFETY: The Contractor shall conduct construction operations with due regard to the convenience and safety of the public at all times. No materials or equipment shall be stored where it will interfere with the safe passage of public traffic. The Contractor shall provide, install, and maintain in satisfactory condition, all necessary signs, flares and other protective facilities and shall take all necessary precautions for the protection of the work and the convenience and safety of the public. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the General Conditions.

W. WORK TO BE DONE WITHOUT DIRECT PAYMENT: Whenever the contract that the Contractor is to perform work or furnish materials of any kind for which no price is fixed in the contract, it shall be understood that the Contractor shall perform such work or furnish said materials without extra charge or allowance or direct payment of any sort. The cost of performing such work or furnishing said material is to be included by the Contractor in a unit price for the appropriate item unless it is expressly specified that such work or material is to be paid for as extra work.

X. AS-BUILT DRAWINGS: As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required. All authorizations given by the Engineer to deviate from the plans shall be drawn on the job site plans. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded on the as-built drawings. Final as-built drawings shall be submitted to the Engineer for review and approval. After the Engineer approves the as-built drawings, the contractor shall submit an electronic copy in Adobe PDF format on CD ROM.

Y. ASBESTOS CONTAINING MATERIALS: The use of asbestos containing materials or equipment is prohibited. The Contractor shall insure that all materials and equipment incorporated in the project are asbestos-free.

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Z WORKER SAFETY: The Contractor shall provide, install and maintain in satisfactory condition all necessary protective facilities and shall take all necessary precautions for the protection and safety of its workers in accordance with the Occupational Safety and Health Standards for the State of Hawaii. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the

General Conditions.

AA. TOILET FACILITIES: All toilet facilities constructed at the project site shall be in accordance with the Public Health Regulations of the State Department of Health (DOH). All necessary precautions shall be observed at the project site. The use of sanitary facilities shall be strictly enforced and workers violating these provisions shall be promptly discharged.

BB. SIGNS: Whenever the project involves closing or obstructing any public thoroughfare, the Contractor shall provide traffic signs conforming to the applicable provisions of the current edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways", published by the Federal Highway Administration as directed by the Engineer for the purpose of diverting or warning traffic prior to the construction area. All traffic signs shall bear proper wording stating thereon the necessary information as to diverting or warning traffic.

When indicated in the Proposal, the Contractor shall provide a project sign, size 4'-0" x 7'-0" to be placed as directed by the Engineer. The sign shall be constructed in accordance with Section 01581 - Project Sign of these specifications and approved by the Engineer. All wording, type and size of lettering and color selection shall be as specified in these specifications or as approved by the Engineer.

All signs shall be kept neat and clean, and properly erected at all times.

CC. FIELD OFFICE AREA FOR DEPARTMENT: When indicated in the Proposal, the Contractor shall provide a housed working area of at least 100 square feet adjacent to the Contractor's office for the Department's use. This area will be used by the Engineer to perform tests and to store equipment. As a minimum, the field office shall include the following: standard sized office desk and chair, lighting, ventilation, window-type air conditioning rated at 5,000 BTU, door and window with locking hardware, electrical outlets, and working communications facilities (a cellular telephone is acceptable). The Department will pay for all long distance toll charges made by the Engineer.

DD. QUANTITIES: All bids will be compared on the basis of quantities of work to be done as shown in the Proposal; the quantities shown in the Unit Price items are estimated, being given as a basis for comparison of bids. The Department reserves the right to increase or decrease the quantities given under the items or delete items entirely as may be required during the progress of the work.

EE. OTHER HEALTH MEASURES: Forms of work site exposure or conditions which may be detrimental to the health or welfare of workers or of the general public shall be eliminated or reduced to safe levels as required by the DOH codes, standards, and regulations. Suitable first aid kits and a person qualified to render first aid, as specified in the DOH regulations, shall be provided at all times when work is scheduled.

FF. HAWAII BUSINESS OR COMPLIANT NON-HAWAII BUSINESS REQUIREMENT: Bidders (Contractors) shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR.

GG. COMPLIANCE WITH §3-122-112 HAR:

As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the following documents to the Department.

A. TAX CLEARANCE REQUIREMENTS (HRS Chapter 237): Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.

B. Department of Labor (DLIR) "**Certificate of Compliance**". (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers' Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) "**Certificate of Good Standing**". Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at http://vendors.ehawaii.gov to acquire a "Certificate of Vendor Compliance" indicating the bidder's status is compliant with the requirements of §103D-310(c), HRS, and shall be accepted for contracting and final payment purposes. Bidders that elect to use the new HCE services will be required to pay an annual fee of $12.00 to the Hawaii Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

P R O P O S A L

FOR

DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
State of Hawaii

Job No. DOAH26A
Kamuela Vacuum Cooling Plant
Food Safety Modernization Act Improvements
Lalamilo Ahupua'a, South Kohala, Hawai'i Island

_____, 2020

Chief Engineer
Agricultural Resource Management Division
Department of Agriculture
State of Hawaii
Honolulu, Hawaii

Dear Sir:

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to seal warehouse opening, painting, remove/dispose hazardous material, install septic system, abandon/fill existing cesspool, install drinking fountain, hand washing sink, and related work as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Bidders, Information and Instructions to Bidders, Proposal, Detailed Specifications, Interim General Conditions, Plans, and any and all addenda for:

Job No. DOAH26A
Kamuela Vacuum Cooling Plant
Food Safety Modernization Act Improvements
Lalamilo Ahupua'a, South Kohala, Hawai'i Island

on file in the office of the Agricultural Resource Management Division for the TOTAL BASE BID (Items 1 to 15) of:

_____

_____Dollars ($_____)
and will fully complete all work under this contract within 180 consecutive calendar days from the date of written notice to proceed, including date of said order, said total sum being itemized on the following pages.

PROPOSAL
Kamuela Vacuum Cooling Plant
Food Safety Modernization Act Improvements

BASE BID

Item No.	Estimated Quantity	Unit	Description	Unit Price	Total
1.		LS	Mobilization/Demobilization		$_____
2.		LS	Temporary Erosion Control (inclusive, but not limited to, NPDES permit requirements, roadway cleaning, and stabilized construction entrance)		$_____
3.	2	EA	40' x 8'-6" x 8' (One Trip) shipping container, furnish and install.	$_____	$_____
4.		LS	Furnish and install plumbing fixtures to include but not be limited to all plumbing fixtures, paper towel dispenser, soap dispenser, structural supports, enclosure, drain, water, power, septic tank, leach field, fill and abandon existing cesspool, inspect and clean condenser drains to cold storage, and any associated work.		$_____
5.	40	SF	Furnishing and paying for all labor, tools, and materials necessary patch and repair existing holes, cracks, penetrations, and gaps in metal siding.	$_____	$_____
6.		EA	Furnish and install specified hardware at existing exterior doors.	$_____	$_____
7.		LS	Furnishing and paying for all labor, tools, and materials necessary to paint the entire building interior wall surfaces including but not limited to siding, framing, trims, doors, and louvers.		$_____
8.		LS	Furnishing and paying for all labor, tools, and materials necessary to paint the entire building exterior wall surfaces including but not		$_____

			limited to siding, framing, trims, flashing, doors, bollards, and louvers.		
9.		LS	Furnishing and paying for all labor, tools, and materials necessary for complete interior surface preparation and removal of lead-containing and lead-based paints, in accordance with project plans and specifications		$_____
10.		LS	Furnishing and paying for all sampling, shipping, and laboratory analytical fees for TCLP testing of debris generated from interior paint removal, in accordance with project plans and specifications		$_____
11.		LS	Furnishing and paying for all labor, tools, equipment, and materials necessary for handling, storage, transport and disposal of interior lead-containing and lead-based paint waste determined as hazardous waste by TCLP testing to an approved EPA hazardous waste disposal site, in accordance with project plans and specifications		$_____
12.		LS	Furnishing and paying for all labor, tools, and materials necessary for complete exterior surface preparation and removal of lead-containing and lead-based paints, in accordance with project plans and specifications		$_____
13.		LS	Furnishing and paying for all sampling, shipping, and laboratory analytical fees for TCLP testing of debris generated from exterior paint removal, in accordance with project plans and specifications		$_____
14.		LS	Furnishing and paying for all labor, tools, equipment, and materials necessary for handling, storage, transport and disposal of exterior lead-containing and lead-based paint waste determined as hazardous waste by TCLP testing to an		$_____

			approved EPA hazardous waste disposal site, in accordance with project plans and specifications		
15.		LS	Furnishing and paying for all labor, tools, and materials necessary for removal and replacement of PCB-containing fluorescent light ballasts, mercury-containing fluorescent light tubes and light switches, in accordance with project plans and specifications, in place complete		$_____
			Total – BASE BID (Items 1-15)		$_____

PROPOSAL
Kamuela Vacuum Cooling Plant
Food Safety Modernization Act Improvements

HAWAII PRODUCTS PREFERENCE AND/OR USE OF HAWAII PRODUCTS

In accordance with Act 175, SLH 2009, the Hawaii products preference is applicable to this solicitation. Bidders offering a Hawaii product ("HP") shall identify the HP in the table below.

Persons desiring to qualify their product(s) not currently on the Hawaii Product List, shall complete Form SPO-38, *Certification for Hawaii Product Preference*, and submit the completed form no later than the deadline specified in the procurement notice and solicitation. The responsibility for certification and qualification shall rest upon the person requesting the preference. One form shall be completed and submitted for each product. Form SPO-38 is available at http://Hawaii.gov/spo/goods-services-construction/preferences-103d-pt-x/hi-products/hawaii-product-preferences

For the purpose of selecting the low bid when a solicitation contains both HP and non-HP, the price offered for a HP item shall be decreased by subtracting 10% for the class I or 15% for the class II HP item(s) offered. The lowest total offer, taking the preference into consideration, shall be awarded the contract, unless the offer provides for additional award criteria. The contract amount of any contract awarded, however, shall be the amount of the price offered, exclusive of the preferences.

In the event of any change that materially alters the bidder's ability to supply the Hawaii product(s), the bidder shall immediately notify the procurement officer in writing and the parties shall enter into discussions for the purpose of revising the contract or terminating the contract for convenience.

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price
1.	**Aggregates and Sand** – Basalt, Rock, Cinder, Limestone and Coral CTS Earthworking, Inc. Edwin Deluz Trucking & Gravel LLC Grace Pacific GW Construction Jas. W. Glover, Ltd. Puna Rock Co., Ltd. Sanford's Service Center, Inc. Tileco, Inc. West Hawaii Concrete Yamada and Sons, Inc.	I			$_____	$_____
2.	**Aggregates –** Recycled Asphalt and Concrete Jas. W. Glover, Ltd.	I			$_____	$_____

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price
3.	**Asphalt and Paving Materials** Grace Pacific Corporation Jas. W. Glover, Ltd. Walker-Moody Pavement Products and Equipment Yamada and Sons, Inc. dba YS Rock and Con-Agg of Hawaii	I			$_____	$_____
4.	**Cement and Concrete** – Cement and Concrete Products BOMAT, Ltd. Jas. W. Glover, Ltd. Kohala Coast Concrete & Precast LLC Tileco, Inc. West Hawaii Concrete Yamada and Sons, Inc.	I			$_____	$_____
5.	**Precast Concrete Products** – Aloha Precast, Inc. GPRM Prestress, LLC Hawaii Precast, Inc. Kohala Coast Concrete & Precast LLC Ramtek Fabrication Co., Inc. Walker Industries, Ltd.	I			$_____	$_____
6.	**Signs** – Traffic, regulatory and construction GP Roadway Solutions, Inc. Safety Systems and Signs Hawaii, Inc.	I			$_____	$_____
7.	**Soil Amendments, Mulch, Compost** Kauai Nursery & Landscaping, Inc. Sanford's Service Center, Inc.	II			$_____	$_____
8.	**Compost Filter** EnviroTech BioSolutions Hawaii, Inc. Certified Erosion Control Hawaii LLC					

RECYCLED PRODUCTS PREFERENCE

This project allows a 10% price preference for recycled products in accordance with HRS 103D-1005. Please indicate your recycled or non-recycled product by indicating its cost FOB jobsite unloaded in the schedule below, including applicable General Excise & Use Taxes.

DESCRIPTION	RECYCLED PRODUCT COST	NONRECYCLED PRODUCT COST
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____

The bidder requesting a recycled product preference shall also complete and submit the form "CERTIFICATION OF RECYCLED CONTENT" as shown in the Interim General Conditions and provide all supporting information with this proposal. Additional information may be requested to qualify a product.

The following definitions are applicable to the CERTIFICATION OF RECYCLED CONTENT form:

"Post-consumer recovered material" means any product used by a consumer, including a business that purchases the material, that has served its intended end use, and that has been separated or diverted from the solid waste stream for the purpose of use, reuse, or recycling.

"Product" includes materials, manufactures, supplies, merchandise, goods, wares, and foodstuffs.

"Recovered material" means waste material and by-products that have been separated, diverted, or removed from the solid waste stream after a manufacturing process for the purpose of use, reuse, or recycling. Recovered material does not include those materials and by-products that are generated and normally reused on-site or within original manufacturing processes (such as mill broke, in the case of paper products).

"Recycled content" means the percentage of a product composed of recovered material, or post-consumer recovered material, or both.

"Recycled product" means a product containing recovered material, or post-consumer recovered material, or both.

The bidder agrees that preference for recycled products shall be taken into consideration to determine the low bidder in accordance with said Section and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive any preference.

CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Base Bid (Items 1 to 15) selected by the Department of Agriculture. Write the total of bid items 1 to 15 on page P-1.

It is understood and agreed that the Department of Agriculture reserves the right to reject any and/or all bids and waive any defects when, in the Board's opinion, such rejection or waiver will be for the best interest of the State of Hawaii.

In the event all bids exceed available funds certified by the appropriate fiscal officer, the head of the purchasing agency responsible for the procurement in question is authorized in situations where time or economic considerations preclude resolicitation of work of a reduced scope to negotiate an adjustment of the bid price, including changes in the bid requirements, with the low responsible and responsive bidder, in order to bring the bid within the amount of available funds. It is understood and agreed upon that the head of the purchasing agency may delete a portion or all of any item(s) in the proposal at the stated unit or lump sum price as necessary to stay within the available funding. The bidder is responsible to make an earnest effort to represent the actual cost of each item, including all materials, labor, equipment, overhead and profit in their bid proposal to preclude claims of anticipated profit or loss of profit because of an unbalanced bid proposal.

It is also understood that if a mutually agreeable cost for the reduced scope of work necessitated by a lack of available funds cannot be agreed upon between the bidder and the head of the purchasing agency within 14 calendar days after the bid opening, then the bid may be rejected in the best interest of the purchasing agency, and the head of the purchasing agency may negotiate in progressive order (lowest to highest) with the next lowest responsible and responsive bidder.

It is also understood and agreed that the award of the contract shall be conditioned upon funds being made available for this project and further upon the right of the Department of Agriculture to hold all bids received for a period of sixty (60) days from the date of the opening thereof, unless otherwise required by law, during which time no bid may be withdrawn.

It is also understood that Notice to Proceed may be delayed up to one (1) year after the bid opening date, and that no additional compensation will be provided for any claim for escalation or delay for issuance of Notice to Proceed on or before that date.

It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase or decrease, and that the undersigned will perform all quantities of work as either increased or decreased, in accordance with the provisions of the Contract Specifications.

It is also understood and agreed that the estimated quantities shown for the items for which a UNIT PRICE is asked in this Proposal are only for the purpose of comparing on a uniform basis, bids offered for the work under this contract, and the undersigned agrees that he is satisfied with and will at no time, dispute said estimated quantities as a means of claims for anticipated profit or loss of profit, because of a difference between the quantities of the various classes of work done or the materials and equipment installed, and the said estimated quantities. On UNIT PRICE bids, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

After the proposals are opened and read, the figures will be extended and/or totaled in accordance with the bid prices of the acceptable proposals and the totals will be compared. In the comparison of bids, words written in the proposal shall govern over figures and unit prices will govern over totals.

Until the award of the contract, however, the right will be reserved to reject any and all proposals and to waive any defects or technicalities as may be deemed best for the interest of the State.

It is also understood and agreed that liquidated damages in the amount of FIVE HUNDRED AND NO/100 ($500.00) for each and every calendar day in excess thereof prior to completion of the contract shall be withheld from payments due to the Contractor.

It is also understood and agreed that if this bid is accepted, the successful bidder must enter into and execute a contract with the Department of Agriculture and furnish a Performance and Payment Bond, as required by law. These bonds shall conform to provisions of Section 103D-324 and 325, Hawaii Revised Statutes and any law applicable hereto.

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

It is understood that by submitting this proposal, the undersigned is declaring that his firm has not been assisted or represented on this matter by an individual who has, in a State capacity, been involved in the subject matter of this contract in the past two years.

It is understood that by submitting this proposal in accordance with HAR 3-122-192, the undersigned is declaring that the price submitted is independently arrived without collusion.

It is also understood that by submitting this proposal, a Certification for Safety and Health Programs for bids in excess of $100,000 (in accordance with HRS 396-18), the undersigned certifies that his organization will have a written safety and health plan for this project that will be available and implemented by the Notice to Proceed date of this project. Details of the requirements of this plan may be obtained from the Department of Labor and Industrial Relations, Occupational, Safety and Health Division (HIOSH).

It is further understood and agreed that the successful bidder shall comply with paragraph 3.1.a "SUBCONTRACTING" of the General Provisions which requires that the contractor shall perform with his own organization and with the assistance of workmen under his immediate superintendence, work of a value not less than twenty percent (20%) of the value of all work embraced in the Contract, except that certain contract items of work, if specifically referred to in the special provisions, will be exempted from said twenty percent requirement.

Compliance with §103-310 HRS. As a condition of award all bidders shall comply with all laws governing entities doing business in the State, including Chapter 237 HRS (general excise tax); Chapter 383 HRS (employment security – unemployment insurance); Chapter 386 HRS (workers compensation); Chapter 392 HRS (temporary disability insurance); and Chapter 393 HRS (pre-paid health care), and shall produce all documents to the State (DLNR, Engineering Division) required to demonstrate compliance with these subsections. Any bidder making a false affirmation or certification under this subsection shall be suspended and may be debarred from further offerings or awards pursuant to §103D-702 HRS.

RECEIPT OF ADDENDA

The bidder also acknowledges receipt of any and all addenda issued by the Agricultural Resource Management Division, by recording the date of receipt of the respective addenda in the space provided below:

Addendum	Date Received	Addendum	Date Received
No. 1	_____	No. 5	_____
No. 2	_____	No. 6	_____
No. 3	_____	No. 7	_____
No. 4	_____	No. 8	_____

It is understood that failure to receive any such addendum shall not relieve the Contractor from any obligation under this Proposal as submitted.

It is also understood and agreed that if this Proposal is accepted and the undersigned should fail or neglect to contract as aforesaid, the State may determine that the bidder has abandoned the Contract, and thereupon, forfeiture of the security accompanying his proposal shall operate and the same shall become the property of the State.

JOINT CONTRACTORS OR SUBCONTRACTORS TO BE ENGAGED ON THIS PROJECT

The Bidder agrees that the following is a complete listing of all joint contractors or subcontractors covered under Chapter 444, Hawaii Revised Statutes (HRS), who will be engaged by the Bidder on this project to perform the required work indicated pursuant to Section 103D-302, HRS. 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. The Bidder certifies that the completed listing of joint contractors or subcontractors fulfills the requirements for the project and the Bidder, together with the listed subcontractors or joint contractors have all the specialty contractor's licenses to complete the work, except as provided for in HRS §103D-302(b). Failure of the Bidder to comply with this requirement may be just cause for rejection of the bid.

"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 in which 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.

General Engineering "A" Contractors automatically have these "C" specialty contractor's licenses: C-3, C-9, C-10, C-17, C-24, C-31a, C-32, C-35, C-37a, C-37b, C-38, C-43, C-49, C-56, C-57a, C-57b and C-61.

General Building "B" Contractors automatically have these "C" specialty contractor's licenses: C-5, C-6, C-10, C-12, C-24, C-25, C-31a, C-32a, C-42a and C-42b.

In completing the Joint Contractors or Subcontractors List, describe the specialty contractor's nature and scope of work to be performed for this project and provide the complete firm name of the joint

contractor or subcontractor in the respective columns. If the Bidder is a general contractor providing the work of a required specialty contractor, whose license is not automatically held pursuant to HAR 16-77-32, fill in the Bidder's (general contractor's) name and nature and scope of work to be performed on this project.

List only one joint contractor or subcontractor per required specialty contractor's classification, unless within the same specialty, the work of each joint contractor or subcontractor can be described so that there is no overlap in work descriptions.

If a contractor's license is required by law for the performance of the work which is called for in this bid, the bidder and all subcontractors must have the required license before the submission of the bidder's proposal in the case of a non-federal aid project, and for federal-aid projects, the bidder must have the required license prior to the award of the project and all subcontractors prior to the start of the subcontracted work.

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Enclosed herewith is a:

1.	Surety Bond (*1)	)	
2.	Legal Tender (*2)	)	
3.	Cashier's Check (*3)	)	
4.	Certificate of Deposit (*3)	)	in the
5.	Certified Check (*3)	)	amount
6.	Official Check (*3)	)	of
7.	Share Certificate (*3)	)	
8.	Teller's Check (*3)	)	
9.	Treasurer's Check (*3)	)	

(Cross Out Those Not Applicable)

_____

_____Dollars ($_____)

as required by law.

Respectfully submitted,

_____
Name of Company, Joint Venture
or Partnership

_____
Contractor's License No.

By _____
Signature (*4)

Title _____
Print Name _____
Date _____
Address _____
_____
Telephone No. _____

E-Mail Address _____

NOTES:

1. Surety bond underwritten by a company licensed to issue bonds in this State;

2. Legal tender; or

3. A certificate of deposit; share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by, and payable on demand to the State by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration.

   A. These instruments may be utilized only to a maximum of $100,000.

   B. If the required security or bond amount totals over $100,000, more than one instrument not exceeding $100,000 each and issued by different financial institutions shall be accepted.

4. Please attach to this page evidence of the authority of this officer to submit bids on behalf of the Company and also the names and residence addresses of all officers of the Company.

5. Fill in all blank spaces with information asked for or bid may be invalidated. PROPOSAL MUST BE INTACT, MISSING PAGES MAY INVALIDATE YOUR BID.

End of Proposal

TABLE OF CONTENTS

DIVISION 10 – SPECIALTIES
NOT INCLUDED

TABLE CONTENTS (cont.)

SECTION 00700

GENERAL CONDITIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS AND COVENANTS

A. The Department of Land and Natural Resources Interim General Conditions and General Conditions shall govern all work specified hereinafter in all Divisions and Sections.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01019

GENERAL SPECIFICATIONS

PART 1 -– GENERAL

1.1 GENERAL REQUIREMENTS

Work shall consist of furnishing all labor, tools, materials and equipment necessary and required to construct in place complete all work as indicated on the drawings and as specified herein.

1.2 GENERAL

A. Examination of Premises: The Contractor shall contact the Engineer and obtain permission before visiting the site.

B. All lines and grades shall be established by a licensed surveyor, or licensed Civil Engineer, registered in the State of Hawaii. The Contractor shall submit evidence of current and valid registration.

C. Notices: The Contractor shall notify the Engineer and give at least three (3) working days notice before starting any work.

D. Disruption of Utility Services: All work related to the temporary disconnection of electrical or water (potable or non-potable) system shall be pre-arranged with the Engineer so that any disruption of such services will be kept to a minimum. In the event temporary power or water hook-up is required, the Contractor shall provide the necessary services.

E. Contractor's Operations

1. The Contractor must employ, insofar as possible, such methods and means of carrying out the work so as not to cause any interruption or interference to the facility's operations. Where the Contractor's operations would result in interruptions which would hamper the operations of the facilities, the Contractor shall rearrange the schedule of work accordingly.

2. The Contractor shall maintain safe passageway to and from the facility for the user agency personnel and the public at all times.

3. The Contractor shall be aware of the existing aviation easement and shall carefully read and strictly comply with the requirements of the Hawaii Administrative Rules, Title 19, Chapter 12, Section 7, as amended, is applicable and made a part of the Contract.

F. Lead Paint

1. When the project includes paint to be disturbed that was applied prior to 1980, it shall be assumed to contain lead. The Contractor shall inform its employees, subcontractors, and all other persons engaged in the project that lead containing paints are present in the existing buildings at the job site and to follow the requirements of the Department of Labor and Industrial Relations, Division of Occupational Safety and Health, Title 12, Subtitle 8,Chapter 148, Lead Exposure in Construction, Hawaii Administrative Rules (Chapter 12-148, HAR).

G. Parking Policy for Contractor

1. The Contractor and its employees will not be allowed to park in zones assigned to facility personnel.

2. Areas to be used by the Contractor shall be as designated by the Engineer. Any lawn damaged by the Contractor shall be restored as instructed by the Engineer at no cost to the State.

H. Toilet Accommodations: The Contractor shall provide their own toilet facilities.

I. Protection of Property: The Contractor shall continually maintain adequate protection of all its work from damage and shall protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. The Contractor shall repair, replace or pay the expense of repair of damages resulting from its operations.

J. Use of Power Driven Equipment: The Contractor is cautioned to take all necessary safety precautions to protect the facility personnel, and the public whenever power driven equipment is used.

K. Safety: The Contractor shall carefully read and strictly comply with the requirements of the Hawaii Occupational Safety and Health Law, Chapter 396, Hawaii Revised Statutes, as amended, is applicable and made a part of the Contract.

L. Clean Up Premises: The Contractor shall clean up and remove from premises all debris accumulated from operations as necessary or as directed. See also Section 7.25 of the General Conditions.

M. Responsibility

1. The State will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the prime Contractor in matters pertaining to other trades employed on the job. The Contractor shall be responsible for coordinating the work of all trades on the job.

2. Should the Contractor discover any discrepancy in the plans or specifications, the

Contractor shall immediately notify the Engineer before proceeding any further with the work, otherwise, the Contractor will be held responsible for any cost involved in correction of work placed due to such discrepancy.

N. Cooperation With Other Contractors: The State reserves the right at any time to contract for or otherwise perform other or additional work within the contract zone limits of this Contract. The Contractor of this project shall, to the extent ordered by the State, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by other contractors.

O. Division of the Work: The Divisions and Sections into which these Specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to all work specified within each Section.

P. Drawings and Specifications

1. The Contractor shall not make alterations in the drawings and specifications. In the event the contractor discovers any errors or discrepancies, the Contractor shall immediately notify the Engineer in accordance with the General Conditions.

2. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the work.

3. Specifications and drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.

Q. Approvals

1. Contractor shall obtain Department of Land and Natural Resources, State Historic Preservation Division (SHPD) approval prior to the start of construction at no cost to the State.

R. Required Submittals

1. Required submittals as specified in the Technical Sections of these specifications include one or more of the following: Shop drawings; color samples; material samples; technical data; schedules of materials; schedules of operations; guarantees; operating and maintenance manuals; and as-built drawings.

2. The Contractor shall make a comprehensive list of the required submittals, by Specification Section, and submit this list to the Engineer within 15 days after notice to proceed.

3. As-Built Drawings: When as-built drawings are required for submittal, the following shall apply:

a. As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required.

b. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded in red on the as-built drawings.

c. The following procedure shall be followed:

1) Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans.

2) Within two weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean copy of plans using a red pencil. Any deletions shall be so noted and redrawn as necessary. The Contractor shall stamp or mark the tracings "AS-BUILT", and also sign and date each drawing so marked.

3) The Contractor shall submit the as-built drawings to the Engineer for review and approval. After the Engineer approves the as-built drawings, the Contractor shall submit an electronic copy in Adobe PDF format on CD ROM.

4) Any as-built drawing which the Engineer determines does not accurately record the deviation shall be corrected by the State, and the Contractor shall be charged for the services.

1.3 REFERENCE CONSTRUCTION STANDARDS

The reference construction standards shall supplement the requirements of these specifications. Where there is a conflict between the reference standards and the project specifications, the project specification shall govern. The following reference construction standards, including addendums and revisions, are hereby incorporated into and made a part of these specifications and shall be applicable to all work performed by the Contractor:

A. “Hawaii Standard Specifications for Road and Bridge Construction” dated 2005, including all special provisions, State of Hawaii, Department of Transportation, Highways Division.

1. Paragraphs relating to Measurement and Payment in the Sections are not applicable to this project.

B. "Water System Standards" dated 2002, of the Board of Water Supply and Department of Water Supply, for the counties of Kauai, Maui, Hawaii and Honolulu.

1. Paragraphs relating to Measurement and Payment in the Sections are not applicable to this project.

2. Where an installation detail is not indicated on the drawings, the standard detail in the “Standard Details for Water System Construction, Vol. 2” including all revisions and addendums shall be followed.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

PART 1 -– GENERAL

Wherever used in the project, the following abbreviations will have the meanings listed:

Abbreviation	Company
AA	Aluminum Association Incorporated 818 Connecticut Avenue, N.W. Washington, D.C. 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W., Suite 225 Washington, D.C. 20001
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI
AEIC	Association of Edison Illuminating Companies 51 East 42nd Street New York, NY 10017
AFBMA	Anti-Friction Bearing Manufacturer's Association 60 East 42nd Street New York, NY 10017
AGA	American Gas Association 8501 East Pleasant Valley Road Cleveland, OH 44131
AGMA	American Gear Manufacturer's Association 1330 Massachusetts Avenue, N.W. Washington, D.C.
AISC	American Institute of Steel Construction 101 Park Avenue New York, NY 10017
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, D.C. 20036
AITC	American Institute of Timber Construction

Abbreviation	Company
	333 West Hampden Avenue Englewood, CO 80110
AMCA	Air Moving and Conditioning Association, Inc. 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, NY 10018
APA	American Plywood Association 1119 A Street Tacoma, WA 98401
API	American Petroleum Institute 1801 K Street N.W. Washington, DC 20006
ARI	Air-Conditioning and Refrigeration Institute 1814 North Fort Myer Drive Arlington, VA 22209
ASCE	American Society of Civil Engineers 345 East 47th Street New York, NY 10017
ASCII	American Standard Code for Information Interchange United States of America Standards Institute 1430 Broadway New York, NY 10018
ASE Code	American Standard Safety Code for Elevators, Dumbwaiter and Escalators American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 345 East 47th Street New York, NY 10017
ASME	American Society of Mechanical Engineers 345 East 47th Street

Abbreviation	Company
	New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPA	American Wood Preservers Association 1625 Eye Street Washington, DC 20006
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CBM	Certified Ballast Manufacturers 2120 Keith Building Cleveland, OH 44115
CMAA	Crane Manufacturers Association of America, Inc. (Formerly called: Overhead Electrical Crane Institute - OECI) 1326 Freeport Road Pittsburgh, PA 15238
CRSI	Concrete Reinforcing Steel Institute 180 North La Salle Street Chicago, IL 60601
CSA	Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario, M9W IR3, Canada
DEMA	Diesel Engine Manufacturer's Association 122 East 42nd Street New York, NY 10017

Abbreviation	Company
DIS	Division of Industrial Safety California Department of Industrial Relations 2422 Arden Way Sacramento, CA 95825
EEI	Edison Electric Institute 90 Park Avenue New York, NY 10016
EIA	Electronic Industries Association 2001 Eye Street N.W. Washington, DC 20006
EJMA	Expansion Joint Manufacturer's Association 331 Madison Avenue New York, NY 10017
ESO	Electrical Safety Orders, California Administrative Code, Title 8, Chap. 4, Subarticle 5 Office of Procurement, Publications Section P.O. Box 20191 8141 Elder Creek Road Sacramento, CA 95820
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch Washington Navy Yard, Bldg. 197 Washington, DC 20407
FEDSTDS	Federal Standards (see FEDSPECS)
FM	Factory Mutual Research 1151 Boston-Providence Turnpike Norwood, MA 02062
HEI	Heat Exchange Institute 122 East 42nd Street New York, NY 10017
HI	Hydraulic Institute

Abbreviation	Company
	1230 Keith Building Cleveland, OH 44115
IAPMO	International Association of Plumbing and Mechanical Officials 5032 Alhambra Avenue Los Angeles, CA 90032
ICBO	International Conference of Building Officials 5360 South Workman Mill Road Whittier, CA 90601
ICEA	Insulated Cable Engineers Association P.O. Box P South Yarmouth, MA 02664
IEEE	Institute of Electrical and Electronics Engineers, Inc. 345 East 47th Street New York, NY 10017
IES	Illuminating Engineering Society C/O United Engineering Center 345 East 47th Street New York, NY 10017
ISA	Instrument Society of America 400 Stanwix Street Pittsburgh, PA 15222
JIC	Joint Industrial Council 7901 Westpark Drive McLean, VA 22101
MILSPEC	Military Specifications Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, N.E. Vienna, VA 22180

Abbreviation	Company
NAAMM	National Association of Architectural Metal Manufacturers 100 South Marion Street Oak Park, IL 60302
NACE	National Association of Corrosion Engineers P.O. Box 986 Katy, TX 77450
NEC	National Electric Code National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
NEMA	National Electrical Manufacturer's Association 155 East 44th Street New York, NY 10017
NESC	National Electric Safety Code American National Standards Institute 1430 Broadway New York, NY 10018
NFPA	National Forest Products Association (Formerly called: National Lumber Manufacturer's Association) 1619 Massachusetts Avenue, N.W. Washington, DC 20036
OSHA	Occupational Safety and Health Act U.S. Department of Labor San Francisco Regional Office 450 Golden Gate Avenue, Box 36017 San Francisco, CA 94102
PPIC	The Plumbing & Piping Industry Council, Inc. Suite 402 510 Shatto Place Los Angeles, CA 90020
SAE	Society of Automotive Engineers 2 Pennsylvania Street New York, NY 10001

Abbreviation	Company
SAMA	Scientific Apparatus Makers Association One Thomas Circle Washington, DC 20005
SBCC	Southern Building Code Congress 1116 Brown-Marx Building Birmingham, AL 35203
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc. 8224 Old Courthouse Road Tysons Corner Vienna, VA 22180
SSPWC	Standard Specifications for Public Works Construction Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034
TEMA	Tubular Exchanger Manufacturer's Association 331 Madison Avenue New York, NY 10017
UBC	Uniform Building Code Published by ICBO
UL	Underwriters Laboratories Inc. 207 East Ohio Street Chicago, IL 60611
UMC	Uniform Mechanical Code Published by ICBO
UPC	Uniform Plumbing Code Published by IAPMO
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association (Formerly called: West Coast Lumberman's Association - WCLA) Yeon Building Portland, CA 97204

PART 2 -– PRODUCTS (NOT USED)

PART 3 -– EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01300

SUBMITTALS

PART 1 -– GENERAL

1.1 SUBMITTALS

A. Shop drawings shall be required for as called for in the plans, specifications or by the Engineer.

B. Other required submittals shall include:

1. Piping Layout.

2. Manufacturer's Data.

3. Certificates of Warranty.

4. Any others as called for in the plans, specifications, or by the Engineer.

1.2 BIDDER'S SPECIAL RESPONSIBILITY FOR COORDINATING CONTRACTUAL WORK AND SUBMITTALS:

A. The Contractor is responsible for the coordination of all contractual work and submittals.

B. The Contractor shall have a rubber stamp made up in the following format:

CONTRACTOR NAME

PROJECT: _____

_____

JOB NO: _____

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

DATE RECEIVED _____
SPECIFICATION SECTION _____
SPECIFICATION PARAGRAPH _____
DRAWING NUMBER_____
SUBCONTRACTOR NAME _____

SUPPLIER NAME _____

MANUFACTURER NAME _____

CERTIFIED BY: _____

C. This stamp, "filled in", should appear on the title sheet of each shop drawing, on a cover sheet of submittals in an 8-1/2" x 11" format, or on one face of a cardstock tag (min. 3" x 6") tied to each sample. The tag on the samples should state what the sample is so that, if the tag is accidentally separated from the sample, it can be matched up again. The back of this tag will be used by the Engineer for his receipt, review, and log stamp and for any comments that relate to the sample.

D. All submittals for material, equipment, and shop drawings listed in the contract documents, including dimensioned plumbing shop drawings, shall be required and shall be reviewed by the Engineer, prior to any ordering of materials and equipment.

E. Unless otherwise noted, the Contractor shall submit to the Engineer for his review eight copies of all shop drawings, piping layout, and/or catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) required for the construction. Drawings shall be submitted in sufficient time to allow the Engineer not less than twenty regular working days for examining the drawings.

F. The drawing shall be accurate, distinct, and complete and shall contain all required information, including satisfactory identification of items, units and assemblies in relation to the contract drawings and specifications.

G. Unless otherwise approved by the Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the drawings or other approved means that the Contractor has checked the shop drawings and that the work or equipment shown is in accordance with contract requirements and has been checked for dimensions and relationship with work of all other trades involved. All deviations from the plans and specifications shall be listed. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the contract documents and will be returned to the Contractor for resubmission in the proper form.

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

I. The review of such drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for correctness of the dimensions, fabrication details, and space requirements or for deviations from the contract drawings and specifications, unless the Contractor has called attention to such deviations, in writing, by a letter accompanying the drawings and the Engineer approved the change or deviations, in writing, at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, he shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.

J. The approval of the above drawings, lists, prints, specifications, or other data shall in no way release the Contractor from his responsibility for the proper fulfillment of the requirements of this contract nor for fulfilling the purpose of the installation nor from his liability to replace the same should it prove defective or fail to meet the specified requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Description: This section covers the requirements for mobilization and demobilization.

1.2 MOBILIZATION: Mobilization shall consist of the transporting, assembling, constructing, installing, and making ready for use at the job site, all the equipment, machinery, structures, utilities, materials, labor, and incidentals necessary to do the work covered by this contract.

1.3 DEMOBILIZATION: Demobilization shall consist of the dismantling and removal of the above-mentioned equipment, machinery, structures, utilities, materials, and incidentals, and the cleaning up of the site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GUIDELINES: If the Contractor utilizes private lands other than the sites provided by the Department for mobilization purposes, the provisions of this section shall apply, and the mobilization and demobilization work on said private lands shall be in accordance with the agreement between the Contractor and the land owner.

Any and all additional mobilization or demobilization costs in excess of the maximum amounts specified in the Proposal shall be included in the appropriate unit prices bid in the Proposal. The Contractor shall not receive any compensation for mobilization and demobilization in addition to those specified in the Proposal.

All equipment, machinery, buildings, utilities and incidentals mobilized and demobilized under this section shall remain the property of the Contractor.

END OF SECTION

SECTION 01567

POLLUTION CONTROL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Rubbish Disposal

1. No burning of debris and/or waste materials shall be permitted on the project site.

2. No burying of debris and/or waste material shall be permitted on the project site.

3. All debris and waste material shall be hauled away to a DOH-permitted solid waste management facility allowed to accept such waste. During loading operations, debris and waste materials shall be watered down to allay dust.

4. No dry sweeping shall be permitted in cleaning rubbish and fines which can become airborne from floors or other paved areas. Vacuuming, wet mopping or wet or damp sweeping is permissible.

5. Clean-up shall include the collection of all waste paper and wrapping materials, cans, bottles, construction waste materials and other objectionable materials, and removal as required. Frequency of clean-up shall coincide with rubbish producing events.

B. Dust

1. The Contractor shall prevent dust from becoming airborne at all times including non-working hours, weekends and holidays in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 60.1 - Air Pollution Control.

2. The method of dust control and costs shall be the responsibility of the Contractor. Methods of dust control shall include the use of water, chemicals or asphalt over surfaces which may create airborne dust.

3. The Contractor shall be responsible for all damage claims in accordance with Section 7.16 - "Responsibility for Damage Claims" of the GENERAL CONDITIONS.

C. Noise

1. Noise shall be kept within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 46 - Community Noise Control. The Contractor shall obtain and pay for the Community Noise Permit from the State Department of Health when the construction equipment or other devices emit noise at levels exceeding the allowable limits.

2. All internal combustion engine-powered equipment shall have mufflers to minimize noise and shall be properly maintained to reduce noise to acceptable levels.

3. Starting-up of construction equipment meeting allowable noise limits shall not be done prior to 6:45 a.m. without prior approval of the Engineer. Equipment exceeding allowable noise levels shall not be started-up prior to 7:00 a.m.

D. Others

1. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, the Contractor shall prevent any material from being carried onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutters and catch basins unless treated to comply with the State Department of Health water pollution regulations.

2. Trucks hauling debris shall be covered as required by PUC Regulation. Trucks hauling fine materials shall be covered.

3. No dumping of waste concrete will be permitted at the job-site.

4. Except in an emergency, such as a mechanical breakdown, all vehicle fueling and maintenance shall be done in a designated area. A temporary berm shall be constructed around the area when runoff can cause a problem.

E. Suspension of Work

1. Violations of any of the above requirements or any other pollution control requirements which may be specified in the Technical Specifications herein shall be cause for suspension of the work creating such violation. No additional compensation shall be due the Contractor for remedial measures to correct the offense. Also, no extension of time will be granted for delays caused by such suspensions.

2. If no corrective action is taken by the Contractor within 72 hours after a suspension is ordered by the Engineer, the State reserves the right to take whatever action is necessary to correct the situation and to deduct all costs incurred by the State in taking such action from monies due the Contractor.

3. The Engineer may also suspend any operations which he feels are creating pollution

problems although they may not be in violation of the above-mentioned requirements. In this instance, the work shall be done by force account as described in Subsection 4.2b -"Additional Work" of the GENERAL CONDITIONS and paid for in accordance with Subsection 8.4b - "Force - Account Work" therein. The count of elapsed working days to be charged against the contract in this situation shall be computed in accordance with Subsection 7.18 - "Contract Time" of the GENERAL CONDITIONS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01715

EXISTING CONDITIONS - ASBESTOS / LEAD / HAZARDOUS MATERIAL SURVEY

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes hazardous material survey for asbestos and lead-containing materials, PCB/mercury electrical components, and estimated impacted soil, associated with the Kamuela Vacuum Cooling Plant, Food Safety Modernization Act Improvements (DOAH26A), Island of Hawaii, and is provided for the Contractor's information.

B. Related Sections include the following:

1. SECTION 02095 - MANAGEMENT OF IMPACTED SOIL for requirements of work which disturbs impacted soil.

2. SECTION 13282 - LEAD HAZARD CONTROL for requirements of work which disturbs lead-containing paints which, for the purpose of this Section, is defined as paint with any measurable levels of lead.

3. SECTION 13286 - LIGHT BALLASTS AND LAMPS CONTAINING PCBs AND MERCURY for requirements of work which disturbs lamps and/or light ballasts.

4. SECTION 13288 - TESTING/AIR MONITORING for requirements for monitoring and clearance for compliance.

1.2 ASBESTOS

Asbestos-containing material (ACM) was not confirmed in the project areas, during the survey. In an event that suspected ACM is discovered, proper handling and disposal shall be conducted in a manner protective of the site workers, the staff, the public, and the environment from asbestos hazards.

1.3 LEAD CONTAINING PAINT

A. Inform employees, subcontractors, and other persons engaged in the project that lead-containing paints (LCP) and lead-based paints (LBP) are present in the project site. Follow the requirements of Federal, State, and local regulations.

B. For the purpose of this Section, LCP is defined as paints containing any detectable amount of lead. LBP is defined as paints with lead concentrations exceeding 5,000 milligrams per kilogram (mg/kg).

C. Review the attached lead testing data which identify locations where LCP was found. Lead testing was for design purposes only, and the results do not satisfy any of the requirements for worker exposure assessment.

D. Contractor may conduct additional lead testing of existing painted surface at his/her own expense.

E. Contractor shall follow applicable rules and regulations pertaining to the handling, removal, and disposal of lead paint.

1.4 ARSENIC

Arsenic-containing materials were not confirmed in the project areas, during the survey. In an event arsenic-containing or arsenic-treated material is discovered, proper handling and disposal shall be conducted in a manner protective of the site workers, the staff, the public, and the environment from arsenic hazard. Arsenic is a known carcinogen.

1.5 POLYCHLORINATED BIPHENYLS (PCBs), MERCURY, TERMITICIDES, CHLORDANE, DIELDRIN

Inform employees, subcontractors, and other persons engaged in the project that PCBs, mercury, chlordane, and dieldrin may present in the existing building(s) and at the job site.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

3.1 SURVEY

A. *Hazardous Materials Survey Report for Kamuela Vacuum Cooling Units Warehouse A and B and Site Office Building, State of Hawaii Department of Agriculture, 66-1370 mamalahoa Highway, Waimea, Hawaii*, 85 pages, dated February 26, 2020, prepared by Myounghee Noh & Associates, L.L.C.

B. Contractor shall review existing survey report(s) and shall verify and understand the locations and volumes of hazardous materials.

END OF SECTION

Hazardous Material Survey Report
for
Kamuela Vacuum Cooling Units
Warehouses A and B and Site Office Building
State of Hawaii Department of Agriculture
66-1370 Mamalahoa Highway
Waimea, Island of Hawaii 96743

MNA Project 2686_2

February 26, 2020

Myounghee Noh & Associates

Environmental Studies and Consulting Services

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This report is prepared for:

SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

HAZARDOUS MATERIAL SURVEY REPORT
FOR
KAMUELA VACUUM COOLING UNITS
WAREHOUSES A AND B AND SITE OFFICE BUILDING
STATE OF HAWAII DEPARTMENT OF AGRICULTURE
66-1370 MAMALAHOA HIGHWAY
WAIMEA, ISLAND OF HAWAII 96743

MNA Project 2686_2

February 26, 2020

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CONTRIBUTORS

Project Manager/Data QC	Phillip Cabanila
Certified Inspectors	Phillip Cabanila, Adam Custer
Report Writer/Drafter	Kristin Cabanila
Technical Editor/QC	Jessica Walsh

EXECUTIVE SUMMARY

In November 2019, Myounghee Noh & Associates, L.L.C. (MNA), was retained by SSFM International, Inc., to conduct a hazardous material survey at the State of Hawaii Department of Agriculture Kamuela Vacuum Cooling Units Warehouse Buildings A and B and Site Office at 66-1370 Mamalahoa Highway, Waimea, Island of Hawaii. Targeted were those areas anticipated to be disturbed or demolished during the planned renovation/demolition work.

The objective of the survey was to identify the presence, extent, and conditions of hazardous materials in and on the building in the areas anticipated to be disturbed, so that the information can be incorporated in the design.

On 26 November 2019, MNA conducted this hazardous material survey and identified 43 suspect building materials. Based on the analysis of 27 asbestos/bulk samples, 66 lead/paint chip, two arsenic/bulk samples, and a visual inspection of light ballasts, fluorescent light tubes, and light switches, MNA provides the following summary:

Summary of Hazardous Material Findings

	ACM	LCP	LBP	Arsenic	PCB	Mercury
Site Office						
Main Room	◙					◙
Restroom						◙
Exterior and Roof		◙				
Warehouse A						
Office		◙	◙			◙
Exterior and Roof	◙	◙	◙			
Cooling Containers 1 and 2						
Warehouse B						
Chilled Rooms 1 and 2		◙			◙*	◙
Main Room		◙	◙			◙
Exterior and Roof		◙	◙			

◙ indicates presence of hazardous material
*All ballasts were inaccessible and are suspected to be PCB-containing.
ACM – Asbestos-Containing Material
LCP – Lead-Containing Paint, <5,000 mg/kg
LBP – Lead-Based Paint, ≥5,000 mg/kg
PCB – Polychlorinated Biphenyls

Based on the visual survey and sampling and analysis of suspect bulk materials and paints, special hazard control measures are warranted for work involving asbestos, lead paint, polychlorinated biphenyls, and mercury. These control measures are briefly described in Section 10 Recommendations for Renovation and Construction Work. General dust and runoff controls are also warranted.

Contractors must verify, prior to bidding, the location and volumes of potentially hazardous materials and determine the appropriate dust and hazard control measures based on the area and material to be disturbed. Quantities of materials provided in this report are based on visual approximations only during the survey and should not be used for bidding purposes.

Analytical results provided in this report do not meet the requirements for waste characterizations. Contractor must coordinate with permitted landfill for required waste characterizations.

Any asbestos-containing material (ACM) disturbance exceeding 3 square feet or 3 linear feet of friable ACM or generating 0.5 cubic feet of ACM debris is considered a regulated activity. Contractors are required to comply with 29 CFR 1926.1101(k)(3)(i) to identify the presence, location, and quantity of ACM before any work is begun.

1.0 INTRODUCTION

Myounghee Noh & Associates, L.L.C. (MNA), under an agreement with SSFM International, Inc., conducted a hazardous material survey for the State of Hawaii Department of Agriculture Kamuela Vacuum Cooling Units Warehouse Buildings A and B and Site Office located at 66-1370 Mamalahoa Highway, Waimea, Island of Hawaii.

MNA's survey was conducted in support of the planned renovation of Warehouse A and demolition of Warehouse B. Targeted were those areas anticipated to be disturbed by the renovation/demolition and construction work, as follows (Table 1):

- Hazardous building materials due to the suspected presence of asbestos, lead, or arsenic.
- Polychlorinated biphenyls (PCB)-containing light ballasts.
- Mercury-containing electrical equipment, such as fluorescent light tubes, high-intensity discharge light bulbs, and light switches.

Warehouse A
November 2019

Warehouse B
November 2019

Site Office Building
November 2019

Warehouse A
Warehouse B
Site Office
Mamalahoa Highway
Ala Ohia Road
Map Area
Scale (ft.)
0 80 160 240
Myounghee Noh & Associates, L.L.C.
Figure 1. Vicinity Map
State of Hawaii Department of Agriculture
Kamuela Vacuum Cooling Units, Hawaii
DRAFT

Table 1. Anticipated Design Scope of Work

Work Anticipated
Warehouse A
• Demolish building
Warehouse B
• Install hand/eye washing station • Provide exterior washing station • Install water fountain • General improvements and renovations

2.0 SAMPLING AND SURVEY METHODS

On 26 November 2019, State of Hawaii-certified building inspectors, Phillip Cabanila and Adam Custer, conducted the building material survey. The inspectors performed a visual assessment of the project site, identified materials suspected of containing asbestos, lead, or arsenic, and collected samples of these materials. Inspector certifications are presented in Appendix A.

2.1 Identifying Homogeneous Materials

The inspectors identified building materials with the same appearance, color, and substrate as homogeneous materials. Interior homogeneous materials are considered unique per building and building floor, while exterior building materials are considered unique per area/structure. Building materials with the same characteristics (appearance, color, and substrate), as an identified homogeneous material, should be considered to possess the same hazard characteristics, unless specifically identified as otherwise in the report. As an example, if beige paint on metal pipe is found to be lead-based paint (LBP), then all identical beige paint on metal pipe should be treated as LBP. Table 2 provides an overview of sampling and a summary of hazardous materials identified.

Table 2. Summary of Sampling and Results

Materials Sampled	Samples Submitted/ Inspected	Suspect Material Locations	Identified Hazardous Materials
Site Office			
Asbestos in bulk material or paint	15	Ceilings, floor, sink, walls, window frames	1 ACM (5% Chrysotile)
Lead in paint	10	Cove base, door frames, eaves, fascia, roofing system, walls, window frames	2 LCP (40 mg/kg – 340 mg/kg)
Arsenic in bulk	0	---	None
PCB light ballasts	2	Fluorescent light fixtures (4 fixtures, containing a total of 4 ballasts inventoried)	None
Mercury light tubes	8	Fluorescent light tubes (8 tubes inventoried)	8 Low mercury vapor light tubes
Mercury light switches	3	Wall switches (3 switches inventoried)	3 Suspect mercury-containing light switches
HID bulbs	0	---	None

Materials Sampled	Samples Submitted/ Inspected	Suspect Material Locations	Identified Hazardous Materials
Warehouse A			
Asbestos in bulk material or paint	6	Ceilings, roofing system, walls	1 ACM (20% Chrysotile)
Lead in paint	28	Beams, bollards, cabinets, ceilings, columns, conduit, door frames, electrical box, frame, pipes, roofing system, trusses, Vacuum Tanks 1 and 2, walls, window frame	13 LCP (660 mg/kg – 100,000 mg/kg) including 5 LBP (9,500 mg/kg – 100,000 mg/kg)
Arsenic in bulk	2	Ceiling	None
PCB light ballasts	1	Fluorescent light fixtures (1 fixture, containing 1 ballast inventoried)	None
Mercury light tubes	2	Fluorescent light tubes (2 tubes inventoried)	2 Conventional mercury-containing light tubes
Mercury light switches	1	Wall switches (1 switches inventoried)	1 Suspect mercury-containing light switches
HID bulbs	0	---	None
Warehouse B			
Asbestos in bulk material or paint	6	Bollard footing, footing	None
Lead in paint	14	Beams, bollards, bollard bases, ceilings, columns, column bases, doors, door frames, footing, flashing, panel, roofing system, tank base, walls	9 LCP (40 mg/kg – 39,000 mg/kg) including 2 LBP (5,700 mg/kg – 39,000 mg/kg)
Arsenic in bulk	0	---	None
PCB light ballasts	0	Fluorescent light fixtures (16 fixtures, containing a total of 16 ballasts inventoried)	16 Suspect PCB-containing light ballasts*
Mercury light tubes	32	Fluorescent light tubes (32 tubes inventoried)	32 Conventional mercury-containing light tubes
Mercury light switches	4	Wall switches (4 switches inventoried)	4 Suspect mercury-containing light switches
HID bulbs	24	24 HID fixtures inventoried	24 HID bulbs

*All ballasts were inaccessible and are suspected to be PCB-containing.
ACM – Asbestos-Containing Material
HID – High-Intensity Discharge
LBP – Lead-Based Paint, ≥5,000 mg/kg
LCP – Lead-Containing Paint, <5,000 mg/kg
mg/kg – milligrams per kilogram (equivalent to parts per million)
PCB – Polychlorinated biphenyls

2.2 Building Material Sampling

Bulk and paint samples were collected using a decontaminated chisel, razor, or hammer in a manner that minimized airborne dust. The inspectors collected triplicate samples for asbestos and duplicate samples for lead. Samples were placed in sealable plastic bags, labeled with a unique identification number, and recorded on a chain-of-custody. For each sample, the date, sample appearance, analyte, and sample location were recorded on a field data form. Asbestos samples were transported under chain-of-custody to LA Testing in South Pasadena, California. Lead and arsenic samples were delivered under chain-of-custody to Hawaii Analytical Laboratory in Honolulu, Hawaii.

2.3 PCB-Containing Ballast Inspection

Fluorescent light ballasts in each building were inventoried and inspected for the presence of PCB-containing dielectric fluid. MNA recorded the number of fluorescent light fixtures and selected accessible fixtures to be inspected. Three of five accessible light fixtures were inspected. MNA confirmed that the light switch was off, opened the light fixture, removed the ballast cover plate, and inspected the ballast for a "No PCBs" label and/or the manufactured date. The location of inspected fixtures was recorded, and the light fixtures were reassembled following inspections.

Ballast manufactured between July 1, 1978, and July 1, 1998, that does not contain PCBs must be labeled "No PCBs." Ballast manufactured after 1998 are not required to be labeled. Ballasts without the "No PCBs" label or that are manufactured prior to 1979 are considered suspect PCB-containing in accordance with EPA guidance for PCB. Inaccessible ballasts are assumed to be PCB-containing.

2.4 Mercury-Containing Light Tube and Switch Inspection

MNA visually inspected fluorescent light tubes in each building to identify if they were conventional mercury-containing tubes. According to the EPA guidelines, lamps with green end caps are identified as low-mercury light tubes which may contain 3.5 - 4 milligrams (mg) of mercury, compared to a conventional fluorescent light tube with 8 - 14 mg of mercury (http://www.epa.gov/osw/hazard/wastetypes/universal/lamps/faqs.htm). If a green band is not observed at the end cap, it is considered a conventional mercury-containing tube.

MNA also turned on and off all accessible light switches throughout each building. If a switch did not make a clicking sound when turned on and off, it was considered to be suspect mercury-containing. The locations of inspected light tubes and switches were recorded.

3.0 LABORATORY INFORMATION

LA Testing analyzed the asbestos samples by polarized light microscopy using the Environmental Protection Agency (EPA) Method 600/R-93/116. LA Testing, South Pasadena, is certified by:

- National Voluntary Laboratory Accreditation Program (NVLAP), certification 200232-0
- State of Hawaii Department of Health (HDOH), certification L-01-034
- American Industrial Hygienist Association (AIHA) Environmental Lead Laboratory Accreditation Program (ELLAP), certification 102814

Hawaii Analytical Laboratory analyzed the lead samples by flame atomic absorption spectroscopy using the EPA Method 7082m and the arsenic samples by polarized light microscopy using method 3050B/6010B. Hawaii Analytical Laboratory, Honolulu, is certified by:

- NVLAP, certification 200655-0
- HDOH, certification L-14-002
- AIHA ELLAP, certification 101812

4.0 ASBESTOS RESULTS

Materials determined to contain greater than, or equal to, 1% asbestos are considered regulated asbestos-containing material (ACM) under the National Emission Standards for Hazardous Air Pollutants (NESHAP) as specified in 40 Code of Federal Regulations (CFR) Part 61 Subpart M. The U.S. Occupational Safety and Health Administration (OSHA) Asbestos General Industry and Construction Standards also define ACM as 1% asbestos or more by volume under 29 CFR 1910.1001 and 29 CFR 1926.1101, respectively. However, any measurable levels of asbestos fibers are considered to be a health concern, in an uncontrolled work environment.

Site Office: Five homogeneous materials suspected of containing asbestos were identified and sampled, generating 15 samples for analysis. One ACM, light gray undercoating on metal sink, was confirmed in the Main Room, with a result of 5% chrysotile asbestos.

Warehouse A: Two homogeneous materials suspected of containing asbestos were identified and sampled, generating six samples for analysis. One ACM, beige cement panels on exterior roofing system and walls, was confirmed in the survey area, with a result of 20% chrysotile asbestos.

Warehouse B: Two homogeneous materials suspected of containing asbestos were identified and sampled, generating six samples for analysis. None of the samples contained measureable levels of asbestos. Therefore, it is concluded that no ACM is present in the area anticipated to be disturbed (Table 3).

Table 3. Asbestos-Containing Material Determination

Areas	Locations	HM ID	Material Color	Material	Substrate	Result	Condition	Estimated Quantity
Site Office								
Main Room	Floor	38	Beige with streaks	12" x 12" Vinyl tile Mastic	Concrete	ND	Fair	450 sq. ft.
Main Room	**Sink**	**39**	**Lt. gray**	**Undercoating**	**Metal**	**ACM 5%**	**Good**	**5 sq. ft.**
Main Room	Window frames	43	Gray	Caulking	Metal	ND	Good	60 ln. ft.
Main Room, Restroom	Ceilings, walls	40	Lt. gray	Painted drywall Joint compound	None	ND	Good	1,500 sq. ft.
Restroom	Sink	41	Lt. gray	Caulking	Porcelain	ND	Fair	5 ln. ft.
Warehouse A								
Cooling Containers 1 and 2	Ceilings, walls	36	Tan	Insulation	Metal	ND	Poor	4,000 sq. ft.
Exterior	**Roofing system, walls**	**35**	**Beige**	**Cement panels**	**None**	**ACM 20%**	**Poor**	**6,600 sq. ft.**
Warehouse B								
Exterior	Footing	37	Lt. brown	Skim coat Stucco	Concrete	ND	Poor	250 sq. ft.
Exterior	Bollard footing	42	Gray	Paint/skim coat	Concrete	ND	Poor	10 sq. ft.

Bold values indicate results above the reporting limit.
The asbestos found to be chrysotile.
Good – Material is in an "as installed" condition. It is usable as is and may show cosmetic wear and tear or fading.
Fair – Material is functional for its installed purpose but shows initial signs of deterioration beyond the cosmetic.
Poor – Material shows significant deterioration and may not be functional for its installed purpose. The binding of the material has decreased integrity as indicated by peeling, cracking, or crumbling of the material.

Abbreviations and Acronyms
ACM – Asbestos-Containing Material
ln. ft. – Linear Feet
sq. ft. – Square Feet
HM ID – Homogeneous Material Identifier
ND – Not Detected

The suspected ACM descriptions and identifiers are provided in Appendix B. Sample and hazardous material location drawings are provided in Appendix C. Photographs of suspected materials are presented in Appendix D. Laboratory analytical reports, chain-of-custody, and field data forms are provided in Appendix E.

5.0 LEAD RESULTS

The U.S. Department of Housing and Urban Development (HUD) and the EPA define paint containing 5,000 milligrams per kilogram (mg/kg), or 0.5% by weight, or more of lead to be LBP. Paint containing any measurable concentration of lead is considered to be lead-containing paint (LCP) and a health concern. When lead is detected in a multi-layer sample, it is assumed that all layers represented by the sample contain lead at the same concentration.

Site Office: Five suspected lead paints were identified and sampled, generating 10 paint chip samples. Two LCP were identified in the survey area, with results ranging from 40 mg/kg to 340 mg/kg. None of the lead paints were identified as LBP, exceeding 5,000 mg/kg, the threshold for LBP.

Warehouse A: Fourteen suspected lead paints were identified and sampled, generating 28 paint chip samples. Thirteen LCP were identified in the survey area, with results ranging from 660 mg/kg to 100,000 mg/kg. Five of those paints were identified as LBP.

Warehouse B: Fourteen suspected lead paints were identified and sampled, generating 28 paint chip samples. Nine LCP were identified in the survey area, with results ranging from 40 mg/kg to 39,000 mg/kg. Five of those paints were identified as LBP (Table 4).

Suspected LCP descriptions and identifiers are provided in Appendix B. Sample and hazardous material location drawings are in Appendix C. Photographs of suspected LCP are presented in Appendix D. Laboratory analytical reports, chain-of-custody, and field data forms are provided in Appendix E.

Table 4. Lead-Containing Paint Determination

Areas	Locations	HM ID	Material Color	Substrate	Result (mg/kg)	Condition	Estimated Quantity
Site Office							
Main Room	Walls	27	Lt. gray	Drywall	<40	Good	250 sq. ft.
Main Room, Restroom	Door frames, window frames	28	Lt. gray	Wood	<40	Fair	150 ln. ft.
Main Room, Restroom	Cove base	29	Lt. brown	Wood	<40	Fair	200 ln. ft.
Exterior	Door frames, eaves, fascia, window frames	30	Peach	Wood	**LCP 40 - 46**	Poor	350 ln. ft.
Exterior	Roofing system, walls	31	Green	Metal	**LCP 270 - 340**	Poor	600 sq. ft.
Warehouse A							

Areas	Locations	HM ID	Material Color	Substrate	Result (mg/kg)	Condition	Estimated Quantity
Office	Walls	6	White	Wood	**LCP 660 - 790**	Poor	300 sq. ft.
Office	Door frame, window frame	10	Brown	Wood	**LCP 1,000 - 1,100**	Fair	50 ln. ft.
Office	Column	11	Lt. brown	Metal	**LCP 3,100 - 3,700**	Fair	10 ln. ft.
Office	Door	12	Lt. brown	Wood	**LCP 1,300 - 1,500**	Fair	30 sq. ft.
Office	Ceiling	13	White	Canec	<40	Fair	100 sq. ft.
Office	Cabinets, walls	14	Lt. green	Wood	**LBP 9,500 - 11,000**	Fair	100 sq. ft.
Exterior	Beams, columns, conduit, pipes, trusses	1	Silver	Metal	**LBP 19,000 - 51,000**	Poor	5,000 ln. ft.
Exterior	Beams, bollards, columns, trusses	2	Off-white	Metal	**LCP 1,400 - 1,600**	Poor	2,000 ln. ft.
Exterior	Vacuum Tank 1	3	Beige	Metal	**LBP 78,000 - 100,000**	Poor	300 sq. ft.
Exterior	Vacuum Tank 2	4	Aqua with brown under layer	Metal	**LBP 19,000 - 22,000**	Poor	300 sq. ft.
Exterior	Door frame, walls, window frame	5	Off-white	Wood	**LCP 1,200**	Poor	500 sq. ft.
Exterior	Roofing system, walls	7	Beige	Transite	**LBP 47,000 - 52,000**	Poor	6,600 sq. ft.
Exterior	Conduit, electrical box	8	Gray	Metal	**LCP 3,500 - 3,600**	Poor	60 sq. ft.
Exterior	Frame, wall	9	Gray	Wood	**LCP 1,100 - 1,300**	Poor	100 sq. ft.
Warehouse B							
Main Room	Beams, ceiling	18	Lt. green	Metal	**LCP 76 - 80**	Fair	1,800 sq. ft.
Main Room	Beams, columns	19	Lt. brown	Metal	**LBP 4,800 - 5,700**	Fair	900 ln. ft.
Main Room	Column base, footing	20	Lt. brown	Concrete	<40	Poor	1,000 sq. ft.
Main Room	Walls	21	Beige	Metal	**LCP 40**	Fair	4,500 sq. ft.
Main Room	Walls	22	Lt. gray	Wood	<40	Fair	250 sq. ft.
Main Room	Doors, door frames	23	Tan	Metal	**LCP 220**	Poor	80 sq. ft.
Main Room	Bollards, column base, tank base	24	Yellow	Concrete	<40	Fair	120 sq. ft.
Chilled Rooms 1 and 2	Beams, ceilings, columns, walls	25	White	Metal	**LCP 40 - 46**	Poor	6,500 sq. ft.
Exterior	Roofing system, walls	15	Beige	Metal	**LCP 130 - 150**	Poor	10,000 sq. ft.
Exterior	Beams, flashing, walls	16	Green	Metal	<40	Poor	1,500 sq. ft.
Exterior	Footing	17	Lt. brown	Concrete	<40	Poor	50 sq. ft.
Exterior	Bollards, bollard base	26	Lt. gray	Concrete	**LCP** <40 - **89**	Poor	20 sq. ft.

Areas	Locations	HM ID	Material Color	Substrate	Result (mg/kg)	Condition	Estimated Quantity
Exterior	Panel	32	Yellow	Wood	**LCP 49 - 52**	Poor	20 sq. ft.
Exterior	Bollards	33	Gray	Metal	**LBP 33,000 - 39,000**	Poor	20 sq. ft.

Bold values indicate results above the reporting limit.
Good – Material is in an "as installed" condition. It is usable as is and may show cosmetic wear and tear or fading.
Fair – Material is functional for its installed purpose but shows initial signs of deterioration beyond the cosmetic.
Poor – Material shows significant deterioration and may not be functional for its installed purpose. Paint is bubbling or peeling over 20% or more of surface area and no longer protects the substrate.

Abbreviations and Acronyms
HM ID – Hazardous Material Identifier
LCP – Lead-Containing Paint, <5,000 mg/kg
mg/kg– milligrams per kilogram or parts per million
LBP – Lead-Based Paint, ≥5,000 mg/kg
ln. ft. – Linear Feet
sq. ft. – Square Feet

6.0 ARSENIC RESULTS

The disturbance of arsenic-containing materials is regulated by the OSHA Inorganic Arsenic General Industry Standard under 29 CFR 1910.1018.

Site Office and Warehouse B: No suspected arsenic-containing materials were observed; therefore, no samples were collected during this survey.

Warehouse A: One building material suspected of containing arsenic, white canec ceiling in Office, was identified and sampled, generating two samples for analysis. Neither sample contained a measurable level of arsenic. Therefore, no arsenic-containing materials were identified in the building.

Suspected arsenic-containing material descriptions and identifiers are provided in Appendix B. Sample location drawings are provided in Appendix C. Photographs of suspected arsenic-containing material are presented in Appendix D. Laboratory analytical reports, chain-of-custody, and field data forms are provided in Appendix E.

7.0 SUSPECT PCB-CONTAINING BALLAST RESULTS

Site Office: MNA inventoried four fluorescent light fixtures, containing a total of four ballasts throughout the building. All fixtures were accessible. Two light ballasts were inspected, and each was identified as non-PCB ballast because the "No PCBs" label was observed. The ballasts were located in the Main Room.

Warehouse A: MNA inventoried one fluorescent light fixture, containing a one ballast, in the Office. The light ballast was inspected and identified as a PCB ballast because the "No PCBs" label was not observed.

Warehouse B: MNA inventoried 16 fluorescent light fixtures, containing a total of 16 ballasts throughout the building. None of the fixtures were accessible by inspectors; therefore, the 16 ballasts were assumed to contain PCB. Contractor must be required to inspect each ballast before removal and replacement, if required.

8.0 MERCURY RESULTS

Site Office: MNA inventoried and visually inspected eight fluorescent light tubes in the building. None of the fluorescent light tubes had a green band, indicating conventional mercury-containing tubes. No high-intensity discharge light bulbs were observed in the building. Three light switches were also inspected, and all of them were suspected to contain mercury.

Warehouse A: MNA inventoried and visually inspected two fluorescent light tubes in the building. None of the fluorescent light tubes had a green band, indicating conventional mercury-containing tubes. No high-intensity discharge light bulbs were observed in the project areas. One light switch was also inspected, and it was suspected to contain mercury.

Warehouse B: MNA inventoried and visually inspected 32 fluorescent light tubes in the project area. None of the fluorescent light tubes had a green band, indicating conventional mercury-containing tubes. Twenty-four high-intensity discharge light bulbs were observed in the Main Room. Four light switches inspected were suspected to contain mercury.

9.0 SUMMARY OF SURVEY RESULTS

MNA conducted a hazardous material survey at the State of Hawaii Department of Agriculture Kamuela Vacuum Cooling Units Warehouse Buildings A and B and the Site Office, at 16-1370 Mamalahoa Highway, Waimea, Island of Hawaii. MNA's survey was conducted in support of the renovation and demolition project (design scope in Table 1).

Based on the analysis of 27 asbestos-suspected building material samples, 66 lead-suspected paint chip samples, two arsenic-suspected canec samples, and a visual inspection of light ballasts, fluorescent light tubes, and light switches, MNA provides the following summary:

Summary of Hazardous Material Findings

	ACM	LCP	LBP	Arsenic	PCB	Mercury
Site Office						
Main Room	◙				◙	◙
Restroom						
Exterior and Roof		◙				
Warehouse A						
Office		◙	◙			◙
Exterior and Roof	◙	◙	◙			
Warehouse B						
Chilled Room 1		◙			◙*	◙
Chilled Room 2		◙			◙*	◙
Main Room		◙	◙			◙
Exterior and Roof		◙	◙			

◙ indicates presence of hazardous material
*None of the ballasts were accessible therefore suspected to contain PCB.
ACM – Asbestos-Containing Material LCP – Lead-Containing Paint, <5,000 mg/kg
LBP – Lead-Based Paint, ≥5,000 mg/kg PCB – Polychlorinated Biphenyls

10.0 RECOMMENDATIONS FOR RENOVATION AND CONSTRUCTION WORK

It is required that properly trained employees perform construction work and renovation that disturbs hazardous materials, in a manner protective of the site workers, the public, facility users, and the environment. The following recommendations address OSHA and other applicable federal requirements. These recommendations provide guidance for the management of hazardous building materials and control of occupational and environmental hazards associated with operations, maintenance, renovation, and demolition. These recommendations are based on information gathered during the hazardous materials survey. These recommendations are not intended to constitute a formal work plan but are intended to provide a starting point for the development of a work plan or procedure.

10.1 Asbestos-Containing Materials

Employees involved in renovation or demolition activities that disturb asbestos must conduct work in accordance with 29 CFR 1926.1101, the OSHA Asbestos Construction Standard. Work practices that would trigger these requirements include, but are not limited to, repair, maintenance, or renovation of structures containing asbestos, as well as removal or encapsulation of materials containing asbestos. For each project, the contractor must determine the appropriate safety measures based on the area to be disturbed, the type, volume, and condition of asbestos materials. Applicable work practice guidelines involving the disturbance of asbestos materials are summarized, but are not limited to:

- Employees must anticipate hazards, implement appropriate engineering controls, and utilize personal protective equipment (PPE).
- Employers must provide and require the use of appropriate PPE for any employee exposed to airborne concentrations of asbestos that exceed OSHA regulatory limits, or for which a required negative exposure assessment is not produced (29 CFR 1926.1101[i][1]).
- Employees must utilize respiratory protection until the initial exposure monitoring assessment documents safe working levels of airborne asbestos (29 CFR 1926.1101[f] and [h]). Additional periodic exposure monitoring may be required.
- An initial exposure monitoring assessment should be carried out when workers are disturbing asbestos to ensure that they are not exposed to airborne asbestos concentrations greater than the Permissible Exposure Limit (PEL) of 0.1 fibers per cubic centimeter (f/cc) of air as an 8-hour time-weighted average (TWA), and the Excursion Limit of 1.0 f/cc over a 30-minute sampling period.
- The work site must be maintained as a controlled regulated area and supervised by a competent person at all times.
- Employees must implement stringent dust control procedures to prevent asbestos in any airborne or settled dust.
- Employees must clean the work area thoroughly using wet methods and a high-efficiency particulate air (HEPA) vacuum. Dry sweeping or air blowing of asbestos-containing debris and dust must be avoided.

- Waste and dust containing asbestos must be collected separately from other construction debris. Workers must conduct prompt and controlled clean up and disposal of asbestos wastes and debris in leak-tight containers.
- Asbestos-containing waste must be wet, packaged, labeled, stored, and disposed of in accordance with applicable regulations.
- Visually inspect the work area to ensure that all asbestos-containing debris and dust has been properly removed.
- Conduct clearance in accordance with contract specifications.

10.2 Lead-Containing Paints

Employees involved in renovation or demolition activities that disturb lead paints must conduct work in general accordance with 29 CFR 1926.62 OSHA Lead Construction Standard. Work practices that would trigger these requirements include, but are not limited to, sanding, blasting, welding, cutting, or scraping. For each project, the contractor must determine the appropriate safety measures based on the area to be disturbed, the lead concentration, and the paint condition. Applicable work practice guidelines involving the disturbance of lead paints are summarized, but are not limited to:

- Employees must anticipate lead hazards and implement appropriate engineering controls and PPE.
- Employees must utilize respiratory protection until the initial air monitoring assessment documents safe working levels of airborne lead (29 CFR 1926.62[d][1] and [2][i][A]).
- An exposure assessment should be carried out when employees are disturbing LCP or LBP to ensure that they are not exposed to airborne lead concentrations greater than the PEL of 50 micrograms per cubic meter ($\mu g/m^3$) averaged over an 8-hour period. Additional periodic exposure monitoring may be required if the Action Level, 30 $\mu g/m^3$, averaged over an 8-hour period is exceeded.
- Employees must implement stringent dust control procedures to prevent airborne lead dust.
- Employees must clean the work area thoroughly using wet methods and a HEPA vacuum. Dry sweeping or air blowing of lead debris and dust must be avoided.
- Lead-containing debris must be segregated from other wastes, collected, and containerized. Wastes must be characterized per State of Hawaii requirements, including a determination of the waste as hazardous or non-hazardous. Lead-containing waste must be handled and disposed of in accordance with applicable requirements.
- Visually inspect and verify the work area to ensure all lead-containing debris and dust has been properly removed and the project site is free of lead hazard.
- Conduct clearance in accordance with contract specifications.

10.3 Arsenic-Containing Materials

Based on the sampling and analysis of one suspected arsenic-containing material in Warehouse A, no materials containing arsenic were identified in the project areas during this survey. Therefore, no special arsenic control measures are provided.

10.4 PCB-Containing Ballasts

When the label on ballasts are missing, illegible, or does not state "No PCBs," workers must handle and dispose of these ballasts as PCB-containing ballasts. Trained workers are required to remove suspect PCB-containing light ballasts or cleaning up PCB spills, and the work must be performed in accordance with OSHA and EPA requirements. The handling, storage, transportation, and disposal of suspect PCB-containing waste are regulated by the Toxic Substance Control Act (TSCA; 40 CFR Part 761). Safeguards, precautions, and protective measures must be designed and implemented to prevent PCB release or exposure. For each project, the contractor should determine the appropriate safety measures based on the number and condition of suspect PCB-containing ballasts. Applicable work practice guidelines involving PCB-containing ballasts and/or PCB-contaminated materials are summarized, but are not limited to:

- Employees must anticipate hazards and utilize appropriate engineering controls and PPE.
- All work involving PCB should be performed by properly trained and equipped personnel.
- A written spill plan may aid in spill response.
- Maintain a PCB spill response kit on site that contains at a minimum the following items: disposable nitrile or nitrile rubber gloves, disposable coveralls, chemical safety goggles, disposable foot covers, PCB warning signs for controlled areas, caution tape, oil absorbent pads, sealable waste containers to prevent exposure to vapors, tape, rags, paper and writing equipment, and labels for waste containers and secondary containment for vessels.
- Clean up leaks and spills and handle disposal operations in compliance with regulatory requirements and project specifications.
- Trained employees should clean up PCB spills using the spill response kit and appropriate equipment.
- Establish PCB controlled areas for removal or spill cleanup to prevent unauthorized entry of personnel. Maintain an access log of employees working in PCB controlled areas.
- All PCB waste must be stored and disposed of in compliance with TSCA regulations, and all records involving PCB must be properly maintained.
- Inspect PCB waste containers for seal tightness in a timely manner.

10.5 Mercury-Containing Light Tubes, Switches, and HID Bulbs

Trained employees are required to perform disturbance, removal, or spill cleanup of mercury-containing light tubes or suspect mercury-containing light switches, and the work must be performed in accordance with EPA and OSHA regulations. Safeguards, precautions, and protective measures must be implemented to prevent mercury exposure. Applicable work practice guidelines involving mercury-containing items and/or mercury-contaminated materials are summarized, but are not limited to:

- Employees must anticipate hazards, implement appropriate engineering controls and PPE, and ventilate the affected area if light tubes or bulbs are broken.
- All work involving mercury-containing items must be conducted by properly trained and equipped personnel.

- A written mercury spill response plan may aid in spill response should a mercury release occur.
- Maintain a mercury spill kit on site.
- Clean up leaks and spills and handle disposal operations in compliance with regulatory requirements and spill kit Safety Data Sheet (SDS).
- Trained employees must ventilate the area and clean up mercury spills using the response kit and appropriate equipment and PPE.
- Establish mercury-controlled areas for removal or spill cleanup to prevent unauthorized entry of personnel. Maintain an access log of employees working in mercury-controlled areas.
- All mercury waste must be stored and disposed of in compliance with EPA regulations, and all records involving mercury must be properly maintained.
- Inspect mercury waste containers for leaks in a timely manner.

11.0 LIMITATIONS

Industry standard effort was made to identify suspected hazardous building materials during the survey at the project area. However, this does not imply a guarantee that all suspected building materials and hazardous materials were identified by this assessment because certain building materials and/or surfaces may be hidden by walls, flooring, partitions, other building components, or existing equipment or furniture. If any previously unforeseen suspected materials become known, additional assessment may be required prior to the planned renovation and demolition project.

Material quantities provided in this report are based on visual approximations taken at the time of the survey only and should not be used for bidding purpose. It is the Contractor's responsibility to verify the material quantities and volume of waste prior to bidding.

Analytical results provided in this report do not meet the requirements for waste characterizations. Contractor must coordinate with permitted landfills for required waste characterizations.

Any ACM disturbance exceeding 3 square feet or 3 linear feet of friable ACM or generating 0.5 cubic feet of ACM debris is considered a regulated activity. Contractors are required to comply with 29 CFR 1926.1101(k)(3)(i) to identify the presence, location, and quantity of ACM before any work is begun.

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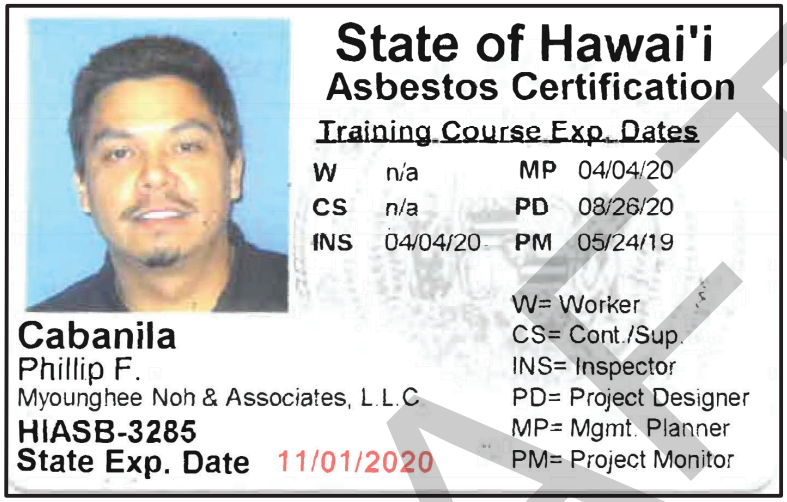
APPENDIX A: INSPECTOR CERTIFICATIONS

Phillip Cabanila

Adam Custer



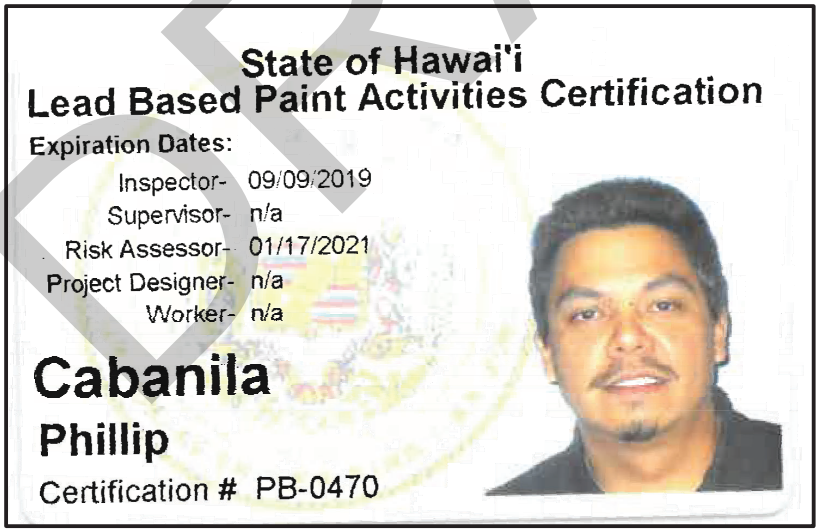
State of Hawai'i
Asbestos Certification

Training Course Exp. Dates

W	n/a	MP	04/04/20
CS	n/a	PD	08/26/20
INS	04/04/20	PM	05/24/19

W= Worker
CS= Cont./Sup.
INS= Inspector
PD= Project Designer
MP= Mgmt. Planner
PM= Project Monitor

Cabanila
Phillip F.
Myounghee Noh & Associates, L.L.C
HIASB-3285
State Exp. Date 11/01/2020

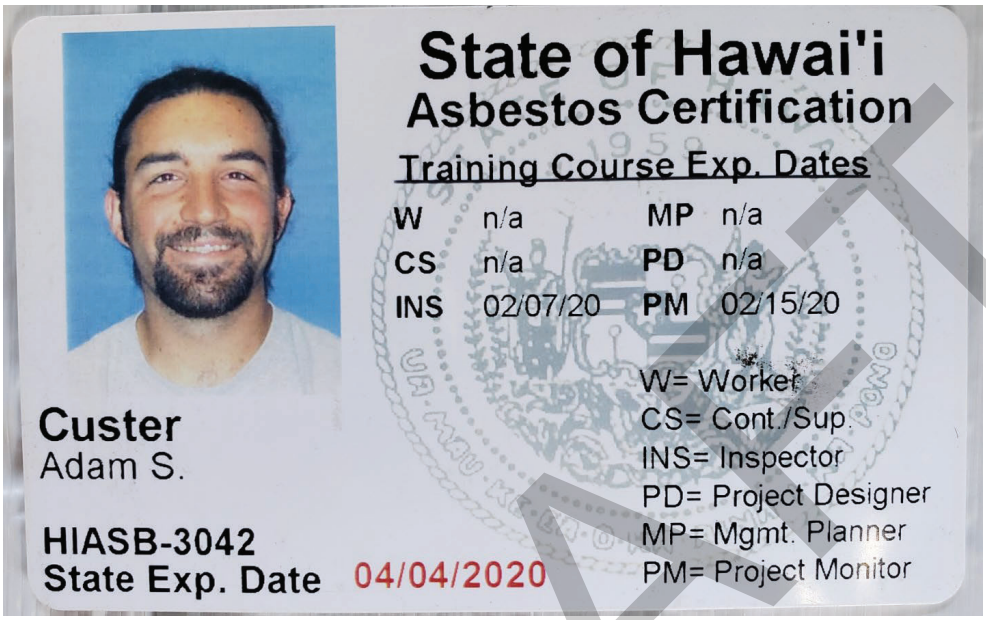


State of Hawai'i
Lead Based Paint Activities Certification

Expiration Dates:

Inspector- 09/09/2019
Supervisor- n/a
Risk Assessor- 01/17/2021
Project Designer- n/a
Worker- n/a

Cabanila
Phillip
Certification # PB-0470


State of Hawai'i
Asbestos Certification
Training Course Exp. Dates
W n/a
CS n/a
INS 02/07/20
MP n/a
PD n/a
PM 02/15/20
W= Worker
CS= Cont./Sup.
INS= Inspector
PD= Project Designer
MP= Mgmt. Planner
PM= Project Monitor
Custer
Adam S.
HIASB-3042
State Exp. Date 04/04/2020

APPENDIX B: HOMOGENEOUS MATERIALS IDENTIFIED AND SAMPLE TYPES COLLECTED

Homogeneous Materials Identified and Sample Types Collected

HM ID	Building	Areas	Locations	Material Color	Material	Substrate	Asb	Pb	Ars	Result
1	WHA	Exterior	Beams, columns, conduit, pipes, trusses	Silver	Paint	Metal		X		LBP 19,000 - 51,000 mg/kg
2	WHA	Exterior	Beams, bollards, columns, trusses	Off-white	Paint	Metal		X		LCP 1,400 - 1,600 mg/kg
3	WHA	Exterior	Vacuum Tank 1	Beige	Paint	Metal		X		LBP 78,000 - 100,000 mg/kg
4	WHA	Exterior	Vacuum Tank 2	Aqua with brown underlayer	Paint	Metal		X		LBP 19,000 - 22,000 mg/kg
5	WHA	Exterior	Door frame, walls, window frame	Off-white	Paint	Wood		X		LCP 1,200 mg/kg
6	WHA	Office	Walls	White	Paint	Wood		X		LCP 660 - 790 mg/kg
7	WHA	Exterior	Roofing system, walls	Lt. green	Paint	Transite		X		LBP 47,000 - 52,000 mg/kg
8	WHA	Exterior	Conduit, electrical box	Gray	Paint	Metal		X		LCP 3,500 - 3,600 mg/kg
9	WHA	Exterior	Frame, wall	Gray	Paint	Wood		X		LCP 1,100 - 1,300 mg/kg
10	WHA	Office	Door frame, window frame	Brown	Paint	Wood		X		LCP 1,000 - 1,100 mg/kg
11	WHA	Office	Column	Lt. brown	Paint	Metal		X		LCP 3,100 - 3,700 mg/kg

Homogeneous Materials Identified and Sample Types Collected

HM ID	Building	Areas	Locations	Material Color	Material	Substrate	Asb	Pb	Ars	Result
12	**WHA**	**Office**	**Door**	**Lt. brown**	**Paint**	**Wood**		**X**		**LCP 1,300 - 1,500 mg/kg**
13	WHA	Office	Ceiling	White	Paint	Canec		X		<40 mg/kg
14	**WHA**	**Office**	**Cabinets, walls**	**Lt. green**	**Paint**	**Wood**		**X**		**LBP 9,500 - 11,000 mg/kg**
15	**WHB**	**Exterior**	**Roofing system, walls**	**Beige**	**Paint**	**Metal**		**X**		**LCP 130 - 150 mg/kg**
16	WHB	Exterior	Beams, flashing, walls	Green	Paint	Metal		X		<40 mg/kg
17	WHB	Exterior	Footing	Lt. brown	Paint	Concrete		X		<40 mg/kg
18	**WHB**	**Main Room**	**Beams, ceiling**	**Lt. green**	**Paint**	**Metal**		**X**		**LCP 76 - 80 mg/kg**
19	**WHB**	**Main Room**	**Beams, columns**	**Lt. brown**	**Paint**	**Metal**		**X**		**LBP 4,800 - 5,700 mg/kg**
20	WHB	Main Room	Column base, footing	Lt. brown	Paint	Concrete		X		<40 mg/kg
21	**WHB**	**Main Room**	**Walls**	**Beige**	**Paint**	**Metal**		**X**		**LCP 40 mg/kg**
22	WHB	Main Room	Walls	Lt. gray	Paint	Wood		X		<40 mg/kg
23	**WHB**	**Main Room**	**Doors, door frames**	**Tan**	**Paint**	**Metal**		**X**		**LCP 220 mg/kg**
24	WHB	Main Room	Bollards, column base, tank base	Yellow	Paint	Concrete		X		<40 mg/kg
25	**WHB**	**Chilled Rooms 1 and 2**	**Beams, ceilings, columns, walls**	**White**	**Paint**	**Metal**		**X**		**LCP 40 - 46 mg/kg**
26	**WHB**	**Exterior**	**Bollards, bollard base**	**Lt. gray**	**Paint**	**Concrete**		**X**		**LCP <40 - 89**
27	Site Office	Main Room	Walls	Lt. gray	Paint	Drywall		X		<40 mg/kg

Homogeneous Materials Identified and Sample Types Collected

HM ID	Building	Areas	Locations	Material Color	Material	Substrate	Asb	Pb	Ars	Result
28	Site Office	Main Room, Restroom	Door frames, window frames	Lt. gray	Paint	Wood		X		<40 mg/kg
29	Site Office	Main Room, Restroom	Cove base	Lt. brown	Paint	Wood		X		<40 mg/kg
30	**Site Office**	**Exterior**	**Door frames, eaves, fascia, window frames**	**Peach**	**Paint**	**Wood**		**X**		**LCP 40 - 46 mg/kg**
31	**Site Office**	**Exterior**	**Roofing system, walls**	**Green**	**Paint**	**Metal**		**X**		**LCP 270 - 340 mg/kg**
32	**WHB**	**Exterior**	**Panel**	**Yellow**	**Paint**	**Wood**		**X**		**LCP 49 - 52 mg/kg**
33	**WHB**	**Exterior**	**Bollards**	**Gray**	**Paint**	**Metal**		**X**		**LBP 33,000 - 39,000 mg/kg**
34	WHA	Office	Ceiling	White	Canec	None			X	<38 - <41 mg/kg
35	**WHA**	**Exterior**	**Roofing system, walls**	**Beige**	**Transite panels**	**None**	**X**			**ACM 20%**
36	WHA	Cooling Containers 1 and 2	Ceilings, walls	Tan	Insulation	Metal	X			ND
37	WHB	Exterior	Footing	Lt. brown	Skim coat Stucco	Concrete	X			ND
38	Site Office	Main Room	Floor	Beige with streaks	12" x 12" Vinyl tile Mastic	Concrete	X			ND
39	**Site Office**	**Main Room**	**Sink**	**Lt. gray**	**Undercoating**	**Metal**	**X**			**ACM 5%**
40	Site Office	Main Room, Restroom	Ceilings, walls	Lt. gray	Painted drywall Joint compound	None	X			ND
41	Site Office	Restroom	Sink	Lt. gray	Caulking	Porcelain	X			ND

Homogeneous Materials Identified and Sample Types Collected

HM ID	Building	Areas	Locations	Material Color	Material	Substrate	Asb	Pb	Ars	Result
42	WHB	Exterior	Bollard footing	Gray	Paint/skim coat	Concrete	X			ND
43	Site Office	Main Room	Window frames	Gray	Caulking	Metal	X			ND

Bold values indicate results above the reporting limit.

All asbestos found to be chrysotile.

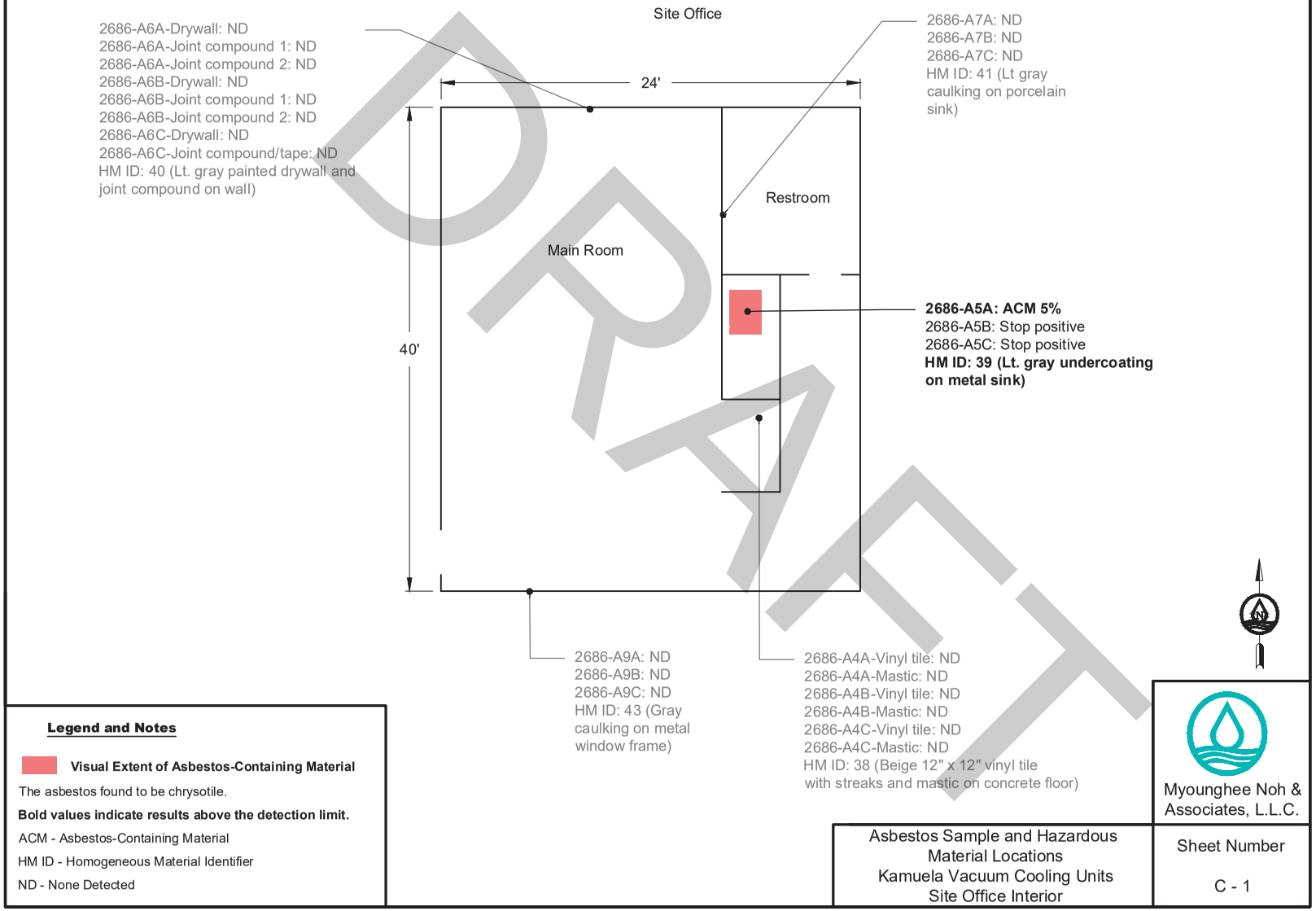
Abbreviations and Acronyms

Asb - Asbestos
ACM - Asbestos-Containing Material
Ars - Arsenic
HM ID - Homogeneous Material Identifier
LBP - Lead-Based Paint ≥5,000 mg/kg
LCP - Lead-Containing Paint <5,000 mg/kg
mg/kg - milligrams per kilogram, equivalent to parts per million
ND - Not Detected
Pb - Lead
WHA - Warehouse A
WHB - Warehouse B

APPENDIX C: SAMPLE AND HAZARDOUS MATERIAL LOCATION DRAWINGS

List of Drawings	
Asbestos and Lead Sample and Hazardous Material Locations – Site Office	C-1 and C-2
Asbestos and Lead Sample and Hazardous Material Locations – Warehouse A	C-3 - C-5
Asbestos and Lead Sample and Hazardous Material Locations – Warehouse B	C-6 - C-8

HM ID	Locations	Color	Material	Substrate	Results
39	Sink	Lt. gray	Undercoating	Metal	**ACM 5%**



Legend and Notes

Visual Extent of Asbestos-Containing Material

The asbestos found to be chrysotile.

Bold values indicate results above the detection limit.

ACM - Asbestos-Containing Material

HM ID - Homogeneous Material Identifier

ND - None Detected

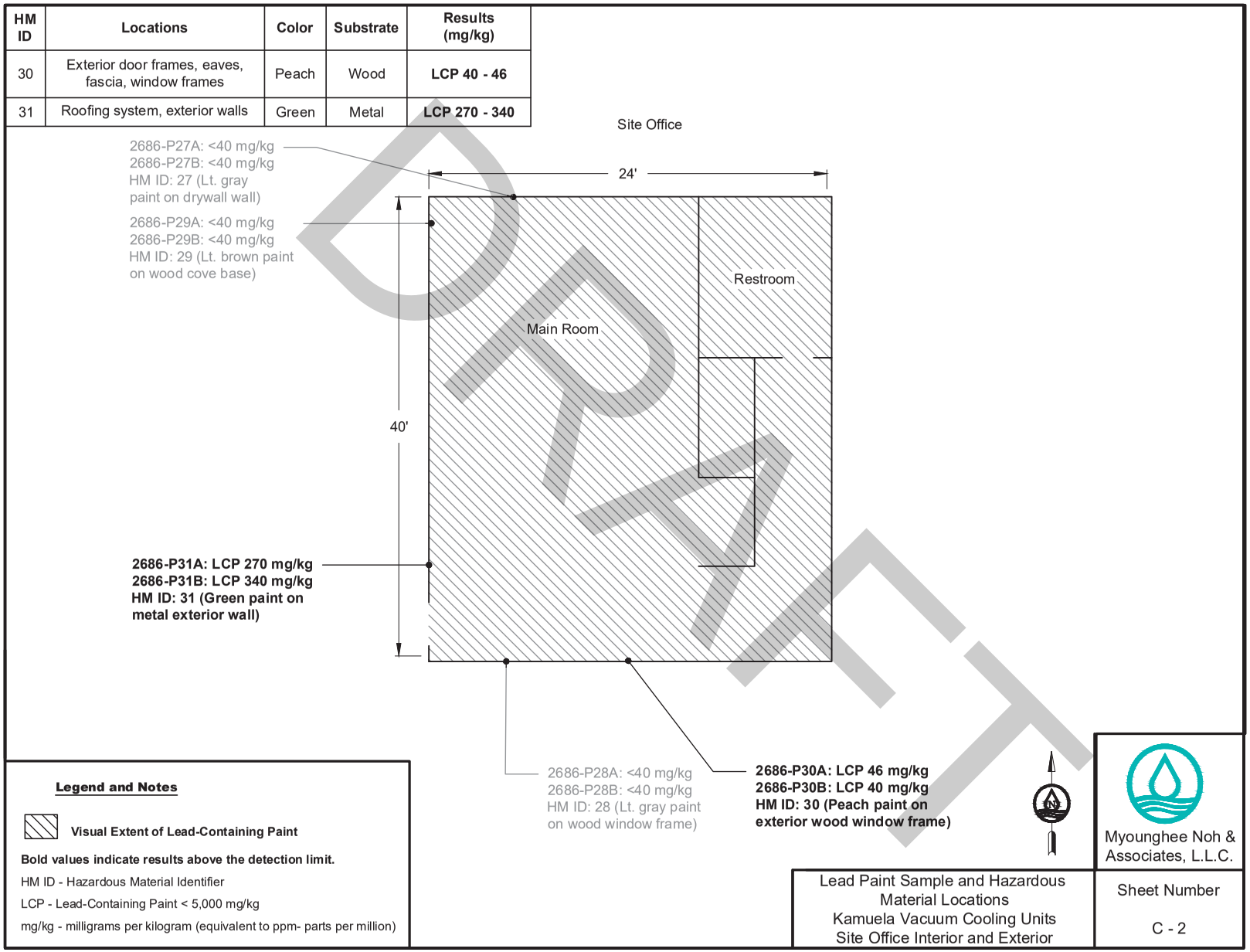
Myounghee Noh & Associates, L.L.C.

Asbestos Sample and Hazardous Material Locations
Kamuela Vacuum Cooling Units
Site Office Interior

Sheet Number

C - 1

HM ID	Locations	Color	Substrate	Results (mg/kg)
30	Exterior door frames, eaves, fascia, window frames	Peach	Wood	**LCP 40 - 46**
31	Roofing system, exterior walls	Green	Metal	**LCP 270 - 340**



Legend and Notes

Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

HM ID - Hazardous Material Identifier

LCP - Lead-Containing Paint < 5,000 mg/kg

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

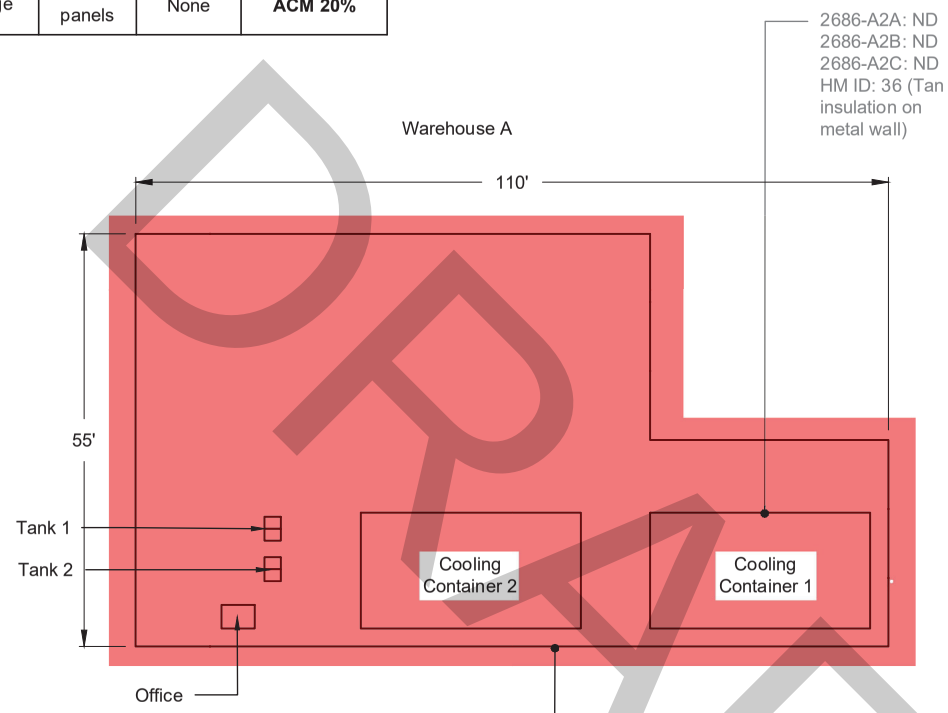
Myounghee Noh & Associates, L.L.C.

Lead Paint Sample and Hazardous Material Locations
Kamuela Vacuum Cooling Units
Site Office Interior and Exterior

Sheet Number

C - 2

HM ID	Locations	Color	Material	Substrate	Results
35	Roofing system, exterior walls	Beige	Cement panels	None	**ACM 20%**



Legend and Notes

Visual Extent of Asbestos-Containing Material

The asbestos found to be chrysotile.

Bold values indicate results above the detection limit.

ACM - Asbestos-Containing Material

HM ID - Homogeneous Material Identifier

ND - None Detected

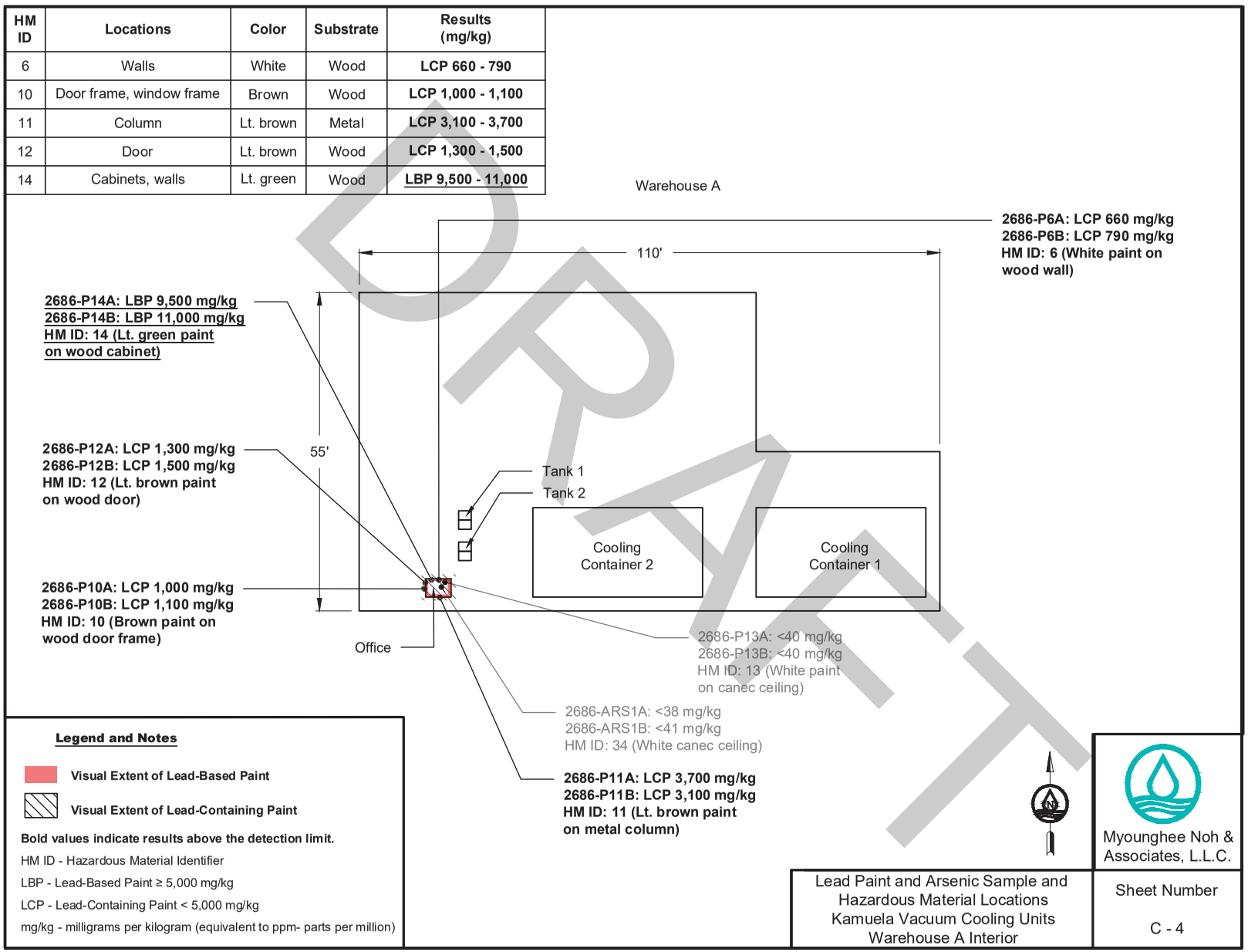
Myounghee Noh & Associates, L.L.C.

Asbestos Sample and Hazardous Material Locations
Kamuela Vacuum Cooling Units
Warehouse A Interior and Exterior

Sheet Number

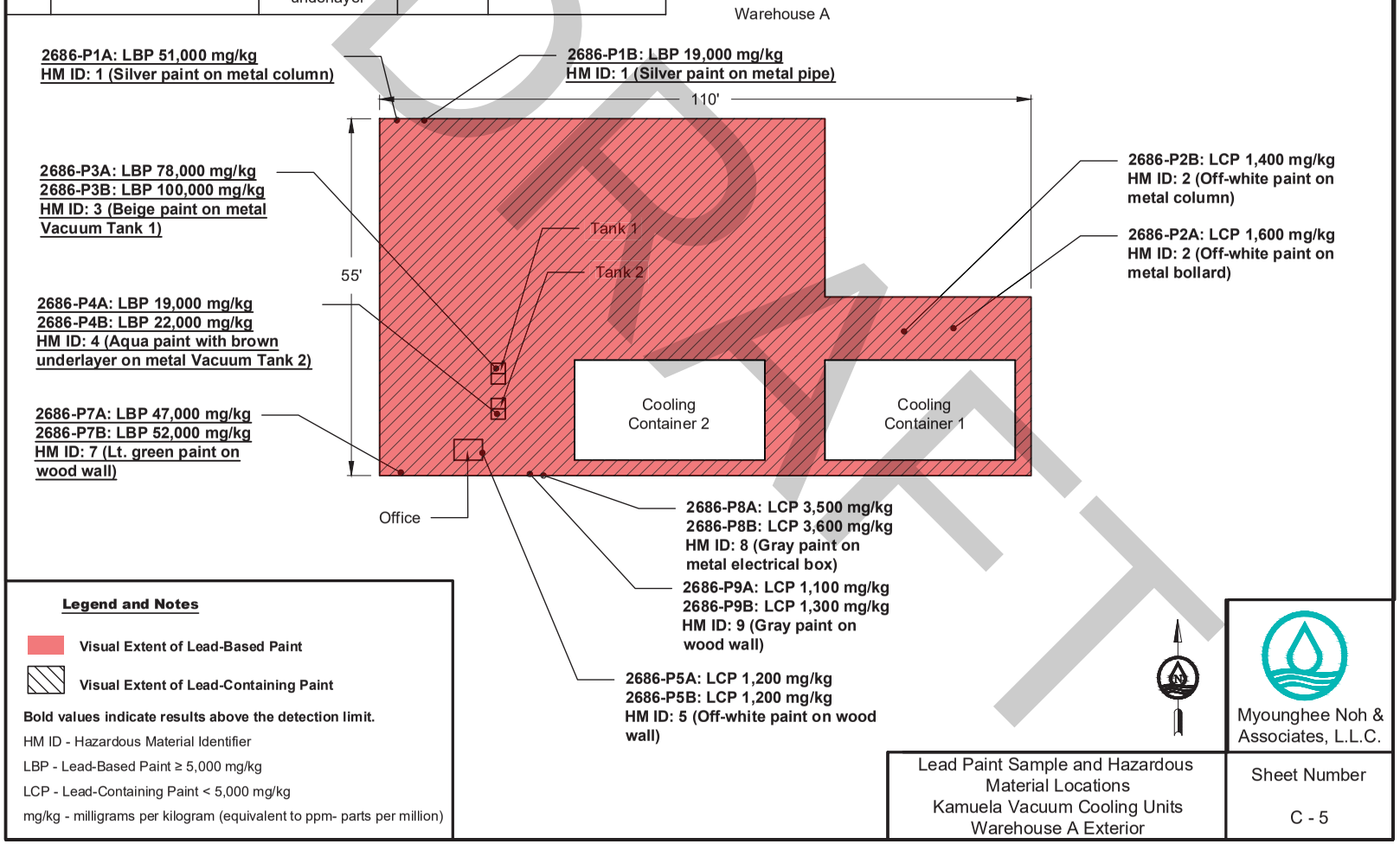
C - 3

HM ID	Locations	Color	Substrate	Results (mg/kg)
6	Walls	White	Wood	**LCP 660 - 790**
10	Door frame, window frame	Brown	Wood	**LCP 1,000 - 1,100**
11	Column	Lt. brown	Metal	**LCP 3,100 - 3,700**
12	Door	Lt. brown	Wood	**LCP 1,300 - 1,500**
14	Cabinets, walls	Lt. green	Wood	**LBP 9,500 - 11,000**



HM ID	Locations	Color	Substrate	Results (mg/kg)
1	Beams, columns, conduit, pipes, trusses	Silver	Metal	**LBP 19,000 - 51,000**
2	Beams, bollards, columns, trusses	Off-white		**LCP 1,400 - 1,600**
3	Vacuum Tank 1	Beige		**LBP 78,000 - 100,000**
4	Vacuum Tank 2	Aqua with brown underlayer		**LBP 19,000 - 22,000**

HM ID	Locations	Color	Substrate	Results (mg/kg)
5	Door frame, walls, window frame	Off-white	Wood	**LCP 1,200**
7	Wall	Lt. green	Wood	**LBP 47,000 - 52,000**
8	Conduit, electrical box	Gray	Metal	**LCP 3,500 - 3,600**
9	Frame, wall	Gray	Wood	**LCP 1,100 - 1,300**



Legend and Notes

Visual Extent of Lead-Based Paint

Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

HM ID - Hazardous Material Identifier

LBP - Lead-Based Paint ≥ 5,000 mg/kg

LCP - Lead-Containing Paint < 5,000 mg/kg

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

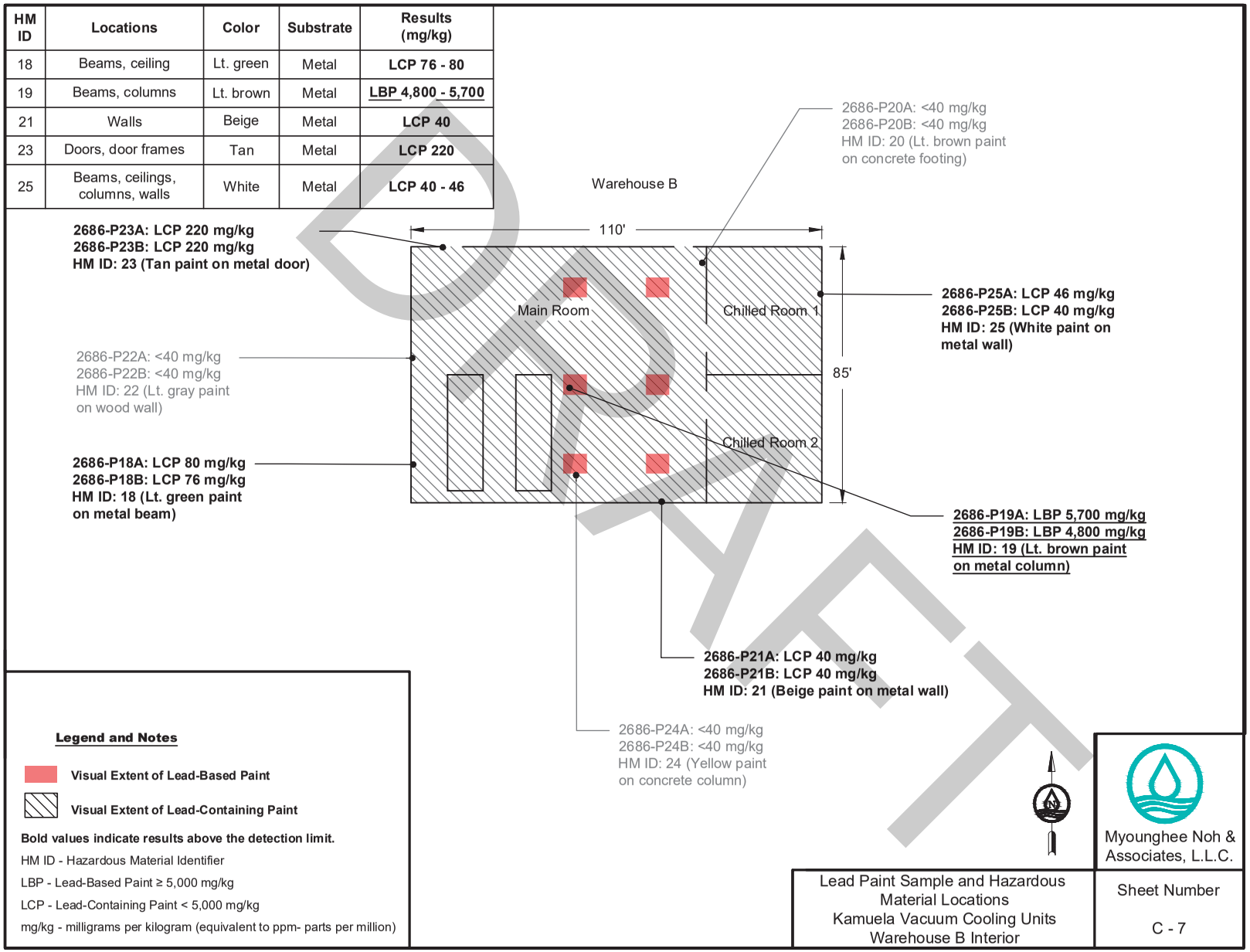
Myounghee Noh & Associates, L.L.C.

Lead Paint Sample and Hazardous Material Locations
Kamuela Vacuum Cooling Units
Warehouse A Exterior

Sheet Number
C - 5

Warehouse B
110'
85'
Main Room
Chilled Room 1
Chilled Room 2
2686-A8A-Texture/skim coat: ND
2686-A8B-Texture/skim coat: ND
2686-A8B-Stucco: ND
2686-A8C-Texture/skim coat: ND
2686-A8C-Stucco: ND
HM ID: 42 (Gray paint, skim coat, and stucco on exterior bollard footing)
2686-A3A-Texture paint/skim coat: ND
2686-A3A-Stucco: ND
2686-A3B-Texture paint/skim coat: ND
2686-A3B-Stucco: ND
2686-A3C-Texture paint/skim coat: ND
2686-A3C-Stucco: ND
HM ID: 37 (Lt. brown paint, skim coat, and stucco on exterior footing)
Legend and Notes
HM ID - Homogeneous Material Identifier
ND - None Detected
Asbestos Sample Locations
Kamuela Vacuum Cooling Units
Warehouse B Interior and Exterior
Myounghee Noh & Associates, L.L.C.
Sheet Number
C - 6
DRAFT

HM ID	Locations	Color	Substrate	Results (mg/kg)
18	Beams, ceiling	Lt. green	Metal	**LCP 76 - 80**
19	Beams, columns	Lt. brown	Metal	**LBP 4,800 - 5,700**
21	Walls	Beige	Metal	**LCP 40**
23	Doors, door frames	Tan	Metal	**LCP 220**
25	Beams, ceilings, columns, walls	White	Metal	**LCP 40 - 46**



Legend and Notes

Visual Extent of Lead-Based Paint

Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

HM ID - Hazardous Material Identifier

LBP - Lead-Based Paint ≥ 5,000 mg/kg

LCP - Lead-Containing Paint < 5,000 mg/kg

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

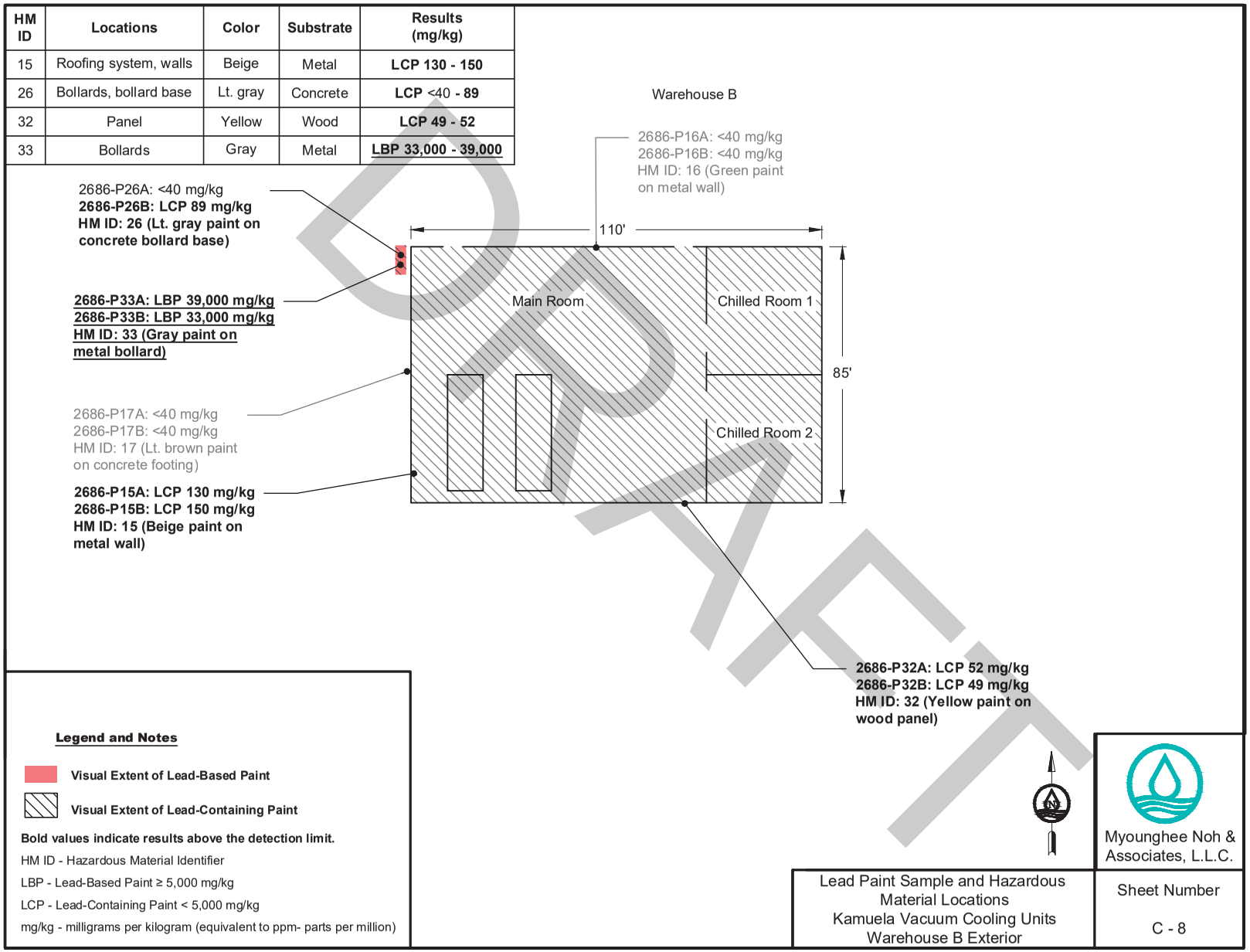
Myounghee Noh & Associates, L.L.C.

Lead Paint Sample and Hazardous Material Locations
Kamuela Vacuum Cooling Units
Warehouse B Interior

Sheet Number

C - 7

HM ID	Locations	Color	Substrate	Results (mg/kg)
15	Roofing system, walls	Beige	Metal	**LCP 130 - 150**
26	Bollards, bollard base	Lt. gray	Concrete	**LCP <40 - 89**
32	Panel	Yellow	Wood	**LCP 49 - 52**
33	Bollards	Gray	Metal	**LBP 33,000 - 39,000**



Legend and Notes

Visual Extent of Lead-Based Paint

Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

HM ID - Hazardous Material Identifier

LBP - Lead-Based Paint ≥ 5,000 mg/kg

LCP - Lead-Containing Paint < 5,000 mg/kg

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

Myounghee Noh & Associates, L.L.C.

Lead Paint Sample and Hazardous Material Locations
Kamuela Vacuum Cooling Units
Warehouse B Exterior

Sheet Number

C - 8

APPENDIX D: PHOTOGRAPHS

HM ID: 1
Warehouse A

Exterior
Silver paint on metal column.

LBP
2686-P1A: 51,000 mg/kg
2686-P1B: 19,000 mg/kg

HM ID: 2
Warehouse A

Exterior
Off-white paint on metal bollard.

LCP
2686-P2A: 1,600 mg/kg
2686-P2B: 1,400 mg/kg

HM ID: 3
Warehouse A

Exterior
Beige paint on metal vacuum tank #1.

LBP
2686-P3A: 78,000 mg/kg
2686-P3B: 100,000 mg/kg

HM ID: 4
Warehouse A

Exterior
Aqua paint with brown underlayer on metal vacuum tank #2.

LBP
2686-P4A: 19,000 mg/kg
2686-P4B: 22,000 mg/kg

HM ID: 5
Warehouse A

Office
Off-white paint on wood wall.

LCP
2686-P5A: 1,200 mg/kg
2686-P5B: 1,200 mg/kg

HM ID: 6
Warehouse A

Office
White paint on wood wall.

LCP
2686-P6A: 660 mg/kg
2686-P6B: 790 mg/kg

HM ID: 7
Warehouse A

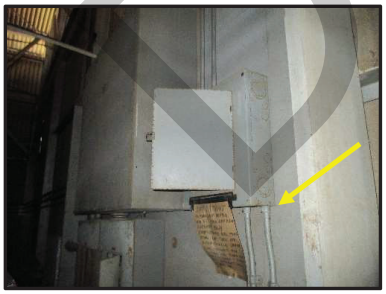
Exterior
Light green paint on wood wall.

LBP
2686-P7A: 47,000 mg/kg
2686-P7B: 52,000 mg/kg

HM ID: 8
Warehouse A

Exterior
Gray paint on metal electrical box.

LCP
2686-P8A: 3,500 mg/kg
2686-P8B: 3,600 mg/kg



HM ID: 9
Warehouse A

Exterior
Gray paint on wood wall.

LCP
2686-P9A: 1,100 mg/kg
2686-P9B: 1,300 mg/kg

HM ID: 10
Warehouse A

Office
Brown paint on wood door frame.

LCP
2686-P10A: 1,000 mg/kg
2686-P10B: 1,100 mg/kg

HM ID: 11
Warehouse A

Office
Light brown paint on metal column.

LCP
2686-P11A: 3,700 mg/kg
2686-P11B: 3,100 mg/kg

HM ID: 12
Warehouse A

Office
Light brown paint on wood door.

LCP
2686-P12A: 1,300 mg/kg
2686-P12B: 1,500 mg/kg

HM ID: 13
Warehouse A

Office
White paint on canec ceiling.

Non-LCP
2686-P13A: <40 mg/kg
2686-P13B: <40 mg/kg

HM ID: 14
Warehouse A

Office
Light green paint on wood cabinet.

LBP
2686-P14A: 9,500 mg/kg
2686-P14B: 11,000 mg/kg

HM ID: 15
Warehouse B

Exterior
Beige paint on metal wall.

LCP
2686-P15A: 130 mg/kg
2686-P15B: 150 mg/kg

HM ID: 16
Warehouse B

Exterior
Green paint on metal wall.

Non-LCP
2686-P16A: <40 mg/kg
2686-P16B: <40 mg/kg

HM ID: 17
Warehouse B

Exterior
Light brown paint on concrete footing.

Non-LCP
2686-P17A: <40 mg/kg
2686-P17B: <40 mg/kg

HM ID: 18
Warehouse B

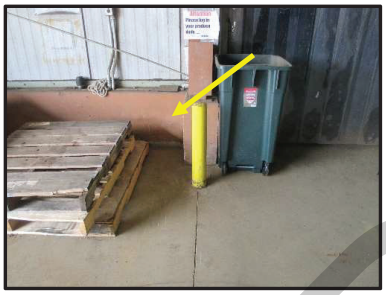
Main Room
Light green paint on metal beams.

LCP
2686-P18A: 80 mg/kg
2686-P18B: 76 mg/kg

HM ID: 19
Warehouse B

Main Room
Light brown paint on metal column.

LBP
2686-P19A: 5,700 mg/kg
2686-P19B: 4,800 mg/kg



HM ID: 20
Warehouse B

Main Room
Light brown paint on concrete footing.

Non-LCP
2686-P20A: <40 mg/kg
2686-P20B: <40 mg/kg

HM ID: 21
Warehouse B

Main Room
Beige paint on metal wall.

LCP
2686-P21A: 40 mg/kg
2686-P21B: 40 mg/kg

HM ID: 22
Warehouse B

Main Room
Light gray paint on wood wall.

Non-LCP
2686-P22A: <40 mg/kg
2686-P22B: <40 mg/kg

HM ID: 23
Warehouse B

Main Room
Tan paint on metal door.

LCP
2686-P23A: 220 mg/kg
2686-P23B: 220 mg/kg

HM ID: 24
Warehouse B

Main Room
Yellow paint on concrete column base.

Non-LCP
2686-P24A: <40 mg/kg
2686-P24B: <40 mg/kg

HM ID: 25
Warehouse B

Chilled Room 1
White paint on metal wall.

LCP
2686-P25A: 46 mg/kg
2686-P25B: 40 mg/kg

HM ID: 26
Warehouse B

Exterior
Light gray paint on concrete bollard base.

LCP
2686-P26A: <40 mg/kg
2686-P26B: 89 mg/kg

HM ID: 27
Site Office

Main Room
Light gray paint on drywall wall.

Non-LCP
2686-P27A: <40 mg/kg
2686-P27B: <40 mg/kg

HM ID: 28
Site Office

Main Room
Light gray paint on wood window frame.

Non-LCP
2686-P28A: <40 mg/kg
2686-P28B: <40 mg/kg

HM ID: 29
Site Office

Main Room
Light brown paint on wood cove base.

Non-LCP
2686-P29A: <40 mg/kg
2686-P29B: <40 mg/kg

HM ID: 30
Site Office

Exterior
Peach paint on wood eave.

LCP
2686-P30A: 46 mg/kg
2686-P30B: 40 mg/kg

HM ID: 31
Site Office

Exterior
Green paint on metal wall.

LCP
2686-P31A: 270 mg/kg
2686-P31B: 340 mg/kg

HM ID: 32
Warehouse B

Exterior
Yellow paint on wood panel.

LCP
2686-P32A: 52 mg/kg
2686-P32B: 49 mg/kg

HM ID: 33
Warehouse B

Exterior
Gray paint on metal bollard.

LBP
2686-P33A: 39,000 mg/kg
2686-P33B: 33,000 mg/kg

HM ID: 34
Warehouse A

Office
White canec on ceiling.

Non-Arsenic
2686-ARS1A: <38 mg/kg
2686-ARS1B: <41 mg/kg

HM ID: 35
Warehouse A

Exterior
Beige transite panel on wall.

ACM
2686-A1A: 20% Chrysotile
2686-A1B: Stop positive
2686-A1C: Stop positive

HM ID: 36
Warehouse A

Cooling Container 1
Tan insulation on metal wall.

Non-ACM
2686-A2A: ND
2686-A2B: ND
2686-A2C: ND

HM ID: 37
Warehouse B

Exterior
Light brown skim coat and stucco on concrete footing.

Non-ACM
2686-A3A-Texture/skim coat: ND
2686-A3A-Stucco: ND
2686-A3B-Texture/skim coat: ND
2686-A3B-Stucco: ND
2686-A3C-Texture/skim coat: ND
2686-A3C-Stucco: ND

HM ID: 38
Site Office

Main Room
Beige 12" x 12" vinyl tile with streaks and mastic on concrete floor.

Non-ACM
2686-A4A-VFT: ND
2686-A4A-Mastic: ND
2686-A4B-VFT: ND
2686-A4B-Mastic: ND
2686-A4C-VFT: ND
2686-A4C-Mastic: ND

HM ID: 39
Site Office

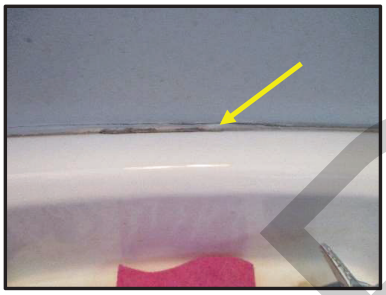
Main Room
Light gray undercoating on metal sink.

ACM
2686-A5A: 5% Chrysotile
2686-A5B: Stop positive
2686-A5C: Stop positive

HM ID: 40
Site Office

Main Room
Light gray painted drywall and joint compound on wall.

Non-ACM
2686-A6A-Drywall: ND
2686-A6A-Joint compound 1: ND
2686-A6A-Joint compound 2: ND
2686-A6B-Drywall: ND
2686-A6B-Joint compound 1: ND
2686-A6B-Joint compound 2: ND
2686-A6C-Drywall: ND
2686-A6C-Joint compound/tape: ND



HM ID: 41
Site Office

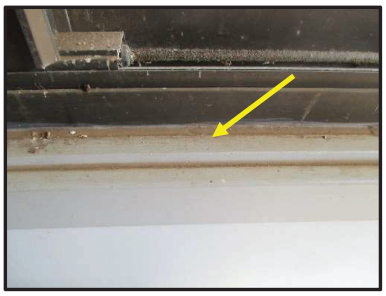
Restroom
Light gray caulking on porcelain sink.

Non-ACM
2686-A7A: ND
2686-A7B: ND
2686-A7C: ND

HM ID: 42
Warehouse B

Exterior
Gray paint and skim coat on concrete bollard footing.

Non-ACM
2686-A8A-Texture/skim coat: ND
2686-A8B-Texture/skim coat: ND
2686-A8C-Texture/skim coat: ND
2686-A8C-Stucco: ND



HM ID: 43
Site Office

Main Room
Gray caulking on metal window frame.

Non-ACM
2686-A9A: ND
2686-A9B: ND
2686-A9C: ND

APPENDIX E: LABORATORY ANALYTICAL REPORTS

LA Testing
520 Mission Street South Pasadena, CA 91030
Tel/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com / pasadenalab@latesting.com

LA Testing Order: 321926773
Customer ID: 32MYOU50
Customer PO:
Project ID:

Attention: Phillip Cabanila
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701
Project: 2686_2 Waimea Vacuum Cooling Facility

Phone: (808) 937-1807
Fax:
Received Date: 12/17/2019 10:50 AM
Analysis Date: 12/17/2019 - 12/18/2019
Collected Date: 11/26/2019

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
2686-A1A *321926773-0001*	WHA, ext. - Beige, transite paneling	Gray/White Fibrous Homogeneous		80% Non-fibrous (Other)	20% Chrysotile
2686-A1B *321926773-0002*	WHA, ext. - Beige, transite paneling				Positive Stop (Not Analyzed)
2686-A1C *321926773-0003*	WHA, ext. - Beige, transite paneling				Positive Stop (Not Analyzed)
2686-A2A *321926773-0004*	WHA, cooling container 1 & 2 - Tan, insulation	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A2B *321926773-0005*	WHA, cooling container 1 & 2 - Tan, insulation	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A2C *321926773-0006*	WHA, cooling container 1 & 2 - Tan, insulation	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A3A-Texture/Skim Coat *321926773-0007* *Unable to separate*	WHB, ext. - Lt. brn, SC	White/Red Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
2686-A3A-Stuco *321926773-0007A*	WHB, ext. - Lt. brn, SC	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A3B-Texture/Skim Coat *321926773-0008* *Unable to separate*	WHB, ext. - Lt. brn, SC	White/Red Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
2686-A3B-Stucco *321926773-0008A*	WHB, ext. - Lt. brn, SC	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A3C-Texture Paint/Skim Coat *321926773-0009* *Unable to separate*	WHB, ext. - Lt. brn, SC	White/Red Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A3C-Stucco *321926773-0009A*	WHB, ext. - Lt. brn, SC	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A4A-Vinyl Floor Tile *321926773-0010*	Site office, main - Beige w/ streaks, 12"x12" VT w/ mastic	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A4A-Mastic *321926773-0010A*	Site office, main - Beige w/ streaks, 12"x12" VT w/ mastic	Black Non-Fibrous Homogeneous	10% Fibrous (Other)	90% Non-fibrous (Other)	None Detected

Initial report from: 12/18/2019 11:09:02

Existing Conditions - Asbestos/Lead/Hazardous Material Survey
01715-58

LA Testing
520 Mission Street South Pasadena, CA 91030
Tel/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com / pasadenalab@latesting.com

LA Testing Order: 321926773
Customer ID: 32MYOU50
Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
2686-A4B-Vinyl Floor Tile *321926773-0011*	Site office, main - Beige w/ streaks, 12"x12" VT w/ mastic	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A4B-Mastic *321926773-0011A*	Site office, main - Beige w/ streaks, 12"x12" VT w/ mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A4C-VFT *321926773-0012*	Site office, main - Beige w/ streaks, 12"x12" VT w/ mastic	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A4C-Mastic *321926773-0012A*	Site office, main - Beige w/ streaks, 12"x12" VT w/ mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A5A *321926773-0013*	Site office, main - Lt. gray, undercoat	Purple Non-Fibrous Homogeneous		95% Non-fibrous (Other)	5% Chrysotile
2686-A5B *321926773-0014*	Site office, main - Lt. gray, undercoat				Positive Stop (Not Analyzed)
2686-A5C *321926773-0015*	Site office, main - Lt. gray, undercoat				Positive Stop (Not Analyzed)
2686-A6A-Drywall *321926773-0016*	Site office, main, RR - Lt. gray, painted DW	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass	78% Non-fibrous (Other)	None Detected
2686-A6A-Joint Compound 1 *321926773-0016A*	Site office, main, RR - Lt. gray, painted DW	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A6A-Joint Compound 2 *321926773-0016B*	Site office, main, RR - Lt. gray, painted DW	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A6B-Drywall *321926773-0017*	Site office, main, RR - Lt. gray, painted DW	Brown/White Fibrous Heterogeneous	20% Cellulose 2% Glass	78% Non-fibrous (Other)	None Detected
2686-A6B-Joint Compound 1 *321926773-0017A*	Site office, main, RR - Lt. gray, painted DW	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A6B-Joint Compound 2 *321926773-0017B*	Site office, main, RR - Lt. gray, painted DW	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A6C-Drywall *321926773-0018*	Site office, main, RR - Lt. gray, painted DW	White Fibrous Homogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
2686-A6C-Joint Compound/Tape *321926773-0018A*	Site office, main, RR - Lt. gray, painted DW	White/Beige Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
2686-A7A *321926773-0019*	Site office, RR - Lt. gray, caulking	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A7B *321926773-0020*	Site office, RR - Lt. gray, caulking	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 12/18/2019 11:09:02

Existing Conditions - Asbestos/Lead/Hazardous Material Survey
01715-59

LA Testing
520 Mission Street South Pasadena, CA 91030
Tel/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com / pasadenalab@latesting.com

LA Testing Order: 321926773
Customer ID: 32MYOU50
Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
2686-A7C *321926773-0021*	Site office, RR - Lt. gray, caulking	Gray/Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A8A-Texture/Skim Coat *321926773-0022* *Unable to separate*	WHB, ext. - Gray painted, SC	White/Red Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
2686-A8B-Texture/Skim Coat *321926773-0023* *Unable to separate*	WHB, ext. - Gray painted, SC	White/Red Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
2686-A8B-Stucco *321926773-0023A*	WHB, ext. - Gray painted, SC	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A8C-Texture Paint/Skim Coat *321926773-0024* *Unable to separate*	WHB, ext. - Gray painted, SC	Gray/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A8C-Stucco *321926773-0024A*	WHB, ext. - Gray painted, SC	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A9A *321926773-0025*	Site office, main - Gray, caulking	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A9B *321926773-0026*	Site office, main - Gray, caulking	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2686-A9C *321926773-0027*	Site office, main - Gray, caulking	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)
Gabriella Figueroa (25)
Nahid Motamedi (11)

Jerry Drapala Ph.D, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method"), but augmented with procedures outlined in the 1993 ("final") version of the method. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. All samples received in acceptable condition unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. EMSL recommends gravimetric reduction for all non-friable organically bound materials prior to analysis. Estimation of uncertainty is available on request.

Samples analyzed by LA Testing South Pasadena, CA NVLAP Lab Code 200232-0, CA ELAP 2283

Initial report from: 12/18/2019 11:09:02

Existing Conditions - Asbestos/Lead/Hazardous Material Survey
01715-60

OrderID: 321926773

Asbestos Chain of Custody

EMSL Order Number (*Lab Use Only*):

#321926773

LATESTING
520 MISSION STREET
SOUTH PASADENA, CA 91030
PHONE: (800)-303-0047
FAX: (323)-254-9962

Company: Myounghee Noh & Associates, LLC	**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 200 Kohola Street	
City: Hilo **State/Province:** HI	**Zip/Postal Code:** 96720 **Country:** United States of America
Report To (Name): Phillip Cabanila	**Telephone #:** 808-937-1807
Email Address: phillip@noh-associates.com	**Fax #:** **Purchase Order:**
Project Name/Number: 2686_2 Waimea Vacuum Cooling Facility	**Please Provide Results:** ☐ Fax ■ Email ☐ Mail
U.S. State Samples Taken: Hawaii	**Connecticut Samples:** ☐ Commercial ☐ Residential

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ■ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

**For TEM Air 3 hr through 6 hr, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PCM - Air ☐ Check if samples are from NY
- ☐ NIOSH 7400
- ☐ w/ OSHA 8hr. TWA

PLM - Bulk (reporting limit)
- ■ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)

Point Count
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)

Point Count w/Gravimetric
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
- ☐ NYS 198.1 (friable in NY)
- ☐ NYS 198.6 NOB (non-friable-NY)
- ☐ NIOSH 9002 (<1%)

TEM – Air ☐ **4-4.5hr TAT (AHERA only)**
- ☐ AHERA 40 CFR, Part 763
- ☐ NIOSH 7402
- ☐ EPA Level II
- ☐ ISO 10312

TEM - Bulk
- ☐ TEM EPA NOB
- ☐ NYS NOB 198.4 (non-friable-NY)
- ☐ Chatfield SOP
- ☐ TEM Mass Analysis-EPA 600 sec. 2.5

TEM – Water: EPA 100.2
- Fibers >10µm ☐ Waste ☐ Drinking
- All Fiber Sizes ☐ Waste ☐ Drinking

TEM- Dust
- ☐ Microvac - ASTM D 5755
- ☐ Wipe - ASTM D6480
- ☐ Carpet Sonication (EPA 600/J-93/167)

Soil/Rock/Vermiculite
- ☐ PLM CARB 435 - A (0.25% sensitivity)
- ☐ PLM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - C (0.01% sensitivity)
- ☐ TEM Qual. via Filtration Technique
- ☐ TEM Qual. via Drop-Mount Technique

Other:
- ☐

■ **Check For Positive Stop – Clearly Identify Homogenous Group** **Filter Pore Size (Air Samples):** ☐ 0.8µm ☐ 0.45µm

Samplers Name: Phillip Cabanila **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
2686-A1A	Asbestos Bulk	Bulk	11/26/2019
2686-A9C	Asbestos Bulk	Bulk	11/26/2019

Client Sample # (s): 2686-A1A - 2686-A9C **Total # of Samples:** 18

Relinquished (Client): [signature] **Date:** 12/11/19 **Time:**

Received (Lab): D Connolly E-FedEx **Date:** 12-17-19 **Time:** 9:45 am 10:50 q

Comments/Special Instructions:
Stop positive

OrderID: 321926773

LA TESTING

Asbestos Chain of Custody

EMSL Order Number (*Lab Use Only*):

#321926773

EMSL Analytical, Inc.
520 Mission Street
South Pasadena, CA 91030
Phone: (800)-303-0047
Fax: (323)-254-9962

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
2686-A1A	Asbestos Bulk	Bulk	11/26/2019
2686-A9C	Asbestos Bulk	Bulk	11/26/2019

***Comments/Special Instructions:**

Stop positive

#321926773

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility — Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC — Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	WALLS, ROOF	BEIGE	TRANSITE PANELING	N/A	G F (P)	Y (N) / TSI S M		

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 1 A	EXT.	WALL	0057	55 × 28' × 110'
2686-A 1 B	↓	↓		
2686-A 1 C				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	WHA	-	COOLING CONTAINER 1 & 2	WALLS, CEILINGS	TAN	INSULATION	M	G F (P)	(Y) N / (TSI) S M	4,000	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 2 A	CONTAINER 1	WALL	0049	1 = 50×10×16
2686-A 2 B	↓ 1	↓		2 = 30×25×15
2686-A 2 C	↓ 2			

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	WHB	-	EXT.	FOOTING	LT. BRN	SC	CC	G F (P)	(Y) N / TSI (S) M	250	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 3 A	EXT.	FOOTING	0073	
2686-A 3 B	↓	↓		
2686-A 3 C				

#321926773

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility — Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC — Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	SITE OFFICE	-	MAIN	FLR	BEIGE w/ STREAKS	12"x12" VT w/ MASTIC	CC	G (F) P	Y (N) / TSI S (M)	450	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 4 A	MAIN ↓		0098	24 x 18'
2686-A 4 B				
2686-A 4 C				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	SITE OFFICE	-	MAIN	SINK	UNDERCOAT LT. GRAY	UNDERCOAT	W	(G) F P	(N) / TSI (S) M	3	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 5 A	MAIN ↓	SINK ↓	0102	
2686-A 5 B				
2686-A 5 C				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	SITE OFFICE	-	MAIN, RR	WALLS, CEILINGS	LT. GRAY	PAINTED DW	NA	(G) F P	(N) / TSI S (M)	1,500	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 6 A	MAIN ↓	WALL ↓	0100, 0101	24'x18'x7 + 20'x8'
2686-A 6 B				
2686-A 6 C				

#321926773

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility — Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC — Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	SITE OFFICE	-	RR	SINK	LT. GRAY	CAULKING	PORCELAIN	G (F) P	Y (N) / TSI S (M)	3	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 7 A	RR ↓	SINK ↓	0104	
2686-A 7 B				
2686-A 7 C				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	WHB	-	EXT.	BOLLARD FOOTING	GRAY PAINTED	SC	CC	G F (P)	(N) N / TSI (S) M	10	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 8 A	EXT. ↓	BOLLARD FOOTING ↓	0071	
2686-A 8 B				
2686-A 8 C				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
	SITE OFFICE	-	MAIN	WINDOW FRAMES	GRAY	CAULKING	M	(G) F P	Y (N) / TSI S (M)	60	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-A 9 A	MAIN ↓	WINDOW FRAMES ↓	0108	
2686-A 9 B				
2686-A 9 C				

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Monday, December 23, 2019

Ms. Myounghee Noh
Myounghee Noh & Associates
99-1046 Iwaena St. Suite 210A
Aiea HI 96701

Phone Number: (808) 484-9214
Facsimile: (808) 484-4660
Email: m_noh@noh-associates.com

Lab Job No: 201910748
Date Submitted: 12/17/2019
Project Name: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Total Recoverable Arsenic (FAAS)

EPA Method: 3051m / 7000Bm

Sample No.	Sample Description	Results	Units	Date Analyzed
201963991	2686-ARS1A	< 38	mg/kg	12/20/2019
Comments:				
201963992	2686-ARS1B	< 41	mg/kg	12/20/2019
Comments:				

All Quality Control data are acceptable unless otherwise noted.

General Comments
The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the "analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. All analysts participate in interlaboratory quality control testing to continuously document profiency. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA LAP, LLC or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. TWA values have been calculated based on information supplied by the client that the laboratory has not independently verified. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
# = Analytical methods marked with an "#" are not within our AIHA LAP, LLC Scope of Accreditation.
MRL = Method Reporting Limit.

Jennifer Hsu Liao
Laboratory Manager

Existing Conditions - Asbestos/Lead/Hazardous Material Survey
01715-67

HAWAII ANALYTICAL LABORATORY, LLC
3615 Harding Avenue, Suite 308
Honolulu, HI 96816
Ph: 808-735-0422 - Fax: 808-735-0047
www.analyzehawaii.com

☐ New Client?

Report To*	Phillip Cabanila
Company	Myounghee Noh & Associates, L.L.C.
Address*	200 Kohola Street Hilo, Hawaii 96720
Phone / Cell No.*	808-937-1807
Report results to	Phillip Cabanila
via email or fax	phillip@noh-associates.com

Invoice To*	Kealohi Serrao
Company	Myounghee Noh & Associates, L.L.C.
Address*	91-1046 Iwaena Street Suite 210 A Aiea, Hawaii 96701
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	kealohi@noh-associates.com

Need Results By*:
- ☑ 5 Working Days (WD)
- ☐ 4 WD
- ☐ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Site/Project Name: Waimea Vacuum Cooling Facility

Client Project No.: 2686_2

Sampled By: Phillip Cabanila/Adam Custer

Comments / Special Instructions: ☐ verbal results needed?

PLM POSITIVE STOP Instructions:
- ☐ Positive stop per SAMPLE
- ☐ Positive stop per LAYER

LAB USE ONLY
Lab Report No.: 201910748

	Sample Identification / Description* (Maxmium of 30 Characters)	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	*Lab ID*
1	2686-ARS1A	11/26/2019	AS Bulk		AS Bulk	7061Am	201963991
2	2686-ARS1B	↓	↓		↓	↓	201963992
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Relinquished By (Print and Sign)	Date/Time	Received By (Print and Sign)	Date/Time
PHILLIP CABANILA	12/1/19	Corin Forrest	12-17-19A10:03 RCVD

Sample description can be paint chips, concrete, specific sample collection location, etc...
If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.
All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.
***Required fields, failure to complete these fields may result in a delay in your samples being processed.**

☐ via FedEx ☐ via USPS ☐ via .....

Page: 1 **of** 1

Hawaii Analytical Laboratory Chain of custody - Rev. 20150224

Hazardous Homogeneous Materials and Sampling Survey Field Form: Arsenic

10748

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	–	OFFICE	CEILING	WHT PAINTED	CANEC	NA	G (F) P	100	

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
2686-Ars \ A	OFFICE	CEILING		0064	
2686-Ars \ B	"	"			

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
								G F P		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
2686-Ars A					
2686-Ars B					

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
								G F P		

Sample ID	Room Sampled	Sample Location	Bldg.	PIC ID	Notes
2686-Ars A					
2686-Ars B					

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Thursday, December 26, 2019

Ms. Myounghee Noh
Myounghee Noh & Associates
99-1046 Iwaena St. Suite 210A
Aiea HI 96701

Phone Number: (808) 484-9214
Facsimile: (808) 484-4660
Email: m_noh@noh-associates.com

Lab Job No: 201910746
Date Submitted: 12/17/2019
Your Project: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Lead, total (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Analyzed
201963925	**2686-P1A**	51000	mg/kg	12/20/2019
Comments				
201963926	**2686-P1B**	19000	mg/kg	12/20/2019
Comments				
201963927	**2686-P2A**	1600	mg/kg	12/20/2019
Comments				
201963928	**2686-P2B**	1400	mg/kg	12/20/2019
Comments				
201963929	**2686-P3A**	78000	mg/kg	12/20/2019
Comments				
201963930	**2686-P3B**	100000	mg/kg	12/20/2019
Comments				
201963931	**2686-P4A**	19000	mg/kg	12/20/2019
Comments				
201963932	**2686-P4B**	22000	mg/kg	12/23/2019
Comments				

Ms. Myounghee Noh
Myounghee Noh & Associates
99-1046 Iwaena St. Suite 210A
Aiea HI 96701

Phone Number: (808) 484-9214
Facsimile: (808) 484-4660
Email: m_noh@noh-associates.com

Lab Job No: 201910746
Date Submitted: 12/17/2019
Your Project: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Lead, total (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Analyzed
201963933	**2686-P5A**	1200	mg/kg	12/23/2019
Comments				
201963934	**2686-P5B**	1200	mg/kg	12/23/2019
Comments				
201963935	**2686-P6A**	660	mg/kg	12/23/2019
Comments				
201963936	**2686-P6B**	790	mg/kg	12/23/2019
Comments				
201963937	**2686-P7A**	47000	mg/kg	12/23/2019
Comments				
201963938	**2686-P7B**	52000	mg/kg	12/23/2019
Comments				
201963939	**2686-P8A**	3500	mg/kg	12/23/2019
Comments				
201963940	**2686-P8B**	3600	mg/kg	12/23/2019
Comments				
201963941	**2686-P9A**	1100	mg/kg	12/23/2019
Comments				
201963942	**2686-P9B**	1300	mg/kg	12/23/2019
Comments				
201963943	**2686-P10A**	1000	mg/kg	12/23/2019
Comments				

Ms. Myounghee Noh
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99-1046 Iwaena St. Suite 210A
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Phone Number: (808) 484-9214
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Email: m_noh@noh-associates.com

Lab Job No: 201910746
Date Submitted: 12/17/2019
Your Project: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Lead, total (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Analyzed
201963944 Comments	**2686-P10B**	1100	mg/kg	12/23/2019
201963945 Comments	**2686-P11A**	3700	mg/kg	12/23/2019
201963946 Comments	**2686-P11B**	3100	mg/kg	12/23/2019
201963947 Comments	**2686-P12A**	1300	mg/kg	12/23/2019
201963948 Comments	**2686-P12B**	1500	mg/kg	12/23/2019
201963949 Comments	**2686-P13A**	< 40	mg/kg	12/23/2019
201963950 Comments	**2686-P13B**	< 40	mg/kg	12/23/2019
201963951 Comments	**2686-P14A**	9500	mg/kg	12/23/2019
201963952 Comments	**2686-P14B**	11000	mg/kg	12/23/2019
201963953 Comments	**2686-P15A**	130	mg/kg	12/23/2019
201963954 Comments	**2686-P15B**	150	mg/kg	12/23/2019

Ms. Myounghee Noh
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Lab Job No: 201910746
Date Submitted: 12/17/2019
Your Project: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Lead, total (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Analyzed
201963955	**2686-P16A**	< 40	mg/kg	12/23/2019
Comments				
201963956	**2686-P16B**	< 40	mg/kg	12/23/2019
Comments				
201963957	**2686-P17A**	< 40	mg/kg	12/23/2019
Comments				
201963958	**2686-P17B**	< 40	mg/kg	12/23/2019
Comments				
201963959	**2686-P18A**	80	mg/kg	12/23/2019
Comments				
201963960	**2686-P18B**	76	mg/kg	12/23/2019
Comments				
201963961	**2686-P19A**	5700	mg/kg	12/23/2019
Comments				
201963962	**2686-P19B**	4800	mg/kg	12/23/2019
Comments				
201963963	**2686-P20A**	< 40	mg/kg	12/23/2019
Comments				
201963964	**2686-P20B**	< 40	mg/kg	12/23/2019
Comments				
201963965	**2686-P21A**	40	mg/kg	12/23/2019
Comments				

Ms. Myounghee Noh
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99-1046 Iwaena St. Suite 210A
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Phone Number: (808) 484-9214
Facsimile: (808) 484-4660
Email: m_noh@noh-associates.com

Lab Job No: 201910746
Date Submitted: 12/17/2019
Your Project: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Lead, total (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Analyzed
201963966 Comments	**2686-P21B**	40	mg/kg	12/23/2019
201963967 Comments	**2686-P22A**	< 40	mg/kg	12/23/2019
201963968 Comments	**2686-P22B**	< 40	mg/kg	12/23/2019
201963969 Comments	**2686-P23A**	220	mg/kg	12/23/2019
201963970 Comments	**2686-P23B**	220	mg/kg	12/23/2019
201963971 Comments	**2686-P24A**	< 40	mg/kg	12/23/2019
201963972 Comments	**2686-P24B**	< 40	mg/kg	12/26/2019
201963973 Comments	**2686-P25A**	46	mg/kg	12/26/2019
201963974 Comments	**2686-P25B**	40	mg/kg	12/26/2019
201963975 Comments	**2686-P26A**	< 40	mg/kg	12/26/2019
201963976 Comments	**2686-P26B**	89	mg/kg	12/26/2019

Ms. Myounghee Noh
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Aiea HI 96701

Phone Number: (808) 484-9214
Facsimile: (808) 484-4660
Email: m_noh@noh-associates.com

Lab Job No: 201910746
Date Submitted: 12/17/2019
Your Project: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Lead, total (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Analyzed
201963977	**2686-P27A**	< 40	mg/kg	12/26/2019
Comments				
201963978	**2686-P27B**	< 40	mg/kg	12/26/2019
Comments				
201963979	**2686-P28A**	< 40	mg/kg	12/26/2019
Comments				
201963980	**2686-P28B**	< 40	mg/kg	12/26/2019
Comments				
201963981	**2686-P29A**	< 40	mg/kg	12/26/2019
Comments				
201963982	**2686-P29B**	< 40	mg/kg	12/26/2019
Comments				
201963983	**2686-P30A**	46	mg/kg	12/26/2019
Comments				
201963984	**2686-P30B**	40	mg/kg	12/26/2019
Comments				
201963985	**2686-P31A**	270	mg/kg	12/26/2019
Comments				
201963986	**2686-P31B**	340	mg/kg	12/26/2019
Comments				
201963987	**2686-P32A**	52	mg/kg	12/26/2019
Comments				

Ms. Myounghee Noh
Myounghee Noh & Associates
99-1046 Iwaena St. Suite 210A
Aiea HI 96701

Phone Number: (808) 484-9214
Facsimile: (808) 484-4660
Email: m_noh@noh-associates.com

Lab Job No: 201910746
Date Submitted: 12/17/2019
Your Project: 2686_2, Waimea Vacuum Cooling Facility, 11/26/19

Lead, total (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Analyzed
201963988	**2686-P32B**	49	mg/kg	12/26/2019
Comments				
201963989	**2686-P33A**	39000	mg/kg	12/26/2019
Comments				
201963990	**2686-P33B**	33000	mg/kg	12/26/2019
Comments				

All Quality Control data are acceptable unless otherwise noted.
MRL for lead air is 5ug.
MRL for lead wipe is 10ug.
MRL for lead paint or soil is 40 mg/kg for a 0.25g sample.

General Comments
The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the "analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. All analysts participate in interlaboratory quality control testing to continuously document profiency. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA LAP, LLC or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. TWA values have been calculated based on information supplied by the client that the laboratory has not independently verified. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
# = Analytical methods marked with an "#" are not within our AIHA LAP, LLC Scope of Accreditation.
MRL = Method Reporting Limit.

Jennifer Hsu Liao
Laboratory Manager

Existing Conditions - Asbestos/Lead/Hazardous Material Survey
01715-76

HAWAII ANALYTICAL LABORATORY, LLC
3615 Harding Avenue, Suite 308
Honolulu, HI 96816
Ph: 808-735-0422 - Fax: 808-735-0047
www.analyzehawaii.com

☐ New Client?

Report To*	Phillip Cabanila
Company	Myounghee Noh & Associates, L.L.C.
Address*	200 Kohola Street
	Hilo, Hawaii 96720
Phone / Cell No.*	808-937-1807
Report results to	Phillip Cabanila
via email or fax	phillip@noh-associates.com

Invoice To*	Kealohi Serrao
Company	Myounghee Noh & Associates, L.L.C.
Address*	91-1046 Iwaena Street Suite 210 A
	Aiea, Hawaii 96701
Phone / Cell No.*	
Purchase Order No.	
Email Invoice To	kealohi@noh-associates.com

Need Results By*:
- ☑ 5 Working Days (WD)
- ☐ 4 WD
- ☐ 3 WD
- ☐ 2 WD
- ☐ 24 hours
- ☐ 6 hours or less
- ☐ 4 hours or less
- ☐ 1-2 hours

Site/Project Name: Waimea Vacuum Cooling Facility

Client Project No.: 2686_2

Sampled By: Phillip Cabanila/Adam Custer

Comments / Special Instructions: ☐ verbal results needed?

PLM POSITIVE STOP Instructions:
- ☐ Positive stop per SAMPLE
- ☐ Positive stop per LAYER

LAB USE ONLY
Lab Report No.: 201910746

	Sample Identification / Description* (Maxmium of 30 Characters)	Date Sampled* (mm/dd/yy)	Collection Medium	Sample Area / Air Volume	Analysis Requested*	Method Reference	*Lab ID*
1	2686-P1A	11/26/2019	Pb Chips		Pb Chips	7082m	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12	2686-P33B	11/26/2019	Pb Chips		Pb Chips	7082m	

Relinquished By (Print and Sign)	Date/Time	Received By (Print and Sign)	Date/Time
PHILLIP CABANILA	12/9/19	Corin Forrest	12-17-19A10:05 RCVD

Sample description can be paint chips, concrete, specific sample collection location, etc...
If matrix is 'soil', please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the comment section.
All samples submitted are subject to Hawaii Analytical Laboratory terms and conditions.
***Required fields, failure to complete these fields may result in a delay in your samples being processed.**

☐ via FedEx ☐ via USPS ☐ via .....

Page: 1 of 1

Hawaii Analytical Laboratory Chain of custody - Rev. 20150224

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	COLUMNS, BEAMS, TRUSSES, PIPES, CONDUIT	SILVER	P	M	G F (P)	5,000	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 1 A	EXT. 201963925	COLUMNS	0052, 0053	
2686-P 1 B	↓ 201963926	PIPES		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	COLUMNS, BEAMS TRUSSES, BOLLARDS	GW	P	M	G F (P)	2,000	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 2 A	EXT. 201963927	~~COLUMNS~~ BOLLARD	0050, 0051	
2686-P 2 B	↓ 201963928	~~BOLLARD~~ COLUMN		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area ~~Sq. ft~~ or L. ft	Hatch Color
	WHA	-	EXT.	VAC TANK 1	BEIGE	P	M	G F (P)	300	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 3 A	EXT. 201963929	VAC TANK 1	0054	
2686-P 3 B	↓ 201963930	↓		

Existing Conditions - Asbestos/Lead/Hazardous Material Survey

01715-77

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility
Location: Waimea, Island of Hawaii
Inspector Initials: PC, AC
Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	VAC TANK 2	AQUA w/ BROWN UNDERLAYER	P	M	G F (P)	300	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 4 A	EXT. 201963931	VAC TANK 2	0054	
2686-P 4 B	↓ 201963932	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	WALLS, WINDOW FRAMES DOOR FRAME	OW	P	W	G F (P)	500	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 5 A	EXT. 201963933	WALL	0055	OFFICE EXT.
2686-P 5 B	↓ 201963934	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	OFFICE	WALLS, C	WHT	P	W	G F (P)	300	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 6 A	OFFICE 201963935	WALL	0061	
2686-P 6 B	↓ 201963936	↓		

Existing Conditions - Asbestos/Lead/Hazardous Material Survey
01715-78

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	WALL	LT. GRN	P	W	G F (P)	20	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 7 A	EXT. 201963937	WALL	0057	
2686-P 7 B	↓ 201963938	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	ELEC. BOXES, CONDUIT	GRAY	P	M	G F (P)	60	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 8 A	EXT. 201963939	ELEC BOX	0059	
2686-P 8 B	↓ 201963940	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	EXT.	FRAME, WALL	GRAY	P	W	G F (P)	100	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 9 A	EXT. 201963941	WALL	0059	ELEC BOX FRAME/WALL
2686-P 9 B	↓ 201963942	↓		

Existing Conditions - Asbestos/Lead/Hazardous Material Survey

01715-79

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	OFFICE	WINDOW & DOOR FRAME	BRN	P	W	G (F) P	50	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 10 A	OFFICE 201963943	DOOR FRAME	0067, 0068	
2686-P 10 B	↓ 201963944	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	OFFICE	COLUMN	LT. BRN	P	M	G (F) P	10	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 11 A	OFFICE 201963945	COLUMN	0065	
2686-P 11 B	↓ 201963946	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	-	OFFICE	DOOR	LT. BRN	P	W	G (F) P	30	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 12 A	OFFICE 201963947	DOOR	0067, 0068	
2686-P 12 B	↓ 201963948	↓		

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	–	OFFICE	CEILING	WHT	P	CANEC	G (F) P	100	

Sample ID	Room Sampled		Sample Location	PIC ID	Notes
2686-P 13 A	OFFICE	201963949	CEILING	0064	
2686-P 13 B	↓	201963950	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHA	–	OFFICE	CABINETS, WALLS	LT. GRN	P	W	G (F) P	100	

Sample ID	Room Sampled		Sample Location	PIC ID	Notes
2686-P 14 A	OFFICE	201963951	CABINET	0062	
2686-P 14 B	↓	201963952	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	–	~~OFI~~ EXT.	WALLS, ROOF	BEIGE	P	M	G F (D)	1900	

Sample ID	Room Sampled		Sample Location	PIC ID	Notes
2686-P 15 A	EXT.	201963953	WALL	0069, 0071, 0076	
2686-P 15 B	↓	201963954	↓		

Existing Conditions - Asbestos/Lead/Hazardous Material Survey

01715-81

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

Existing Conditions - Asbestos/Lead/Hazardous Material Survey

01715-82

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area ~~Sq. ft~~ or L. ft	Hatch Color
	WHB	-	EXT.	WALLS, FLASHING, BEAMS	GRN	P	M	G F (P)	1,500	

Sample ID	Room Sampled		Sample Location	PIC ID	Notes
2686-P 16 A	EXT.	201963955	WALL	0071, 0072, 0073, 0074, 0075	
2686-P 16 B	↓	201963956	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area ~~Sq. ft~~ or L. ft	Hatch Color
	WHB	-	EXT.	FOOTINGS	LT. BRN	P	CC	G F (P)	~~450~~	

Sample ID	Room Sampled		Sample Location	PIC ID	Notes
2686-P 17 A	EXT.	201963957	FOOTINGS	0073	
2686-P 17 B	↓	201963958	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area ~~Sq. ft~~ or L. ft	Hatch Color
	WHB	-	MAIN	BEAMS, CEILING	LT. GRN	P	M	G (F) P	1,800	

Sample ID	Room Sampled		Sample Location	PIC ID	Notes
2686-P 18 A	MAIN	201963959	BEAMS	0077, 0078	
2686-P 18 B	↓	201963960	↓		

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or (L. ft)	Hatch Color
	WHB	-	MAIN	COLUMNS, BEAMS	LT. BRN	P	M	G (F) P	900	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 19 A	MAIN 201963961	COLUMN	0085	
2686-P 19 B	↓ 201963962	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area (Sq. ft) or L. ft	Hatch Color
	WHB	-	MAIN, CHILLED RM 1&2	FOOTINGS, COLUMN BASE	LT. BRN	P	CC	G F (P)	1,000	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 20 A	MAIN 201963963	FOOTING	0084	
2686-P 20 B	↓ 201963964	COLUMN BASE		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area (Sq. ft) or L. ft	Hatch Color
	WHB	-	MAIN	WALLS	BEIGE	P	M	G (F) P	4,500	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 21 A	MAIN 201963965	WALL	0085	
2686-P 21 B	↓ 201963966	↓		

Existing Conditions - Asbestos/Lead/Hazardous Material Survey 01715-83

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

Existing Conditions - Asbestos/Lead/Hazardous Material Survey 01715-84

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	-	MAIN	WALLS	LT. GRAY	P	W	G (F) P	250	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 22 A	MAIN 201963967	WALL	0080	ELEC BOX WALL
2686-P 22 B	↓ 201963968	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	-	MAIN	DOORS, DOOR FRAMES	TAN	P	M	G F (B)	80	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 23 A	MAIN 201963969	DOOR	0081	
2686-P 23 B	↓ 201963970	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	-	MAIN	COLUMN BASE, TANK BASE, BOLLARDS	Y	P	CC	G (F) P	120	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 24 A	MAIN 201963971	COLUMN BASE	0083	
2686-P 24 B	↓ 201963972	↓		

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	-	CHILLED RM 1+2	WALLS, BEAMS, COLUMNS, CEILINGS	WHT	P	M	G F (P)	1,500	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 25 A	CHILLED RM 1 201963973	WALL	0086	
2686-P 25 B	↓ 201963974	COLUMN		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	-	EXT.	BOLLARDS, BOLLARD BASE	LT. GRAY	P	CL	G F (P)	20	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 26 A	EXT. 201963975	BOLLARD BASE	0071	
2686-P 26 B	↓ 201963976	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	SITE OFFICE	-	MAIN	WALLS	LT. GRAY	P	DW	(G) F P		

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 27 A	MAIN 201963977	WALL	0099-00 0101	
2686-P 27 B	↓ 201963978	↓		

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

10746

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility
Location: Waimea, Island of Hawaii
Inspector Initials: PC, AC
Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L.F.	Hatch Color
	SITE OFFICE	-	MAIN, RR	WINDOW & DOOR FRAMES	LT. GRAY	P	W	G (F) P	150	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 28 A	MAIN 201963979	WINDOW FRAME	0100	
2686-P 28 B	↓ 201963980	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L.F.	Hatch Color
	SITE OFFICE	-	MAIN, RR	COVE BASE	LT. BRN	P	W	G (F) P	200	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 29 A	MAIN 201963981	COVE BASE	0099	
2686-P 29 B	↓ 201963982	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L.F.	Hatch Color
	SITE OFFICE	-	EXT.	EAVES, FASCIA, WINDOW FRAMES, DOOR FRAMES	PEACH	P	W	G F (B)	350	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 30 A	EXT. 201963983	WINDOW FRAME	0095 - 0097	
2686-P 30 B	↓ 201963984	EAVES		

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

10746

Project # & Name: 2686_2 HDOA Waimea Vacuum Cooling Facility | Location: Waimea, Island of Hawaii

Inspector Initials: PC, AC | Date & Time: 11/26/2019

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	SITE OFFICE	-	EXT.	WALLS, ROOF	GRN	P	M	G F (P)	600	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 31 A	EXT. 201963985	WALL	0095	
2686-P 31 B	↓ 201963986	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	-	EXT.	PANEL	Y	P	W	G F (P)	20	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 32 A	EXT. 201963987	PANEL	0074	
2686-P 32 B	↓ 201963988	↓		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
	WHB	-	EXT.	BOLLARDS	GRAY	P	M	G F (P)	30	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
2686-P 33 A	EXT. 201963989	BOLLARD	0071	
2686-P 33 B	↓ 201963990	↓		

SECTION 02095

MANAGEMENT OF IMPACTED SOIL

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

Work shall consist of furnishing all labor, tools, materials and equipment necessary and required to construct in place complete all work as indicated on the drawings and as specified herein.

1.2 SUMMARY

A. This Section specifies Contractor requirements when disturbing lead-containing paint (LCP) associated with the Kamuela Vacuum Cooling Plant, Food Safety Modernization Act Improvements (DOAH26A). Contractor shall ensure that employees and subcontractors involved in disturbing or handling impacted soil have access to the project information, and understand and control impacted soil hazards.

B. Heavy metal lead- and arsenic-, and herbicide-impacted soils may be encountered during earth work, including trenching, excavation, and grading. Work that may disturb impacted soil shall be conducted in accordance with OSHA requirements and in compliance with the State and Federal regulations.

C. Conduct pre-construction soil sampling to verify the presence of heavy metals and herbicides in soil anticipated to be disturbed as part of this project.

D. Impacted soil may be scraped and reused on site, sealed under pavement or building pads, and grass, preventing potential exposure to the workers, staff, occupants, other trades, or the public. If the impacted soil is reused elsewhere onsite other than under pavement or building pads, grass or similar vegetation shall be placed on top of the impacted soil.

E. During construction, impacted soil shall be temporarily stockpiled for relocation and covered with 10-mil polyethylene sheeting. Soil stockpiles must have appropriate dust control and storm water runoff preventive measures in accordance with the Storm Water Pollution Prevention Plan and Best Management Practices.

F. Impacted soils may be “burrito-type” wrapped by using at least 10-mil polyethylene sheeting or geotextile fabric to provide physical boundary between clean and impacted soils.

G. Conduct a post-construction soil assessment to verify the lead and arsenic levels in exposed surface soil. The assessment shall be conducted using the multi-incremental sampling method.

H. Soil excavation activities, grading and any disturbance of impacted soil may cause a potential exposure to the site workers, staff, tenants, the public, and the environment to fugitive dust. Routes of exposure are by inhalation, ingestion, and dermal contact. Contractor shall use engineering controls, such as water spray and wind barriers, to control fugitive dust.

I. Contractor shall provide a Competent Person with at least 5 years of experience in the handling and management of soils impacted by hazardous chemicals to manage the project. Competent Person shall be responsible for the implementation of the engineering controls and conformance with the requirements of this specification.

J. Costs incurred due to the Contractor's negligence to control hazards, including but not limited to, medical, legal, site assessment, additional monitoring, and reporting, shall be borne by the Contractor and subtracted from the final payment.

1.3 REFERENCES

A. Quality Standards: Work under this contract shall be conducted in strict accordance with applicable federal, state, and local regulations, standards, and codes governing impacted soils.

B. Most recent editions of any relevant regulation, standard, document, or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall apply. Such documents include, but are not limited to, the following:

1. U.S. Department of Labor, Occupational Safety and Health Administration

    a. 29 CFR 1910 "Occupational Safety and Health Standards" (General Industry Standards)

    b. 29CFR1910.120 "Hazardous Waste Operations and Emergency Response"

    c. 29 CFR 1910.134 "Respiratory Protection"

2. 29 CFR 1910.1000 "Air Contaminants"

    a. 29 CFR 1910.1020 "Access to Employee Exposure and Medical Records"

    b. 29 CFR 1910.1200 "Hazard Communication"

    c. 29 CFR 1926 "Safety and Health Regulations for Construction" (Construction Industry Standards)

3. U. S. Environmental Protection Agency

a. 40 CFR 50 "National Primary and Secondary Ambient Air Quality Standards A”

b. 40 CFR 122 "EPA Administered Permit Program: The National Pollutant Discharge Elimination System"

c. 40 CFR 261 "Identification and Listing of Hazardous Waste"

d. 40 CFR 263 "Standards Applicable to Transporters of Hazardous Waste"

e. 40 CFR 302 "Designation, Reportable Quantities, and Notification"

f. U.S. Environmental Protection Agency: Comprehensive Environmental Restoration, Compensation, and Liability Act, Section 107(1), 1980, exemption for cleanup of legally applied pesticide products

4. U.S. Department of Transportation

a. 49 CFR 172, Subpart E, “Labeling”

b. 49 CFR 172 Subpart F, “Placarding”

5. State Requirements

a. 12-8-3-110, “State of Hawaii, Safety and Health Regulation for Construction” (Construction Industry Standard)

b. Hawaii Department of Health (Fall 2011): Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Hawaii Department of Health Office of Hazard Evaluation and Emergency Response.

c. Hawaii Department of Health (November 2009): Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan (Interim Final), Hawaii Department of Health Office of Hazard Evaluation and Emergency Response.

6. Soil Screening Report: The soil screening report will be generated upon receipt of the laboratory analytical data from soil sampling conducted in the project areas.

1.4 EXCAVATION AND DISTURBACBE OF SOIL

A. During excavation and disturbance of impacted soils, workers, supervisory personnel, subcontractors and consultants must take precautionary measures as necessary to prevent exposure of site workers, the staff, the public, and the environment to lead and arsenic dust.

B. Each employee shall be given the Hazard Communication by a trained professional, including hazard awareness and work practices, safety and health precautions, and the use and requirements for protective clothing, respirators, and equipment in accordance with 29 CFR 1910.1200. A certificate of training, signed and dated by the trainer, shall be provided for each worker. Contractor shall designate competent person(s) to perform or supervise soil excavation and disturbance.

C. Respiratory Protection: Contractor shall establish and implement a respirator protection program, which includes applicable items in 29 CFR 1910.1025, 29 CFR 1910.134 and ANSI Z88.2.

1. Respirator use shall meet the following criteria:

a. Respirators must be selected in accordance with ANSI Practices for Respiratory Protection (Z88.2-2015) and OSHA Respiratory Protection Standard (29 CFR1910.1025).

b. Dual cartridge, half-mask respirators equipped with HEPA filter cartridges are the minimum type of respirator that may be used during soil removal, handling, stockpiling, and disposal operations.

D. Protective Clothing: Personal protective equipment shall be provided to workers in accordance with Contractor's written personal protective equipment program, which includes, at a minimum, applicable items in OSHA regulation 29 CFR 1926, Subpart G.

1. Contractor shall provide full-body disposable protective clothing, including head, body, and foot covers, consisting of material impenetrable to lead and arsenic dust (Tyvek™ or equivalent) in sizes adequate to accommodate movement without tearing.

2. Contractor shall provide and require the use of eye, hearing, skin, fall, load/unload, physical, chemical, biological hazard protections during any activities onsite.

1.5 SUBMITTALS

A. Submit in accordance with SECTION 01300 – SUBMITTAL PROCEDURES.

B. Post-Submittal: Submit the following submittals within 30 working days after completing the impacted soil work.

1. Maps showing the location (depth and area) where impacted soils are reused within the project site .

2. Post-construction existing soil conditions assessment report.

PART 2 – EQUIPMENT

2.1 PERSONAL PROTECTIVE EQUIPMENT

A. Protective clothing: Furnish personnel involved in removal, handling, disposal of soil and contaminated items with disposable, whole body protective covering, face shields with goggles, and impervious gloves. Protective clothing shall be worn throughout the removal of contaminated items, and shall be replaced as necessary.

B. Respirators: Provide respirators approved by the National Institute for Occupational Safety and Health (NIOSH) with filters approved for use in atmospheres that contain lead, arsenic, or other stressors.

2.2 WARNING SIGNS

A. Provide warning signs at approaches to the work area. Locate signs at such a distance that personnel may read the sign and take necessary precautions before entering the area. Provide and affix labels to Department of Transportation (DOT) approved waste drums and other containers of contaminated materials. The caution label must display the following in bold print: **Caution: May Contain Heavy Metals or Herbicides**

B. "No Smoking" signs, warning signs and labels shall be provided throughout the entire project and as deemed necessary by the Competent Person.

PART 3 – EXECUTION

3.1 GENERAL WORK PROCEDURE

A. Prior to beginning work, Contractor and Engineer or Officer in Charge shall discuss the hazard abatement and building demolition, including work procedures, hazard mitigations, and safety precautions. At the conclusion of the project, Contractor shall submit a signed certificate stating that the removal and disposal of hazardous and contaminated materials were completed in accordance with applicable rules and regulations.

B. Contractor is responsible for providing their personnel with appropriate training and protective equipment while they are conducting work, and shall ensure compliance with regulations concerning safety and health of their employees, including worker exposure assessment.

C. Boundaries shall be established at each area where soil excavation or disturbance is to be conducted. The area should be clearly identified to prevent unauthorized entry. Establish a control area by completely enclosing/roping-off the area where impacted soil excavation, grading, removal, stockpiling, or disposal operations will be conducted.

D. At the location where soil will be disturbed, provide a soil test result, representative of the entire volume of soil to be disturbed. If, upon notification of test result, the soil needs to be controlled, in conjunction with recommendations outlined per the soil investigation report and requirements in this Section, the Engineer or Officer in Charge will determine the

method and extent by which the soil will be handled. As a cost saving measure, the Engineer or Officer in Charge may consider reuse of the soils onsite. Appropriate controls shall be exercised to prevent direct or indirect exposures to the workers, staff, the public, and the environment.

E. Provide physical boundaries around the control area to ensure that airborne dust is not released.

F. Caution signs shall be placed as described in Part 2.02A. No one will be permitted in the work area unless the person is provided with appropriate training and protective equipment, and their presence is necessary to the work.

G. There shall be no eating, smoking, drinking, or storing of food or drink within work areas.

H. Select and conduct earthwork procedures to minimize the potential spread of contamination. Handle contaminated items such that no skin contact, inhalation, or ingestion occurs.

I. Before exiting the controlled area and before meal breaks, each worker shall remove personal protective equipment, place disposable items in a labeled, impermeable disposal bag, then exit the area. Workers shall wash their face, arms, and hands thoroughly with a detergent soap to remove contamination. Boots shall be cleaned to minimize tracking of contaminated material from the work area.

J. At the completion of work in an area, the work area shall be cleaned and contaminated clothing, disposable personal protective equipment, surface coverings, and waste material shall be disposed of with the contaminated items.

3.2 SOIL EXCAVATION – GENERAL PROCEDURE

A. Prior to excavation activities, designate an area where excavated soil will be stockpiled. Place one layer of impermeable 10-mil plastic on the ground surface sufficient to contain the impacted soil. Soil stockpiles must have appropriate dust control and storm water runoff preventive measures in accordance with the Storm Water Pollution Prevention Plan and Best Management Practices.

B. Impacted soils, determined to exceed the HDOH Tier 1 EAL for unrestricted use, shall be scraped to two (2) feet below ground surface and relocated under paved parking or under a minimum two (2) feet of clean soil.

C. Impacted soils may be “burrito-type” wrapped by using at least 10-mil polyethylene sheeting or geotextile fabric to provide physical boundary between clean and impacted soils.

D. The location (depth and area) where impacted soils are reused within the project site shall be documented clearly. Maps with coordinates showing the exact location and depth of the soil shall be submitted. Provide impacted-soil location maps to the Engineer or Officer in Charge.

E. Excess impacted soils shall not be reused outside of the project boundary. Excess impacted soils shall be tested for appropriate characterization and disposed of at an approved facility to ensure compliance with the HDOH and recipient guidelines and requirements.

F. Conduct a post-construction existing conditions soil assessment to verify the lead and arsenic levels in exposed surface soil. Multi-incremental sampling method shall be used.

G. Contractor is responsible for disposal of any surplus soil.

H. Maintain surfaces in the work area to be free of accumulations of contaminated materials. Restrict the spread of dust and debris; and to keep waste from being distributed over and outside the work area.

I. When work which disturbs impacted soil has been completed, Engineer or Officer in Charge will visually inspect the work area for evidence of contaminated materials. Contractor shall clean and remove remaining contaminated materials at no additional cost to the DOA. Contractor shall not dismantle the work area boundaries prior to authorization by the Engineer or Officer in Charge.

J. Earthmoving equipment which contacts impacted soil shall be cleaned with a water spray immediately upon completion of work. The wash location shall be within the project site, and all wash water shall be directed into the excavation, evaporated, or contained. Contractor is responsible for the disposal of the equipment wash water.

3.3 PERSONAL AIR MONITORING

A. Contractor shall conduct the workers breathing zone monitoring for at least three (3) full 8-hour shifts and establish a negative exposure assessment for worker's exposure to airborne contaminants. After the establishment of the negative workers exposure, periodic personal monitoring shall be conducted once every seven (7) calendar days to document worker exposure for the duration of impacted soil work.

B. Monitor the physical boundary to ensure unprotected personnel are not exposed above the action levels. If the outside boundary levels are at or exceed the action levels, work shall be stopped and the Competent Person shall immediately correct the condition(s) causing the increased levels and notify the Engineer or Officer in Charge immediately.

C. Submit air sampling results to the Engineer or Officer in Charge within 48 hours after the samples are collected, signed by the accredited analytical laboratory.

END OF SECTION

SECTION 02310

EXCAVATION, BACKFILL AND COMPACTION FOR UTILITIES

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.02 SUMMARY

A. This Section includes excavation, backfill, compaction and grading required for the construction of the utilities.

B. Related Sections includes

1. Section 02530 – SANITARY SEWERAGE

1.03 GENERAL REQUIREMENTS

A. Refer to the following sections of the Standard Specifications of the Department of Public Works, County of Hawaii, September 1986.

1. Section 11 – TRENCH EXCAVATION AND BACKFILL

2. Section 34 – ASPHALT CONCRETE PAVEMENT

B. Refer to the Standard Details for Public Works Construction, County of Hawaii, Department of Public Works.

C. The Contractor shall comply with applicable noise and grading ordinances and regulations, shall maintain adequate erosion control measures, and shall obtain all required permits.

1.04 SUBSURFACE SOIL DATA

The Contractor is expected to examine the site and decide for himself the character of materials to be encountered. The Owner and its Consulting Engineers will not assume responsibility for subsoil and groundwater conditions.

1.05 SUBMITTALS

A. Submit in accordance with Section 01300 – SUBMITTAL PROCEDURES.

B. Material Test Reports: Submit gradation and certifications for bedding and pipe cushion materials, and intermediate backfill.

PART 2 - PRODUCTS

2.01 BEDDING AND PIPE CUSHION

A. Bedding and pipe cushion for sewer and drain lines shall conform to the requirements of the County Standard Specifications except as herein below modified.

B. Pipe cushion for water lines shall be as specified in the County of Hawaii Wastewater Standards except as herein below modified.

2.02 TRENCH BACKFILL

A. For the first lift from the bottom of the trench to 12 inches above the pipe barrel, use pipe cushion material, as herein above specified.

B. Surface Lift: Complete backfilling from the top of intermediate lift to finished grade as specified below:

1. Complete backfilling with intermediate lift material to finished grade, except in planting or pavement areas.

2. In asphalt pavement areas, materials shall conform to the requirements of Section 34, "Asphalt Concrete Pavement," of the County Standard Specifications and as indicated on the plans.

3. Cold-Mix Asphalt Concrete: Cold-mix asphalt concrete for temporary trench patches shall conform to the resurfacing mix requirements shown in Table 1-34 of Section 34, "Asphalt Concrete Pavement," of the County Standard Specifications with the exception of the liquid asphalt. Slow curing liquid asphalt, SC-4 shall be used and shall conform to AASHTO M140.

C. Filter Fabric: Filter fabric for wrapping of pipe cushion in unstable soils shall be a non-woven geotextile manufactured for use in soil drainage. Fabric shall have a minimum grab tensile strength of 100 pounds and elongation at break of 60 percent when tested in accordance with ASTM D4632.

PART 3 - EXECUTION

3.01 PROTECTION

A. Inspection: Examine the areas and conditions under which excavating, backfilling and compacting for utilities is to be provided. Should any condition be found unsuitable, no work shall be done until the unsatisfactory conditions have been corrected and are acceptable to the Contractor. Proceeding with work will imply acceptance of the conditions by the Contractor.

B. Provide protection in compliance with applicable provisions of current State and Federal Safety and Health Standards and acts, codes and ordinances.

C. Existing Utilities: Locate and protect existing utilities. Notify Owner of any conflict between proposed work and existing utilities, or of any utilities found in the field that are not shown on the Drawings.

D. Crib and shore as necessary to retain excavations. Comply with the requirements of OSHA Chapter 132.

3.02 EXCAVATION AND BACKFILL

A. General

1. Comply with Section 11 "Trench Excavation and Backfill" of the County Standard Specifications and Section 1.2 of Part III of the Water System Standards as applicable to the utility line installed.

2. Unless otherwise indicated or specified, surround utilities by minimum 6 inches of cushion material.

B. Excavation

1. The trench width shall be as indicated in the Standard Details for Public Works Construction or Water System Standard Details unless otherwise shown on the Contract Drawings. If the Contractor excavates beyond the specified width and such action results in greater load of overburden than the pipe is designed for, the Contractor shall replace the pipe with one of higher strength or provide a higher class of bedding to withstand the extra load at no cost to the Owner.

2. The top edges of the trench shall be neatly cut along well-defined lines. In overbreaks, the Contractor shall backfill and finish the overbreak areas at no cost to the Owner.

3. The trench width below a level 2 feet above the top of the pipe shall not exceed 6 inches beyond the trench width specified, or as shown. From a level 2 feet above the top of the pipe to existing ground, the width of trench excavation shall extend as nearly vertical as practicable or be confined to the minimum work area required for construction and shall not extend beyond existing structures or utilities adjacent to the pipe alignment, unless otherwise authorized by the Owner.

4. Excavation of utility structures and appurtenances shall conform to the requirements of the Standard Specifications and Water System Standards as herein above specified.

5. The placing of stockpiles of excavated materials, pipes and construction materials adjacent to the trench excavation shall be prohibited on roads, and areas adjacent to roads where stockpiling of material may create a hazardous condition. The Contractor shall haul to and store the materials at a site acceptable to the Owner and haul to the job site as require at no cost to the Owner. Access to existing driveways, fire hydrants and meters shall be provided at all times.

6. When unsuitable material is encountered at the excavation, the Contractor shall be responsible for hauling and disposing of the material. The hauling shall be considered as incidental to the excavation work and no direct payment will be made. The Contractor's soils engineer shall determine if the excavated material is unsuitable and make a written recommendation to the Owner.

C. Additional Excavation

1. When the subgrade material below the established trench or structure grade is unsuitable, such as, muck, buried debris, or adobe, the Contractor shall excavate to a depth of 24 inches below the bottom of the pipe or other depth as recommended by the Contractor's soils engineer or directed by the Owner. The excavated area shall be backfilled with gravel or crushed stone wrapped in filter fabric to within 6 inches of the bottom of the pipe or to the bottom of the concrete jacket or cradle.

2. Any part of the trench excavated below the established grade or beyond the maximum permitted width, other than work identified as "Additional Excavation," shall be refilled and compacted by the Contractor at no cost to the Owner. Refill above the high water table shall be select material conforming to the requirements for intermediate trench backfill lifts. Refill material below the high water table shall be gravel or crushed stone as herein specified.

D. Bedding: Place bedding in the prepared trench excavation as indicated or herein specified.

1. Place bedding and pipe cushion (12 inches above pipe) in maximum 6-inch loose lifts and tamped as determined by ASTM D1557 maximum dry density in areas above the high groundwater table.

2. Place gravel or crushed stone to the depths indicated or specified in areas below the groundwater table and hand tamp to fill in voids under the barrel of the pipe.

3. Bedding shall be installed to provide uniform and continuous support for each section of the pipe or conduit, except at bell holes or depressions necessary for making proper joints.

E. Backfilling

1. Backfilling work shall not commence until acceptance of the pipe installation is given by the Owner.

2. Construct backfill in two operations, initial and intermediate.

a. Initial backfilling shall be placed in 6-inch maximum loose lifts to one foot above the pipe or conduit. Ensure that initially placed material is firmly set under pipe haunches and around the entire periphery of the pipe.

b. For the intermediate lift, the backfill material shall be placed in maximum 8-inch loose horizontal uniform layers and thoroughly compacted by mechanical tamping. In paved areas, layers shall not exceed 6 inches in thickness before compaction. Compaction shall

be to a minimum of 95 percent compaction as determined by ASTM D1557 in both unpaved areas and paved areas.

3. The Contractor shall be responsible for protecting the pipe or structure while placing and compacting the backfill material.

4. The Contractor shall coordinate backfilling with testing of utilities. Testing shall be complete before final backfilling.

F. Final Backfilling

1. In areas to be paved, compact the upper 2 feet below the pavement subgrade to a minimum 95 percent of the ASTM D1557 maximum density. Comply with the requirements of Section 34, "Asphalt Concrete Pavement," of the County Standard Specifications and as indicated on the plans

G. Temporary Patching

1. To accommodate traffic in pavement areas, immediately after backfilling the trench and prior to the permanent restoration, a temporary patch of cold-mix asphalt concrete shall be constructed over the compacted backfill. The cold-mix asphalt shall be compacted to a minimum thickness of 1-1/2 inches and shall be slightly humped not to exceed 3/8 inch for trench width less than 2 feet, and 3/4 inch for trench width greater than 2 feet.

2. The Contractor shall maintain the temporary trench patches in good condition at all times until the permanent restoration is completed. Chuck holes and any depression greater than 1/2 inch shall be repaired immediately.

3.02 QUALITY CONTROL

The Contractor's soils engineer shall perform testing of all trench bedding and backfill materials as specified in DIVISION 2 – SITE CONSTRUCTION.

3.03 FINISH OPERATIONS

A. Restoring: Restore areas that have been damaged or disturbed by construction operations to their original conditions. Repair pavement section as indicated and specified in Section 34, "Asphalt Concrete Pavement," of the County Standard Specifications and as indicated in the plans.

B. Disposal of Surplus Material:

1. Remove from site surplus or other soil material not required for suitable filling, backfilling, or grading.

2. Remove from site and dispose of loose stones, rocks, boulders, dirt, and debris accumulated by its work.

END OF SECTION

SECTION 02530

SANITARY SEWERAGE

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

As specified in Section 00700.

1.01 SUMMARY

A. This Section includes the following for site sewerage system:

1. Inspection.

2. Installation.

3. Field quality control.

4. Backfilling.

5. Final inspection.

B. Related Sections: Section 02310 - EXCAVATION, BACKFILL AND COMPACTION FOR UTILITIES

1.02 DESCRIPTION OF WORK

A. Work includes all labor, materials, testing and inspection, equipment, and incidentals required to complete the work under this section as shown on the Drawings and as herein specified, for the sanitary sewer system.

B. The sanitary sewer system shall be precisely laid out as indicated on the Drawings.

1.03 REFERENCES

The publications listed form a part of this specification to the extent referenced.

A. Department 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 applicable to County of Hawaii, with the exception of paragraph "Measurement and payment"; referred to as "County Standard Specifications".

2. Standard Details for Public Works Construction, September 1984, as applicable to County of Hawaii; referred to as "County Standards Details".

B. ASTM D 2729 - Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.04 SUBMITTALS

A. Submit in accordance to Section 01300 – SUBMITTAL PROCEDURES.
B. Product Data: Manufacturer's product data with references to industry standards and installation instructions for each item to be incorporated into the system. Products shall be provided with identification marks and data as required by the County Standard Specifications. Submit manufacturer's catalog data for pipes and fittings.

C. Shop Drawings: Submit shops drawings for the pipes and fittings.

D. Test Reports: Test results for product tests performed in accordance with the County Standard Specifications.

E. Certificates: Before installation, submit affidavits from the manufacturers or suppliers of pipe and fittings certifying that such materials delivered to the project conform to the requirements of these specifications.

F. As-Built Drawings: Record drawings of the sewerage system

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials shall be in accordance with the County Standard Specifications including but not limited to the following sections:

Gravity Sewer Lines: Install polyvinyl chloride pipe (PVC) or vitrified clay (VC) pipe at the option of the Contractor.

1. PVC Sewer Pipe and Appurtenances Section 21

2. Sewer Manholes and Appurtenances Section 23

B. Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape in rolls, 6 inches minimum width, color coded as stated below with warning and identification imprinted in bold black letters continuously and repeatedly over the entire tape length. Warning and identification to read, "CAUTION, BURIED SEWER PIPE LINE BELOW" or similar wording. Color of tape shall be green and printing shall be permanent, unaffected by moisture or soil.

PART 3 - EXECUTION

3.01 INSPECTION

Examine the areas and conditions under which sewerage system is to be installed. Should any condition be found unsuitable, no work shall be done until the unsatisfactory conditions have been corrected and are acceptable to the Contractor. Proceeding with work will imply acceptance of the conditions by the Contractor.

3.02 INSTALLATION

Gravity Sewer System:

A. Handle and store materials as per manufacturer's instructions.

B. Install the sanitary sewer system as per aforementioned sections of the County Standard Specifications and as noted on the Drawings.

C. Once the mandrel test for deflection of the sewer line is completed as per the Standard Specifications, a golf ball shall be used to identify sags in the line. First the sewer line shall be flushed with a minimum of one pipe volume of clean, clear water. Upon flushing of the sewer lines, a golf ball or approved equal with a specific weight greater than that of water with a clearly marked line dividing the ball into two hemispheres shall be attached to a closed circuit television camera via a tether at a point along the hemisphere and pulled through the entire length of the gravity sewer. The closed circuit television camera shall be pulled facing backward with the golf ball and tether pulled behind so to view the golf ball with the camera. If the golf ball becomes submerged in water such that the marked line (or half or more of the golf ball) is below the water surface level, the section of pipe will not be considered acceptable. Any section of pipe found to be unacceptable will have to be repaired or replaced and retested. All material, equipment and labor required to perform the test and any replacement of pipe, including both labor and materials, shall be provided by the Contractor at no cost to the Owner.

3.04 FIELD QUALITY CONTROL

Testing:

A. The Contractor shall conduct field tests as required in the County Standard Specifications in the presence of the Owner. Provide a minimum of three (3) working days notice prior to performance of the test. Soil material, bedding and backfill testing shall be performed by the Contractor's soils engineer.

B. Provide test for leakage for the sewer pipes and appurtenances as per County Standard Specifications.

3.05 BACKFILLING

A. Backfilling is not permitted until lines have been tested and accepted by the Owner.

B. Perform backfilling in accordance with the requirements of SECTION 02310 – EXCAVATION, BACKFILL AND COMPACTION FOR UTILITIES.

3.06 FINAL INSPECTION

A. The sewerage system shall be complete in every respect and operating as designed, including the cleaning and finishing of the lines. Surplus materials shall have been removed. Lines and manholes shall be free from sand, silt, or other obstructions.

B. Maintain the sewer system in a clear and operational condition until final acceptance by the Owner.

END OF SECTION

SECTION 07411

PREFORMED METAL SIDING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Extent of preformed siding to patch existing metal siding is indicated on the drawings and by provisions of this Section. Provide all materials for a complete repair system.

B. Type of panels required include formed sheet panels for exposed fasteners to existing metal siding.

C. Related Work Described Elsewhere:

1. Sealants are provided under SECTION 07920 - SEALANTS.

2. Exposed exterior face of siding shall be field painted to match existing painted siding.

1.2 SUBMITTALS

Manufacturer's Data: Submit manufacturer's product specifications, standard details, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of preformed panels.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle preformed panels, bulk products, and other manufactured items in a manner to prevent damage or deformation.

B. Handle material carefully to avoid damage to surfaces, edges, and ends.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Siding Panels: Formed from minimum 24 gauge "Zincalume: or "Galvalume" coated steel conforming to ASTM A 792/A 792M, Grade 33 with a minimum AZ50 coating. Panel configuration shall be equivalent to Custom 4-Rib configuration by HPM Building Supply Custom Metal Roofing, or equivalent by Kloeckner Metals, Advanced Roofing Technology or approved equal siding with

exposed fasteners. Panels shall be prefinished as specified.

B. Flashing and Closures: Formed of prefinished material to match siding panels of manufacturer's standard flashings for the panels specified. Provide accessories and other items essential to complete the sheet metal repairs of the same materials as the items to which they are applied. Connect all pieces of linear flashing by a slip joint to permit thermal movement.

2.2 METAL FINISH

A. General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Provide color close to the final field painted color.

B. For exposed exterior surfaces, provide thick finish of Kynar 500 or equivalent conforming to AAMA 621 with a primer from 0.2 to 0.3 dry mils and Kynar topcoat from 0.7 to 0.9 dry mils for a total thickness of 0.9 to 1.2 dry mils.

C. Interior/underside finish shall be off white polyester.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners: Fasteners shall be stainless steel with composite metal and neoprene composition washers. Exposed fasteners shall be gasketed on the exterior side of the covering to waterproof the covering and finished to match siding finish. Provide stainless steel blind rivets where indicated or required.

B. Closure Strips: Formed specifically for this purpose of laminated cross-linked polyethylene closed cell-foam or neoprene materials and as standard with manufacturer. Molded closure strips shall be free of open voids and shall not absorb or retain water. Closure strips shall be formed to match configurations of the panels and shall be provided where indicated and where necessary to provide weathertight construction.

C. Sealants: ASTM C 920, Type S, Grade NS, Class 25, Use NT, polyurethane or as recommended by the siding manufacturer. Color, where exposed, shall match panels.

D. Mastic: As recommended by the siding manufacturer.

E. Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 15-mil dry film thickness per coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive metal siding. Ensure that surfaces are free from defects and projections which might affect the installation.

B. Report unsuitable conditions to the Engineer.

3.2 INSTALLATION

A. General: Comply with panel fabricator's and material manufacturers' instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place in full and firm contact with substrate. Completely seal overlap of existing siding and openings through panels. Correct defects or errors in materials in an accepted manner. Replace materials which cannot be corrected in an accepted manner with new materials. Provide molded closure strips where necessary for weathertight construction.

B. All field cutting of panels shall be done as recommended by manufacturer's written instructions.

C. Joint Sealers: Install joint fillers and sealants where indicated and where required for weatherproof performance of panel system. Provide types of sealants/fillers indicated or, if not otherwise indicted, types recommended by panel manufacturer. Refer to SECTION 07920 - SEALANTS of these specifications for installation requirements applicable to indicated joint sealers.

D. Fasteners: Fastener spacings shall be in accordance with the panel manufacturer's recommendations and as necessary to withstand the design loads for both pullout and pullover. Install fasteners as recommended by the manufacturer of the panels. Install fasteners in straight lines within a tolerance of 1/2-inch in the length of a bay. Drive exposed penetrating type fasteners normal to the surface and to a uniform depth to seat gasketed washers properly and drive so as not to damage factory applied coating. Exercise extreme care in drilling pilot holes for fastenings to keep drills perpendicular and centered. After drilling, remove metal filings and burrs from holes prior to installing fasteners and washers. Torque used in applying fasteners shall not exceed that recommended by the manufacturer. Remove panels deformed or otherwise damaged by overtorqued fastenings, and provide new panels.

E. Closure Strips: Install closure strips as recommended by the manufacturer.

F. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with other substrate materials which are noncompatible (i.e. copper and aluminum) or could

result in corrosion or deterioration of either material or finishes.

3.3 CLEAN-UP AND PROTECTION

Damaged Units: Replace panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures.

END OF SECTION

SECTION 07920

SEALANTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

Completely close with sealant and patching compound all joints indicated or specified to be sealed to a watertight and airtight condition without staining substrates.

1.2 SUBMITTALS

A. Manufacturer's Data: Submit copies of manufacturer's product data and specifications for type of sealant required, to the Engineer for acceptance.

B. Material Safety Data Sheets (MSDS): Submit MSDS for each sealant product.

C. Color Samples: Submit 4 sets of color finish samples of sealants.

D. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Warranty: Submit warranty as stipulated in item entitled "WARRANTY" hereinbelow.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of sealant through one source from a single manufacturer.

B. Preconstruction Compatibility and Adhesion Testing: Submit to sealant manufacturers, for testing samples of materials that will contact or affect sealants. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain optimum adhesion of sealants to joint substrates. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

C. Stain-Test Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver sealants to the jobsite in sealed containers labeled to show the designated name, formula, or specification number, lot number, color, date of manufacture, shelf life, curing time, manufacturer's directions, and name of manufacturer.

B. Storage: Carefully handle and store all materials to prevent inclusion of foreign materials. Remove from project site all damaged and deteriorated materials and materials exceeding shelf life.

C. Sealant materials shall be handled in accordance with the manufacturer's specifications and installed prior to expiration of shelf life.

1.5 WARRANTY

A. Provide a 2-year written warranty from the project acceptance date against leaks, air infiltration, cracks, and other failures of the installation and materials. Where sealant is associated with a system with longer warranty period, sealant warranty shall match applicable system.

1. Repair of sealants to seal leaks caused by faulty materials or workmanship;

2. Repair or replace damage to the building or its finishes, equipment or furniture when occasioned by such leaks at no additional cost to the State.

B. The Surety shall not be held liable beyond 2 years from the project acceptance date.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Sealants:

1. At Vertical and Overhead Moving Joints: One-part polyurethane-based sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25, Use NT. Provide one of the following, or approved equal:

a. Vulkem 116; Tremco, Inc.

b. Chem-Calk 900; Bostik Construction Products Div.

c. Sikaflex 1a; Sika Corp.

d. DynaTrol 1-XL; Pecora Corp.

e. NP-1; MasterSeal.

2. Bedding Compound: For installation of items indicated to be bedded in sealant, use a preformed butyl-polyisobutylene sealant tape. Size of tape as required for the specific application. Provide one of the following, or approved equal:

a. Extru-Seal; Pecora Corp.

b. 440 Tape; Tremco, Inc.

c. Chem-Tape 40; Bostik Construction Products Div.

C. Patching Filler: DAP Platinum Patch Advanced Exterior Filler or approved equal.

D. Primer for Sealants: Non-staining, as recommended by the sealant manufacturer.

E. Sealant Backer Rod: Compressible rod stock of polyethylene foam, polyethylene-jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, nonabsorptive material conforming with ASTM C 1330 as recommended for compatibility with sealant by the sealant manufacturer to control the joint depth for sealant placement, to break bond of sealant at bottom of joint, to form optimum shape of sealant bead on back side, and to provide a highly compressible backer which will minimize the possibility of sealant extrusion when joint is compressed. Do not use oakum or other types of absorptive materials as backstops.

F. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer. Provide self adhesive tape where required.

G. Masking Tape: Non-staining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

Examine joint widths, surfaces, and backing, and their anchorage to the structure, and conditions under which joint sealer and patching work is to be performed, and notify Contractor in writing of conditions detrimental to proper completion of the work and

performance of products. Do not proceed with joint sealer and patching work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.2 JOINT PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers and patching compounds to comply with recommendations of joint sealer and patching compound manufacturers and the following requirements:

1. Remove foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and accepted for sealant adhesion and compatibility by sealant manufacturer; oil; grease; waterproofing; water repellants; water; and surface dirt.

2. Clean concrete and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

4. Steel Surfaces in Contact with Sealant: Scrape and wirebrush to remove loose mill scale. Remove dirt, oil, or grease by solvent cleaning, and wipe surfaces with clean cloths.

5. Clean metal and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

6. Do not permit solvents to air dry. Wipe surfaces free of solvent using clean, dry white cloth or white lintless paper.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant and patching compound with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove smears. Remove tape immediately after tooling without disturbing joint seal.

D. Examine joint size and correct to achieve depth ratio of 1/2 of joint width with a

minimum width and depth of 1/4-inch, maximum width of one-inch unless specifically allowed otherwise by the sealant manufacturer.

3.3 INSTALLATION OF JOINT SEALERS AND PATCHING COMPOUND

A. General: Comply with joint sealer and patching compound manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Weather Conditions: Do not proceed with installation of sealants and patching compounds under adverse weather conditions. Proceed with the work only when weather conditions are favorable for proper cure and development of high early bond strength.

C. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.

   a. Do not leave gaps between ends of joint fillers.

   b. Do not stretch, twist, puncture, or tear joint fillers.

   c. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.

E. Primer: Immediately prior to application of the sealant, clean out all loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete, masonry units, wood, and other porous surfaces in accordance with compound manufacturer's instructions. Do not apply primer to exposed finish surfaces.

F. Installation of Sealants: Install sealants by proven techniques that result in sealants

directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

2. Provide flush joint configuration per Figure 5B in ASTM C 1193, where indicated.

3.4 CLEAN-UP

Clean off excess sealants or sealant smears and patching compound from adjacent surfaces as work progresses by methods and with cleaning materials approved by manufacturers and of products in which joints occur.

3.5 PROTECTION

Protect joint sealers and patching compound during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of project acceptance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION

SECTION 09250

CEMENT WALLBOARD

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

Complete all cement wallboard work as indicated or required by the drawings and as specified herein. Work shall include, but not be limited to, the following:

1. Cement wallboard on metal framing and furring.

2. Metal stud framing for wallboard.

1.2 SUBMITTALS

A. Manufacturer's Data: Material description and manufacturer's recommended installation procedures for each material.

B. Safety Data Sheets (SDS): Submit SDS for each product.

1.3 QUALITY ASSURANCE

A. Transverse Loading: The non-load bearing metal framing shall be capable of carrying a transverse load of 5 psf without exceeding the allowable stress or a deflection of L/360. Increase stud gauge, decrease stud spacing, or provide hidden from view lateral bracing to comply with these requirements at no additional cost to the State.

B. Gypsum Board Terminology: Refer to ASTM C 11, "Terminology Relating to Gypsum and Related Building Materials and Systems", for definition of terms for cement board assemblies not defined in this Section or in referenced standards.

C. Provide support systems and attachments conforming with AISC 341, "Seismic Provisions for Structural Steel Buildings".

D. Seismic: Brace partitions in accordance with ICC IBC Section 1613, “Earthquake Loads.”

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver cement wallboard materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type, and grade; store in a dry well ventilated space, protected from the weather, under cover and off the ground. Stack cement panels flat to prevent sagging. Joint materials shall be stored in accordance with manufacturer's printed instructions. Damaged or deteriorated materials shall be removed from jobsite.

B. Environmental Limitations: Comply with GA-238, "Guidelines for the Prevention of Mold Growth on Gypsum Board", and ASTM C 840, "Application and Finishing of Gypsum Board", requirements or cement board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cementitious Backer Board: ANSI A118.9, "Cementitious Backer Units", or ASTM C 1325, "Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units", glass mesh reinforced mortar backer board, nominal 1/2-inch thick, equivalent to Wonderboard by Custom Building Products, Durock by USG Co., or approved equal.

B. Wallboard and Sheathing Fasteners: ASTM C 1002, "Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs", standard bugle head self-drilling, self-tapping corrosion - resistant drywall screws. Fasteners for cementitious backer board shall have a polymer coating.

C. Reinforced Tape and Cement: ASTM C 475/C 475M, "Joint Compound and Joint Tape for Finishing Gypsum Board", materials for treating joints and fastener heads shall be as manufactured or recommended by the Manufacturer of the wallboard used.

D. Non-Load Bearing Studs: Comply with ASTM C 754, "Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products", for conditions indicated. ASTM C 645, "Nonstructural Steel Framing Members", studs shall be 2-1/2 inches and 3-5/8 inches unless indicated otherwise on the drawings. Studs shall be rolled formed channel of 20 gauge galvanized steel, ASTM A 653/A 653M, "Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-lron Alloy-Coated (Galvannealed) by the Hot-Dip Process", G60 coating. ProSTUD Drywall Framing System gauges for equivalent structural and composite limiting height studs are acceptable. Provide holes and notches for conduit or electrical wiring.

E. Tracks: Metal floor and ceiling tracks shall be rolled formed channel bf electro-zinc plated steel of same gauge as stud with width dimensions suitable to corresponding stud sizes indicated on the drawings.

F. Framing Fasteners: ASTM C 754 or ASTM C 1513, "Steel Tapping Screws for Cold-Formed Steel Framing Connections", except as specified otherwise. Powder actuated fasteners shall be type and size as recommended by the manufacturer of the material being fastened.

G. Joint Treatment Materials: ASTM C 475/C 475M; type recommended by manufacturer for the application indicated, except as otherwise noted. Perforated tape, and joint and topping compound, or "all-purpose" compound.

PART 3 - EXECUTION

3.1 EXAMINATION

Examine substrates to which cement wallboard construction attaches or abuts preset hollow metal frames and structural framing, with installer present, for compliance with requirements for installation tolerances, existence of mold, and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with ASTM C 840, "Application and Finishing of Gypsum Board", Gypsum Association GA-216, and ASTM C 754 as applicable to the type of substrate and drywall support system indicated.

B. Tolerances:

1. Maximum variation of finish surface from true flatness shall be 1/8-inch in 10-feet in any direction unless specified otherwise.

2. Maximum variation of plumbness of wall shall be 1/8-inch in 10-feet of height.

3. Maximum variation from true position shall be 1/8-inch.

C. Metal Wall Framing:

1. Install supplementary framing, blocking, and bracing to support fixtures, equipment services, heavy trim, furnishings, and similar work which cannot be adequately supported on cement board alone to comply with details indicated and with recommendations of cement board manufacturer, or if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.

2. Install runner tracks at floors and structural walls where cement board stud system abuts other work, except as otherwise indicated.

3. Space studs and furring 16-inches on center, except as otherwise indicated.

4. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

5. Install each steel framing and furring member so that fastening surface does not vary more than 1/8-inch from plane of faces of adjacent framing.

D. Cement Wallboard General:

1. Install exposed cement board with smooth side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.

2. Locate either edge or end joints over supports, except in horizontal applications or where intermediate supports or board back-blocking is provided behind end joints.

3. Attach panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

4. Attach board to framing and blocking as required for additional support at openings and cutouts.

5. Space fasteners in boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.

E. Methods of Cement Wallboard Application:

1. Single-Layer Application:

a. On partitions/walls higher than 8-feet one-inch, apply board vertically (parallel), unless otherwise indicated, and provide sheet lengths which will minimize end joints.

b. On partitions/walls 8-feet one-inch or less in height apply board horizontally (perpendicular); use maximum length sheets possible to minimize end joints.

2. Single-Layer Fastening Method: Apply boards to supports by fastening with screws, spaced not to exceed 16-inch centers for walls.

END OF SECTION

SECTION 09760

DECORATIVE FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide prefinished polyester glass reinforced plastic sheets and molding trims adhered to prepared walls.

B. Related Work Described Elsewhere: Substrate is provided under SECTION 09250 - CEMENT WALLBOARD.

1.2 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical product data to indicate compliance with these specifications, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

B. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

C. Samples for Verification: Submit 4 each section of panel for each finish selected indicating the color, texture, and pattern required.

1. Submit complete with specified applied finish.

2. Exposed Molding and Trim: Provide samples of each type, finish, and color.

D. Safety Data Sheets(SDS): Submit SDS for adhesives and sealants prior to their delivery to the site.

1.3 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with ASTM E 84, "Method for Surface Burning Characteristics of Building Materials", minimum wall required rating - Class C.

B. Conform with USDA/FSIS.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials factory packaged on strong pallets.

B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Marlite, Crane Kemlite, or approved equal.

B. Product: Symmetrix with Sani-Coat.

2.2 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319, "Glass-Fiber Reinforced Polyester Wall and Ceiling Panels".

1. Coating: Multi-layer print, primer and finish coats or applied over-layer.

2. Dimensions:

a. Thickness: Minimum 0.090-inch nominal.

b. Width: Four-feet nominal.

c. Length: As indicated on the drawings.

3. Tolerance:

a. Length and Width: +/-1/8 inch.

b. Square: Not to exceed 1/8-inch for 8-foot panels or 5/32-inch for 10-foot panels.

B. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

C. Front Finish: As indicated.

2.3 MOLDINGS

A. PVC: Extruded PVC Trim Molding Profiles for panel thickness as required.

1. Outside Corner.

2. Edge.

3. Spline.

4. Color: To match panels or as selected by the Engineer.

2.4 ACCESSORIES

A. Adhesive: As recommended by the manufacturer for the required substrates.

B. Sealant: Color matched where exposed as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.

B. Repair defects prior to installation. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Cut sheets to meet supports allowing 1/8-inch clearance for every 8-foot of panel. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.

C. Apply panels to substrate, vertically oriented with seams plumb and pattern aligned with adjoining panels. Install panels with manufacturer's recommended gap for panel field and corner joints. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.

D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.

1. All moldings must provide for a minimum 1/8-inch of panel expansion at

joints and edges, to insure proper installation.

2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations.

C. Do not use abrasive cleaners.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The work includes painting and finishing of exterior and interior items and surfaces throughout the project, whether scheduled or not, except as otherwise indicated. Painting shall include new work and existing new surfaces made bare or damaged during construction and existing surfaces as scheduled. Surface preparation, priming, and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of the work and is included in this Section.

B. The work includes field painting of exposed bare and covered pipes and conduits (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the electrical work, such as junction boxes, raceways, and cabinets, except as otherwise indicated.

C. "Paint" as used herein means all coating systems materials, including primers, enamels, sealers, stain, varnish, and fillers, and other applied materials whether used as prime, intermediate, or finish coats, except as specifically noted herein.

D. Paint all exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the Engineer will select these from standard colors available for the materials systems specified.

1.2 PAINTING NOT INCLUDED

The following categories of work are not included as part of the field-applied finish work, or are included in other sections of these specifications.

1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for miscellaneous metal and similar items. Also, for fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories.

2. Mechanical and Electrical Work: The prime coat for mechanical and electrical work is specified in DIVISION 15 - MECHANICAL and DIVISION 16 - ELECTRICAL, respectively. Finish coats are as specified herein.

3. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as

(but not limited to) solid phenolic, plastic laminate, acoustic materials, high performance organic coated metal, and finished mechanical and electrical equipment, including light fixtures, switchgear, and distribution cabinets.

4. Concealed Surfaces (Present and Future): Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, furred areas, and pipe spaces.

5. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, and similar finished materials will not require finish painting, unless otherwise indicated.

6. Labels: Do not paint over any code-required labels, such as Underwriters' Laboratories, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 SUBMITTALS

A. Schedule of Finishes: Submit sets of the proposed painting finish schedule to the Engineer for acceptance. The schedule shall indicate the wet film thickness (mils) at which the proposed paints/coatings will be applied that are necessary to achieve the final dry film thickness indicated on the Schedule of Finishes under item entitled "SCHEDULE OF FINISHES" hereinbelow.

B. Color Samples: Submit the following to the Engineer for acceptance:

1. Three sets of each color finish sample.

2. After the color finish sample has been accepted, one set of color finish samples painted onto 8-1/2 inch x 11-inch cardboard shall be submitted. The cardboard shall be divided into 3 horizontal strips and painted as follows:

a. Prime 3 strips.

b. First coat bottom 2 strips.

c. Second coat bottom strip.

C. Schedule of Operations: Before work on the project is commenced, submit complete sets of a work schedule showing Contractor's sequence of operations and dates.

D. Warranty: Submit warranty as stipulated in item entitled "WARRANTY" hereinbelow.

E. Certifications: Submit copies of asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free, and mercury free paint certificates.

F. Manufacturer's Product Data Sheets: Submit copies of the manufacturer's product data sheets for the primers, paints, coatings, solvents, sealing and patching materials, sealants and caulking, and other materials being used. Data sheets shall indicate thinning and mixing instructions, required film thickness (mil) and application instructions.

G. Manufacturer's Material Safety Data Sheets (MSDS): Submit copies of the manufacturer's material safety data sheets for coatings, solvents, and other hazardous materials.

H. Comprehensive Spray Plan: Where the Contractor proposes to employ airless spraying, submit a Comprehensive Spray Plan, including the following information for acceptance:

1. Documentation that the individual spray applicator(s) on the project have completed an accepted "Spray Applicator Certification Program".

2. The overspray protection methods proposed.

3. The spray application instructions and recommendations of the paint manufacturer he proposes to use.

I. Certificate of Public Liability and Property Damage Insurance

1.4 ANALYZING AND TESTING

A. All paints and their applied thickness shall be subject to testing whenever the Engineer deems necessary to determine conformation to the requirements of these specifications. Should testing by a laboratory be required, the laboratory shall be selected by the Engineer and the cost of testing shall be borne by the Contractor. However, should test results show that the paint is in compliance with this specifications, the cost will be borne by the State.

B. All rejected material shall be removed from the job site immediately. Surfaces painted with the rejected material shall be redone at no additional cost to the State.

C. Where the required paint thickness is deficient, the affected surface(s) shall be recoated as necessary to provide the required paint thickness at no additional cost to the State.

1.5 QUALITY ASSURANCE

A. Painting Terminology: Refer to ASTM D 16, "Standard Terminology for Paint,

Related Coatings, Materials, and Applications".

B. Gloss/Sheen Levels: ASTM D 523, "Specular Gloss", as follows:

Description	Units at 60 Degrees	Units at 85 Degrees
Matte or Flat	0 to 5	10 max
Velvet	0 to 10	10 to 35
Eggshell	10 to 25	10 to 35
Satin	20 to 35	35 min
Semi-Gloss	35 to 70	
Gloss	70 to 85	
High Gloss	more than 85	

C. Where the Contractor proposes to employ airless spraying, the applicator(s) shall have completed an accepted "Spray Applicator Certification Program" conducted by the Painting Industry of Hawaii.

D. As a minimum, the certification shall include material and equipment selection, use and maintenance, hands-on application, and safety training.

1.6 WARRANTY

A. The Contractor shall warrant that the work performed under this Section conforms to the contract requirements and is free of any defect in the materials used and workmanship performed by the Contractor. Such warranty shall continue for a period of 1 year from the project acceptance date and the Contractor shall remedy any such defect which is discovered during that period at no cost to the State.

B. The State will notify the Contractor in writing within a reasonable time after discovery of any failure or defect.

C. Should the Contractor fail to remedy any failure or defect described in Paragraph A above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure or defect and charge the Contractor for the cost of same.

1.7 SPECIAL REQUIREMENTS

A. Codes: The Contractor shall comply with the State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.

B. Safety methods used during coating application shall comply with SSPC-PA Guide 3.

C. Protection:

1. Persons:

a. The Contractor shall take all necessary precautions to protect public pedestrians, including tenants from injury.

b. The Contractor shall provide, erect, and maintain safety barricades around scaffolds, hoists, and wherever Contractor's operation create hazardous conditions in order to properly protect the public and workmen.

2. Completed Work: The Contractor shall provide all necessary protection for wet paint surfaces.

3. Protective Covering: The Contractor shall provide and install protective covering over equipment, floor, and other areas that are not scheduled for treatment. Protective covering shall be clean, sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to original condition.

4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the State and other individuals in the vicinity of the work area during the execution of this Contract. Contractor shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence. Where the damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) it shall be replaced with a new product of equal quality. No proration or use of "used" products will be permitted.

5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and to exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc., shall be removed from the site at the end of each day.

D. Right of Rejection: The Engineer will have the right to reject all work which is not in compliance with the plans and specifications. Rejected work will be redone at no additional cost to the State. In addition, the Engineer will have the right to require the immediate removal of any paint applicator who demonstrates negligence, lack of competence or repeated non-compliance with the contract requirements.

E. Sequence of Operations: The sequence of operations shall divide the surfaces into work areas and present a schedule for:

1. Surface preparation and spot prime.

2. Prime coat.

3. First finish coat.

4. Second finish coat.

F. Inspection and Acceptance: The Contractor shall obtain written acceptance from the Engineer upon completion of each phase of work (phases of work are surface preparation and spot prime, prime, first finish coat, and second finish coat) before proceeding into the next phase of work. The Contractor shall give the Engineer one day (24 hours minimum) advance notice of completion of any phase of work for a work area only when he deviates from the previously submitted work schedule. The Contractor shall provide necessary access to areas to be inspected. Failure to obtain acceptance of any phase of work for a work area may result in redoing the operation at no cost to the State.

G. Bollards: Bollards protecting metering equipment near vehicular traffic shall be painted yellow per ANSI Z535.1 to comply with OSHA 1910.144 and a 2-inch wide strip of reflective tape shall be placed 6-inches below the top.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint materials to the job site in original unopened containers with original labels intact.

B. No paint material, empty cans and paint brushes and rollers, drop cloths and rags, may be stored in buildings, but shall be stored in separate storage facilities away from the buildings. Receiving, opening, and mixing of painting materials shall be done in this area.

C. The Contractor may furnish a job site storage facility. Such facility shall comply with requirements of the local Fire Department. The storage area shall be kept clean and facility shall be locked when not in use or when no visual supervision is possible.

D. Ensure the safe storage and use of paint materials and the safe storage or disposal of waste at the end of each work day.

E. Handle manufactured materials as recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asbestos Prohibition: All paint shall be asbestos-free.

B. Lead Prohibition: All paint shall be lead-free.

C. Mercury Prohibition: All paint shall be mercury-free.

D. Chromate Prohibition: All paint shall be free of zinc-chromate and/or strontium-chromate.

E. Cadmium Prohibition: All paint shall be cadmium-free.

F. Material shall be equal in quality to that specified under the Schedule of Finishes and any given finish shall be as labeled by one manufacturer.

G. All materials shall be delivered to the job site in undamaged original containers bearing the manufacturer's label and shall be stored in such a manner as to prevent damage. All rejected materials shall be removed from the job site immediately.

H. Paints shall be as manufactured by Benjamin Moore, Dupont, Henkel, Devoe, Devoe Coatings, Glidden, Glidden Professional, PPG Protective & Marine Coatings, Sherwin-Williams, Tnemec, or approved equal.

I. Thinning of paint shall be done using material recommended by the manufacturer. Mix proprietary products according to manufacturer's printed specifications. Compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline shall not be used for thinning.

J. Except for metal primers, all paint shall contain maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint.

K. The supplier shall submit a signed certificate indicating the amounts of mildewcide added by both the paint manufacturer and the paint supplier. Mercurial fungicide shall not be used.

2.2 SCHEDULE OF FINISHES

A. The Schedule of Finishes is made for the convenience of the Contractor and indicates the types and quality of finishes to be applied to the surfaces. Refer to Finish Schedule for symbols indicating location for various finishes. Provide additional systems for surfaces to be painted not listed hereinafter.

B. All paints unless otherwise noted, are the products of Benjamin Moore and are so named to establish desired quality and standard of materials. Painting materials, equal to those mentioned by trade name under the various treatments may be used, provided they meet with the acceptance of the Engineer.

C. Treatments shall be applied on exposed surfaces of designated materials, in

conformity with instructions of the paint product used.

D. Exterior Painting: Spread rates are approximate.

1. Concrete:

Prime Coat: N068 Super Spec Masonry Interior/Exterior Acrylic High Build Masonry Primer
1.2 mils DFT @ 425 sf/gal

2nd and 3rd Coats: N448 Ultra Spec Ext Satin Finish
1.5 mils DFT @ 403 sf/gal/coat

2. Typical Coating System for Steel: Follow SSPC-SP-1 for solvent cleaning, for maximum protection follow SSPC-SP-10 near white metal blast.

Producer	Coat	Products	DFT (mils)	Minimum Time to Recoat	Maximum Time to Recoat
Corotech	1st	V175*	1.5-2.1	2 hours	2 weeks exterior
Corotech	2nd	V150	2.2-2.8	8 hours	4 weeks
Corotech	3rd	V500	2.3-3.3	8 hours	3 days

* for galvanized or zincalum coated surfaces or as recommended by the paint manufacturer

3. Wood:

Prime Coat: N023 Fresh Start Multi-Purpose Latex Primer
1.2 mils DFT @ 425 sf/gal

2nd and 3rd Coats: N448 Ultra Spec Ext Satin Finish
1.5 mils DFT @ 403 sf/gal/coat

E. Interior Painting: Spread rates are approximate.

1. Exposed Concrete:

Prime Coat: N068 Super Spec Masonry Interior/Exterior Acrylic High Build Masonry Primer
1.2 mils DFT @ 425 sf/gal

	2nd and 3rd Coats:	N537 Ultra Spec 500 Interior Low Sheen Finish 1.8 mils DFT @ 374 sf/gal/coat

2. Ferrous Metal:

Prime Coat:	P06 Super Spec HP Alkyd Metal Primer 2.0 mils DFT @ 473 sf/gal
2nd and 3rd Coats:	N537 Ultra Spec 500 Interior Low Sheen Finish 1.8 mils DFT @ 374 sf/gal/coat

3. Galvanized Metal:

Prime Coat:	P04 Super Spec HP Acrylic Metal Primer 1.7 mils DFT @ 406 sf/gal or Bulls Eye 1-2-3 Water-Base Primer for All Surfaces 1.5 mils DFT @ 364 sf/gal
2nd and 3rd Coats:	N537 Ultra Spec 500 Interior Low Sheen Finish 1.8 mils DFT @ 374 sf/gal/coat

4. Wood Surfaces for Paint:

Prime Coat:	N023 Fresh Start Multi-Purpose Latex Primer 1.2 mils DFT @ 425 sf/gal
2nd and 3rd Coats:	N537 Ultra Spec 500 Interior Low Sheen Finish 1.8 mils DFT @ 374 sf/gal/coat

2.3 COMPATIBILITY OF PAINTING SYSTEMS AND SUBSTRATES

A. The Contractor shall ensure that painting systems specified are compatible with existing painted surfaces. Alkyd paints shall not be applied over existing latex coating. Alkyd paints shall not be used over cementitious surfaces. Latex paints shall not be applied directly over alkyd paints without proper conditioner and accepted by the Engineer.

B. Field Tests for Alkyd or Latex Paints: The Contractor shall perform the following field tests for compatibility of substrates to new paint systems prior to ordering paint:

1. Latex films will dissolve when wiped with rubbing alcohol; alkyd films will not.

2. When sanded, latex films will "clog" sandpaper; alkyd films will sand clean.

3. Alkyds will soften after applying a 10 percent solution of Drano in water; latex films will not soften.

4. Alkyds will burn when exposed to a flame; latex film will not burn.

5. Paints which do not respond to 2 or more of these tests are probably epoxy, urethane, or other type of coating.

6. Provide a packaged swab test in accordance with the package directions.

7. Existing paint identified or suspect of having lead-containing paint shall be tested in a manner that does not produce airborne or uncontrolled lead debris.

C. Should there be any discrepancies between the specified Schedule of Finishes and the existing paint systems, the Contractor shall notify the Engineer in writing of any incompatible systems specified and submit a revised Schedule of Finishes for acceptance when necessary. With the acceptance of the revised Schedule of Finishes, the Contractor shall make any corrections and/or revisions necessary to resolve the discrepancies and/or inconsistencies. The Contractor shall not proceed with any painting systems that are incompatible, although specified otherwise, until all incompatible conditions detrimental for the proper application and performance of the painting systems have been corrected. The failures due to the application of the incompatible paint systems shall be corrected at no additional cost to the State. Proceeding with the work shall imply acceptance of the specified Schedule of Finishes and the compatibility with the existing painted surfaces by the Contractor.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. General:

1. Surface preparation shall be in accordance with the Painting and Decorating Contractors of America, "Architectural Specification Manual", methods are applicable to all substrates.

2. Scrub surfaces with stiff nylon bristle brush and Trisodium Phosphate (TSP) solution at rate of 3/4 cup TSP per gallon of warm water to remove accumulated film of wax, oil, grease, smoke, dust, dirt, chalky, or other foreign matter which would impair bond or bleeding through new finish.

Thoroughly sponge wipe surfaces with clean water. Allow surfaces to thoroughly dry before priming, painting, calking, or sealing.

a. Following sponge wiping, the surfaces shall be allowed to dry for a minimum of 24 hours.

b. Wood surfaces shall have a maximum moisture content of 12 percent when measured with an electronic moisture meter.

3. Cracks and openings found at joints and where different materials abut each other (e.g. concrete/wood, etc.) shall be sealed with a caulking compound compatible with the substrate and primer/paint. The caulking shall be applied and allowed to set in accordance with the manufacturer's recommendations and instructions.

4. Mildew Removal: Remove all mildew and sterilize the surface to be painted using one of the following methods:

a. Apply a treatment solution composed of the following ingredients and in the noted proportions to the affected surface using a sponge of low-pressure sprayer:

2/3 cup TSP
One quart household bleach
3 quarts warm water

Note: Household bleach shall not be mixed with ammonia or any detergents or cleaners containing ammonia as this will create a poisonous gas.

Scrub the surface as necessary to completely remove the mildew.

b. Apply a commercial mildew treatment solution such as Purex, Jomax Remover or equal in strict accordance with the manufacturer's recommendations and instructions.

c. Following treatment, the surface shall be cleaned with potable water and allowed to thoroughly dry before priming, painting or the applying of sealing and caulking compounds.]

B. The Painting Contractor shall be wholly responsible for the finish of his work and shall not commence any part of it until surfaces are in proper condition. If Painting Contractor considers any surfaces unsuitable for proper finish of his work, he shall notify the Engineer of this fact in writing and he shall not apply any material until the unsuitable surfaces have been made satisfactory, or until the Engineer has instructed him to proceed. Major defects shall be restored by the proper trades. In

general, follow paint manufacturer's directions for surface preparation for the paint to be applied.

C. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.

D. Puttying of nail holes, cracks, and blemishes shall be done after priming coat has become hard and dry and before second coat is applied.

E. Concrete surfaces shall be wire brushed and cleaned to remove all dust and loose mortar.

F. Alkalinity and Moisture Testing of Cementitious Surfaces:

1. Prior to paint application, interior and exterior concrete and masonry scheduled to receive paint shall be tested to determine the alkalinity level of the surface. Testing shall be performed in strict accordance with the test kit manufacturer's instructions.

2. Perform alkalinity and moisture content tests of surfaces to be painted. Cementitious surfaces shall be cured for not less than 30 days prior to painting, but no less than 14 days and then only if the moisture meter tests indicated moisture of less than 17. Make surface moisture test by use of a commercially available moisture meter. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition as specified before application of paint. Efflorescence is caused on cementitious surfaces by moisture entering or contained in the substrate. Water-soluble salts are brought to the surface where the water evaporates, leaving a deposit of residual salts, a white, salty deposit. Here they carbonate and destroy the bond within the substrate components, causing the surface to crumble and break away.

3. Where the alkalinity level exceeds the resistance level of the primer proposed for use, the surface shall be neutralized (e.g. muriatic acid wash) as necessary to reduce the levels to within that acceptable by the primer and thoroughly rinsed with clean water.

G. Surfaces adjacent to areas being finished shall be protected and left clean of paints, stains, etc. Clean drop cloths shall be used until completion of job.

H. Unprimed galvanized metal shall be washed with a solution of chemical phosphoric

metal etch and allowed to dry.

I. Metal surfaces shall be made clean and free of any defects or condition that may produce unsatisfactory finish. Touch-up any chipped or abraded places on surfaces that have been shop coated with the proper primer.

J. Plywood and Wood Surfaces:

1. Surface Cleaning: Surfaces shall be free from dust and other deleterious substances and in a condition accepted by the Engineer prior to receiving paint or other finish. Do not use water to clean uncoated wood.

2. Knots and Resinous Wood: Prior to application of paint, treat knots and resinous wood with an application of surface sealer.

3. Open Joints and Other Openings: Fill with whiting putty. Sand smooth after putty has dried.

4. Checking: Where checking of the wood is present, sand the surface, wipe, and apply a coat of pigmented orange shellac. Allow to dry before paint is applied.

3.2 PAINT APPLICATION

A. General:

1. Apply coating materials in accordance with SSPC-PA 1. SSPC-PA 1 methods are applicable to all substrates, except as modified herein. Thoroughly work coating materials into joints, crevices, and open spaces. Touch-up damaged coatings before applying subsequent coats.

2. Work shall be done in a workmanlike manner by skilled and experienced mechanics and shall conform to the best painting practices.

3. Materials shall be applied in accordance with the manufacturer's specifications and the finished surfaces shall be free from runs, sags, drips, ridges, waves, laps, streaks, brush marks, and variations in color, texture, and finish (glossy or dull). The coverage shall be complete and each coat shall be so applied as to produce a film of uniform thickness. No paint, varnish or enamel shall be applied until the preceding coat is thoroughly dry and acceptance.

4. No exterior painting of unprotected surfaces shall be done in rainy, damp weather. Coats shall be applied only to surfaces that are thoroughly dry.

5. Interior areas shall be broom clean and dust free before and during the

application of coating material.

6. Mixing shall be done outside the building.

B. Application:

1. Paint application shall be by brush, roller, airless spray painting, or combination thereof or as required by manufacturer

2. Where airless spraying is provided, a nozzle of the proper size in accordance with the paint manufacturer's recommendations to properly apply the paint shall be used.

3. Spray painting method shall be used only under accepted conditions. Spraying shall be done only when there is no wind, or under very low wind velocity. When wind velocity increases, all spraying operation shall be stopped. Before start of spraying, all surfaces that do not require painting shall be completely masked and protected. Adequate drop cloths shall be provided over floors, adjacent sidewalks, and over all cars parked nearby that may be stained or damaged from the spray work.

4. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying. Provide each coat in specified condition to receive the next coat.

5. Primers and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by the manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover the surface of the preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.

6. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in selected colors.

C. Colors: Each coat shall be tinted a different shade from the preceding coat. Colors shall be in accordance with the color schedule on the drawings or as selected by the Engineer.

D. Finish Film Thickness: Apply primer, intermediate, and finish coats to not less than 1.5 mils dry film thickness, 4 mils wet unless recommended otherwise in writing by the manufacturer, for each coat and in accordance with the manufacturer's recommendations. Verify mil thickness by use of a suitable wet film gauge. Use a Tooke or other dry film gauge to test for total dry film thickness.

3.3 MISCELLANEOUS

A. Installation of Removed Items: After completion of final paint coat, removed items shall be reinstalled.

B. At the completion of other trades, touch-up damaged surfaces.

3.4 CLEAN-UP

A. During the progress of the work, all debris, empty crates, waste, drippings, etc., shall be removed by the Contractor and the grounds about the areas to be painted shall be left clean and orderly at the end of each work day.

B. Upon completion of the work, staging, scaffolding, containers, and all other debris shall be removed from the site. All paint, shellac, oil or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor) shall be removed and the entire job left clean and acceptable.

END OF SECTION

SECTION 13282

LEAD HAZARD CONTROL

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

Work shall consist of furnishing all labor, tools, materials, and equipment necessary and required to complete lead removal in place complete as indicated on the drawings and as specified herein.

1.2 SUMMARY

A. This Section specifies Contractor requirements when disturbing lead-containing paint (LCP) associated with the Kamuela Vacuum Cooling Plant, Food Safety Modernization Act Improvements (DOAH26A). Contractor shall refer to the survey data and verify the locations and quantities of LCP that will be disturbed as part of the planned improvements. Contractor shall ensure that employees and subcontractors involved in disturbing or removing hazardous materials have access to the survey report and the specifications, and understand and control lead hazards.

B. Contractor shall review the existing lead survey data provided as part of SECTION 01715 - EXISTING CONDITIONS - ASBESTOS/LEAD/HAZARDOUS MATERIAL SURVEY and verify the locations and quantities of LCP.

C. Lead-containing paints were identified in the project areas as follows:

Exterior;

Gray paint on metal bollards, 33,000 – 39,000 mg/kg

Beige paint on metal roofing system and walls, 130 – 150 mg/kg

Yellow paint on wood panel, 49 – 52 mg/kg

Light gray paint on concrete bollards and bollard bases, 89 mg/kg

Interior;

Light brown paint on metal beams and columns in the Main Room, 4,800 -5,700 mg/kg

Tan paint on metal doors and door frames in the Main Room, 220 mg/kg

Light green paint on metal beams and ceiling in the Main room, 76 -80 mg/kg

Beige paint on metal walls in the Main Room, 40 mg/kg

White paint on metal beams, ceilings, columns, and walls in Chilled Rooms 1 and 2, 40 – 46 mg/kg

1. For the purpose of this Section, all paints with measurable levels of lead are considered Lead-Containing Paint which shall be removed or disturbed in accordance with applicable rules and regulations.

2. Total Lead-Based Paint abatement is not anticipated; however, any loose and flaky paints shall be removed to prevent exposures to the site workers, staff, the public, and the environment.

D. Implement appropriate engineering controls and safety measures to prevent site workers, occupants, other trades, public, and environmental exposures to lead hazards.

E. Inform employees, subcontractors, and other persons conducting work for this project, that interior and exterior surfaces of existing buildings associated with this project have lead-containing paints. Initiate and maintain applicable programs necessary to execute the work in accordance with the contract documents, Federal, State, and local rules and regulations.

F. Contractor shall be responsible for ensuring that work generating lead containing debris conforms to the following applicable Federal, State and local rules and regulations.

1. Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health (HIOSH) rules.

2. Environmental Protection Agency (EPA) Toxic Substance Control Act (TSCA 40 CFR Part 745 Lead) Requirements for Lead-Based Paint Activities in Target Housing and Child Occupied Facilities, Lead Renovation, Repair and Painting Rule (RRP Rule), and National Emission Standards of Hazardous Air Pollutants (NESHAP).

3. EPA Resource Conservation and Recovery Act (RCRA) of 1976, amended in 1980 and 1984.

G. Initiate and maintain safety precautions and programs necessary to keep the work place safe for his/her employees and subcontractors.

H. For areas where paint is required to be removed from the substrate due to poor conditions, Conduct a representative sampling of the paint chip waste for TCLP test. Bid the project based on the assumption that disposal of this paint chip waste as hazardous waste is required. For unforeseen lead-containing paint, Contractor may be given equitable adjustment for the disposal cost only (testing cost will be in basic bid), as determined by the Engineer or Officer in Charge.

I. Costs incurred due to Contractor's inability to control hazards shall be borne solely by Contractor, including but not limited to, medical, legal, public and regulatory relations, investigation, clean-up, monitoring, and reporting.

1.3 COORDINATION WITH OTHER SECTION

Contractor shall refer to SECTION 13288 - TESTING/AIR MONITORING for requirements of work when disturbing hazardous materials.

1.4 LEAD-BASED PAINT FIELD TESTING

Contractor reserves the right to conduct existing paint testing for lead, utilizing X-Ray Fluorescence (XRF) analysis or Atomic Absorption Spectrophotometry Analysis (AAS).

1. Testing shall be conducted by an industrial hygienist, at the Contractor's expense.

2. Test results shall be presented to the Engineer or Officer in Charge for evaluation. Contractor's work practices, air monitoring and clearance requirements may be modified in accordance with paint test results.

1.5 SUBMITTALS

A. Contractor shall submit a Lead Hazard Control Plan 20 calendar days prior to lead disturbance work, including but not limited to:

1. A clear scope of work.

2. Description of methods to control lead hazards and dust.

3. A sketch of lead hazard control area and staging area for waste containers, equipment, and supplies.

4. Site Supervisor and/or Competent Person's name, contact number, and certifications.

5. Written Hazard Communication (HAZCOM) program, including worker training records.

6. Written Respiratory Protection Program

7. Medical surveillance records.

8. Written Emergency Procedures Plan.

9. Product specifications and safety data sheets (SDS).

Hazardous waste disposal plan

B. Within 10 days of waste disposal, Contractor shall submit the following:

1. A copy of the Hazardous Waste Disposal Log and the completed waste manifest.

2. Field records including daily field notes and photographs.

3. Sampling and analysis results.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Polyethylene Bags and Sheets: 6 mil minimum thickness in sizes required to accomplish the work.

B. Other Materials: Provide materials, such as, but not limited to, rags, lumber, plywood, fasteners, duct tape, and sealant which may be required to properly prepare and complete the work.

2.2 TOOLS AND EQUIPMENT

HEPA Vacuuming Equipment: Vacuuming equipment utilizing High Efficiency Particulate Air (HEPA) filters.

PART 3 – EXECUTION

3.1 PREPARATION PRIOR TO DISTURBANCE OF LEAD-CONTAINING PAINT

A. Document existing paint chips or debris prior to work (indoors and outdoors), as applicable.

1. If there are any paint chips or debris in the project area, pre-clean horizontal surfaces within the work area prior to disturbing existing LCP.

2. Treat paint chips or debris collected during pre-cleaning and during project related activities as lead-containing waste.

B. Minimize lead-containing dust during work performance using wet methods and equipment with HEPA collection devices. If visual inspection, air monitoring, or clearance by Competent Person, IH, or Engineer or Officer in Charge indicates that control measures are inadequate, Contractor shall stop work, clean up the affected area, and implement enhanced engineering controls at no additional cost to the Owner.

C. Establish a lead control area. Isolate and protect the portions of the area not within the scope of work using 6-mil polyethylene sheeting, or equivalent.

D. Pre-work Visual Inspection: Inspect the immediate project and adjacent areas for the presence of paint chips or debris and document the physical conditions with photographs and narratives. This documentation will serve as baseline conditions to which final visual clearance will be compared.

E. Demarcate the exterior lead control area using lead warning tape.

1. Lead warning tape shall be at least 20 feet away from the closest painted surface being disturbed.

2. Lead warning tape may be placed closer only if existing structural conditions prevent a 20-foot space between the lead warning tape and the working surface.

3. Place 6-mil polyethylene drop sheets around exterior surfaces.

4. Secure drop sheets so that wind, rain, or other forces will not dislodge the sheets.

5. Drop sheets shall extend horizontally, where applicable, at a distance sufficient to capture debris containing paint and substrates.

6. Drop sheets shall be periodically cleaned and kept free of debris. Any water captured by the drop sheet shall be contained and treated as lead-contaminated.

3.2 CONFORMANCE

Work shall be executed in accordance with the following:

A. Occupational Safety and Health Administration (OSHA) rules

1. Contractor shall ensure that work executed in this project is in accordance with the requirements of 29 CFR 1910.1025 and 29 CFR 1926.62.

2. Cost associated with the execution of work in accordance with these OSHA rules shall be the Contractor’s responsibility.

3. Negative exposure assessment, air monitoring and testing cost shall be borne by the Contractor.

B. EPA Toxic Substance Control Act (TSCA)

1. Contractor shall implement good housekeeping methods to confine the spread of airborne lead dust when conducting work on painted surfaces.

a. Doors and windows shall be closed and temporary barriers, using 6 mil polyethylene sheeting, will be set up to minimize the spread of wind blown dust.

b. Minimum 6 mil polyethylene shall be place on the floors and walls, minimum 10-feet on each side of where disturbance is anticipated.

2. At the end of each work day, Contractor shall remove visible debris and dust, HEPA vacuum, and wet-wipe below and around existing horizontal and vertical surfaces where disturbance of hazardous material was conducted.

3. As applicable, carpeted areas shall be lined with 6 mil polyethylene sheeting prior to the start of work and HEPA vacuumed after completion.

C. EPA Resource Conservation and Recovery Act (RCRA) of 1976, amended in 1980 and 1984.

1. The project site may fall into the category of Conditionally Exempt Small Quantity Generator (CESQG) if the facility generates less than 100 kilograms/month or 220 pounds/month of hazardous waste. Contractor shall be responsible for the completion of the Hazardous Waste Disposal Log provided in Appendix A of this Section.

2. Under the requirements for a CESQG, the generator:

a. Must identify painted surfaces with LCP or assumed LCP, and the hazardous waste or acute hazardous waste generated at each site.

b. Not store more than 1,000 kg or 2,200 pounds of hazardous waste, or assumed hazardous waste, at each site at any time.

c. Can dispose of the waste in a municipal solid waste (MSW) landfill provided that Toxicity Characteristic Leaching Procedure (TCLP) results meet the landfill criteria, 5.0 milligrams per liter (mg/L) lead and 1.0 mg/L cadmium.

d. Must dispose of the waste material at an EPA approved landfill off-island that accepts such waste if the TCLP results indicate that the material is hazardous waste (at or above 5.0 mg/L lead or 1.0 mg/L cadmium).

3. Treatment of Assumed to be Lead-Containing Debris:

a. Debris resulting from Contractor's work, such as cutting, scrapping, drilling, coring, chipping, or sanding, of known or assumed LCP surfaces, shall be segregated from the rest of the construction debris.

b. Hazardous waste and assumed to be hazardous waste amounts exceeding the CESQG limit shall follow RCRA regulations for Small Quantity Generator or Large Quantity Generator.

4. Disposal of Lead-Containing Paint Debris:

a. LCP or assumed LCP debris generated by the Contractor must conform to the requirements of 3.15 of this section.

(1) Paint debris with TCLP lead concentration below 5.0 mg/L and TCLP cadmium below 1.0 mg/L may be disposed of at a municipal solid waste landfill that accepts such waste.

(2) Disposal of this demolition debris on private land is prohibited, unless it is permitted by the State and the EPA.

(3) Paint debris with TCLP lead and cadmium concentrations at or above 5.0 mg/L and 1.0 mg/L, respectively, must be disposed of as hazardous waste at an EPA-approved landfill off-island that accepts such waste.

b. Accumulation and mixing of hazardous waste of one generator (facility) with that of another generator is prohibited.

c. Disposal shall be in accordance with the permit requirements of the Municipal Solid Waste Landfill.

d. Contractor shall be responsible for costs related to the disposal of assumed LCP debris and hazardous paint chip waste.

3.3 ACTIVITIES DISTURBING LEAD-CONTAINING PAINT

A. Conduct LCP surface preparation as required for this project, and minimize lead-containing dust using wet methods and HEPA equipment. If visual inspection indicates control measures are inadequate, the Competent Person must stop work, notify Engineer or Officer in Charge, conduct clean-up, and implement enhanced engineering controls immediately at no additional cost to the Owner.

B. Do not execute dry removal or dry sweeping. Waste or paint debris generated during removal shall be promptly staged or packaged, and shall not accumulate uncontrolled at any time. Lead-containing waste shall be properly marked and stored in secure containers appropriate for storing lead-containing waste.

C. Do not allow lead-containing waste to be stored outside of the lead control area, in a high traffic unsecured area, or where the waste could interact with rain or wind and create a secondary hazard or contamination.

3.4 LEAD CONCENTRATIONS IN THE WORK AREA

A. Maximum permissible exposure to airborne concentrations of lead within the project area shall be 30 micrograms per cubic meter ($\mu g/m^3$) air. Stop work whenever this limit exceeded, and Competent Person shall remedy the condition prior to commencing work.

B. Instruct and train each worker in proper respiratory use.

1. Require that each worker always wear a respirator, properly fitted on the face, in the work area from the start of any operations which may cause airborne lead dust until the work area passes the required clearance.

2. Use respiratory protection appropriate for the lead dust levels encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

C. Air Purifying Respirators

Provide half-face or full-face type respirators.

1. Filter Cartridges: Provide, at a minimum, HEPA type filters labeled with the National Institute for Occupational Safety and Health (NIOSH) Certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos-Containing Dusts and Mists" and color coded in accordance with ANSI Z228.2. In addition, a chemical cartridge section may be added.

2. Non-Permitted Respirators: Do not use single use, disposable or quarter-face respirators.

3. Require that respiratory protection be used whenever there is any possibility of LCP disturbance, intentional or accidental.

4. Require that a respirator be worn by anyone in a lead control area at all times when LCP is disturbed.

5. Regardless of Lead-Containing Dust Levels: Require that the minimum level of respiratory protection used be half-face air-purifying respirators with HEPA filters.

D. Fit Testing

1. Initial Fitting: Provide initial fitting of respirators during a respiratory protection training. Fit types of respirator to be actually worn by each individual. Allow an individual to use only those respirators for which training and fit testing have been provided.

2. On an Annual Basis: Check the fit of each worker's respirator using irritant smoke. Valid fit test certificates shall be included in the Lead Hazard Control Plan which shall be maintained onsite.

3. Upon Each Wearing: Require that each time an air purifying respirator is donned, it will be checked for proper fitting with a positive and negative pressure seal checks in accordance with the manufacturer's instructions or ANSI Z88.2 (2015).

E. Type of Respiratory Protection Required

1. Provide respiratory protection as appropriate. Higher levels of protection may be provided as determined by Competent Person or workers themselves. Determine the proper level of protection by dividing the expected or actual airborne lead dust levels in the work area by the "protection factors" given below.

2. Consider the following unless air monitoring results indicate greater protection is necessary. Refer to the Protection Factors table for choice of respirators.

a. Loose equipment cleaning prior to removal in uncontaminated area: Half-face dual cartridge-type respirator.

b. Plastic installation which does not disturb LCP: Half-face dual cartridge-type respirator.

c. Removing or cleaning items or plastic installation when such operation may disturb lead paints or lead dust: Half-face dual cartridge-type respirator.

F. Areas: Contractor’s Competent Person and IH shall frequently inspect the controlled areas and adjacent areas. Contractor activities shall not adversely impact the indoors or outdoors air and horizontal surfaces and ground of the project site.

3.5 STOP ACTION LEVELS

A. Inside Work Area: Maintain airborne levels in the work area of less than the Stop Action Level given below for the type of respiratory protection in use.

B. If the lead dust levels rise above this figure for any sample taken, enhance work procedures to lower ambient dust levels.

C. If lead dust levels for any work shift or 8-hour period exceeds the Stop Action Level, stop work except corrective action, and the Competent Person shall notify Engineer or Officer in Charge. After correcting the cause of lead dust levels, recommence work only after approval by the Competent Person. Competent Person shall document all decisions and follow-up actions and include them in the closeout report.

3.6 PROTECTIVE CLOTHING

Furnish personnel exposed to lead-containing dust with disposable protective whole body clothing, head covering, gloves, and foot coverings. Furnish disposable plastic or rubber gloves to protect hands from lead.

PROTECTION FACTORS

RESPIRATOR TYPE	PROTECTION FACTOR
Air purifying: Negative pressure respirator HEPA filter Half facepiece	Up to 500 $\mu g/m^3$
Powered-air purifying respirator (PAPR): Negative pressure respirator HEPA filter Full facepiece	Up to 2,500 $\mu g/m^3$
PAPR Positive pressure respirator HEPA filter Half or full facepiece or Type C supplied air: Positive pressure respirator Continuous-flow half or full facepiece	Up to 5,000 $\mu g/m^3$

3.7 WARNING SIGNS AND LABELS

A. Provide warning signs at approaches to the lead control areas.

B. Locate signs at such a distance that personnel may read the sign and take necessary precautions before entering the area

C. Provide and affix labels to impermeable bags, lead waste drums, and other containers containing lead materials, scrap, waste, or debris.

D. Signs and labels shall comply with the requirements of 29 CFR 1910.1025.

3.8 TOOLS

Filters on vacuums and exhaust equipment shall be absolute HEPA filters and UL 586 labeled.

3.9 AIR MONITORING

A. Employee Monitoring: Contractor's Competent Person shall monitor employees' exposure to lead in accordance with OSHA requirements.

1. Contractor shall collect air samples from employees' breathing zones during each shift, for the duration of the LCP-disturbing work.

2. Contractor shall collect samples from at least 25% of workers conducting LCP-disturbing tasks, and not less than two workers.

B. Environmental Sampling During Paint Removal Work. An independent Industrial Hygienist (IH) retained by the Contractor will conduct area air sampling daily, on each shift.

1. Sufficient area monitoring shall be conducted to verify unprotected personnel are not exposed at or above the action level, 30 micrograms per cubic meter air.

2. If action level is reached, stop work and correct conditions causing the elevated airborne lead dust levels. Resume only after approval of the IH.

3. Cost of retesting due to Contractor's inability to control lead dust shall be borne by Contractor.

4. For outdoor operations, IH shall determine the location and number of samples to be taken.

Work area and Adjacent:

LEAD

STOP ACTION LEVEL ($\mu g/m^3$)	RESPIRATOR REQUIRED	PROTECTION FACTOR
50	Half-face APR	10
5,000	PAPR or Type C, Continuous flow	100
50,000	Type C, Pressure demand	1,000

C. If the high lead air concentrations were the result of Contractor's failure of work area isolation measures, initiate the following actions:

1. Decontaminate the affected area(s).

2. Require that respiratory protection be worn in affected area until the area is cleared.

D. If the high reading was the result of other causes, initiate corrective action as determined by the IH.

E. Effect on Contract Sum. Complete corrective work with no change in the Contract Sum if lead-containing dust levels exceeding 30 $\mu g/m^3$ were caused by Contractor's activities. Costs involving delay, re-cleaning, additional lead air monitoring and quality control, investigation, and reporting shall be borne by Contractor.

3.10 ANALYTICAL METHODS

A. NIOSH 7082 method shall be used in analyzing air samples. Filters used shall be in accordance with the referenced method.

B. NIOSH 9100 method shall be used in analyzing lead wipe samples.

3.11 AIR SAMPLE MEDIA

Lead Sample Cassettes. Air samples will be collected on 37 millimeter (mm) cassettes with 50 mm extension cowl with 0.8 micrometer cellulose ester membrane.

3.12 LABORATORY TESTING

A. Services of a testing laboratory shall be employed by the IH. Lead air sample results will be made available within 48 hours upon receipt of laboratory analytical results.

B. Engineer or Officer in Charge will have access to air monitoring tests and clearance results.

3.13 CLEAN UP

A. Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Prevent the spread of dust and debris; keep waste from being distributed over the general project area.

1. Do not dry sweep the area.

2. When the paint removal, demolition, or renovation is completed:

a. Clean visible lead paint contamination by vacuuming with a HEPA vacuum followed by wet mopping and wiping.

b. Contractor shall certify that the work was completed in accordance with OSHA 29 CFR 1910.1025, HUD 24 CFR 35, and EPA 40 CFR 745, and that there are no visible accumulations of lead-containing paint and dust in the project areas.

c. Competent Person and IH shall visually inspect the affected surfaces for residual lead paint chips and accumulated lead-containing dust after the work is completed.

d. Contractor shall re-clean areas showing lead-containing dust or residual lead paint chips to the Engineer or Officer in Charge's satisfaction.

B. Contractor is responsible for the restoration and cleaning of any areas outside the work area impacted by or contaminated by lead-containing dust or debris generated by the Contractor's work, such as removal, handling, or storage of lead-containing waste. Contractor shall perform remedial cleaning and restoration of these areas, if any, at no additional cost to the Owner.

3.14 CLEARANCE

Visual Clearance:

1. Pre-demolition inspection shall be conducted jointly by the Competent Person and the IH after painted surface treatment and prior to demolition of structures. Clearance will be granted when the Competent Person and IH agree that the subsequent demolition will generate no visible emission.

2. Final visual inspection shall be conducted by the Competent Person and the IH after demolition is completed and all debris is removed offsite. No visible paint chips or debris with paints shall remain.

3.15 DISPOSAL

A. Landfill may require characterization of the waste generated during the removal work, where a representative sample is analyzed for Toxicity Characteristic Leaching Procedure (TCLP) analysis.

1. If analytical result indicates the TCLP level is below the EPA guideline or within the landfill acceptance criteria, the waste generated from the project can be disposed of as general construction and demolition (C&D) debris.

2. If the TCLP test fails or the result exceeds the landfill acceptance criteria, the waste shall be treated as hazardous waste and be disposed of in a Resource Conservation Recovery Act (RCRA) permitted landfill. Contractor shall contact Engineer or Officer in Charge for EPA ID number.

B. Engineer or Officer in Charge will review for equitable adjustment of contract amount upon evaluation and acceptance of the TCLP results to determine the hazard characteristics. If the waste is determined to be RCRA hazardous waste, the waste shall be disposed of at an off-island EPA-approved facility.

C. Contractor shall submit a copy of the TCLP analytical results to Engineer or Officer in Charge prior to request for EPA ID number. Hazardous Waste Manifest and Landfill Receipt shall be submitted prior to the final billing.

3.16 GENERAL

A. Waste is to be hauled by a waste hauler with required licenses from State and local authority with jurisdiction.

B. Protect interior of truck or dumpster with Critical and Primary Barriers.

C. Carefully load containerized or bagged waste in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to ensure that no unauthorized persons have access to the material. If required by DOT, vehicles shall be placarded with Department of Transportation labels.

D. Do not store containerized or bagged waste outside of the work area. Take containers from the work area directly to a sealed truck or dumpster.

E. Do not transport lead waste materials on open trucks. If waste material is to be transported in drums, label drums with the same warning labels as the bags.

F. Coordinate with landfills in advance of transport and of the quantity of material to be delivered.

G. After completion of hauling and disposal of demolition waste and paint waste, if separated, submit a copy of waste manifest, chain of custody form (if applicable), and waste storage facility receipt to Engineer or Officer in Charge. Final contract payment shall not be made until completed disposal documents are submitted.

3.17 RECORDKEEPING

A. Complete and submit a copy of the Project Hazardous Waste Log to the Engineer or Officer in Charge. See Appendix B of this Section.

B. Maintain accurate documentation of the site activities. Be prepared at all times to present real time information upon regulators' visits.

C. Contractor's Competent Person shall be onsite at all times.

3.18 MEASUREMENT AND PAYMENT

Except for the hazardous waste as indicated in Part 3.15, work performed under this Section shall not be measured or paid for separately, but shall be considered incidental to the lump sum price bid for the item of which it is a part in the Bid Schedule.

APPENDIX A

HAZARDOUS WASTE DISPOSAL LOG

(NAME OF PROJECT)
Street Address
City, State, Zip Code

YEAR	DESCRIPTION OF HAZARDOUS WASTE	APPROXIMATE WEIGHT IN POUNDS	SPECIAL HANDLING
JANUARY			
FEBRUARY			
MARCH			
APRIL			
MAY			
JUNE			
JULY			
AUGUST			
SEPTEMBER			
OCTOBER			
NOVEMBER			
DECEMBER			

_____
By Signature

_____
Print Name

APPENDIX B

PROJECT HAZARDOUS WASTE LOG
(Contractor to complete one per facility site)

PROJECT: _____
DOA JOB NO. _____
START DATE: _____ COMPLETION DATE: _____
GENERAL CONTRACTOR: _____
ADDRESS: _____
_____
TELEPHONE: _____ FAX NUMBER: _____
NAME OF SUPERINTENDENT FOR THIS PROJECT: _____

NAME OF GENERATOR (FACILITY): _____
ADDRESS: _____
_____
TELEPHONE: _____ FAX NUMBER: _____
DESCRIPTION OF HAZARDOUS WASTE: _____
APPROXIMATE WEIGHT (IN POUNDS): _____
MONTHLY DISPOSAL LOG:
MONTH: _____ WEIGHT IN POUNDS: _____
MONTH: _____ WEIGHT IN POUNDS: _____
MONTH: _____ WEIGHT IN POUNDS: _____
DISPOSAL SITE: _____

CONTRACTOR DISPOSING OF HAZARDOUS WASTE: _____
ADDRESS: _____
_____
TELEPHONE: _____ FAX NUMBER: _____

DISPOSAL CONTRACTOR IS A (CHECK ONE OF THE FOLLOWING):

CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR ☐☐

SMALL GENERATOR ☐☐

LARGE GENERATOR ☐☐

_____

APPROVAL:

STATE DESIGNATED COMPETENT PERSON: _____
COMPANY: _____
ADDRESS: _____
_____

TELEPHONE NUMBER: _____

_____ _____
SIGNATURE DATE

END OF SECTION

SECTION 13286

LIGHT BALLASTS AND LAMPS CONTAINING PCBs AND MERCURY

PART 1 – GENERAL

1.1 GENERAL CONDITIONS

Work shall consist of furnishing all labor, tools, materials and equipment necessary and required to remove and dispose of Polychlorinated Biphenyls (PCBs) and mercury-containing electrical components as indicated on the drawings and as specified herein.

1.2 SUMMARY

This Section specifies Contractor requirements when disturbing lead-containing paint (LCP) associated with the Kamuela Vacuum Cooling Plant, Food Safety Modernization Act Improvements (DOAH26A). Contractor shall refer to the survey data and verify the locations and quantities of PCB and mercury that will be disturbed as part of the planned demolition. Contractor shall ensure that employees and subcontractors involved in disturbing or removing hazardous materials have access to the survey report and the specifications, and understand and control PCB and mercury hazards.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR 1910.1000 Air Contaminants

B. U. S. Environmental Protection Agency (EPA):

1. 40 CFR 260 Hazardous Waste Management System, General
2. 40 CFR 261 Identification and Listing of Hazardous Waste
3. 40 CFR 262 Standards Applicable to Generators of Hazardous Waste
4. 40 CFR 263 Standards Applicable to Transporters of Hazardous Waste
5. 40 CFR 264 Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
6. 40 CFR 265 Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
7. 40 CFR 268 Land Disposal Restrictions

8. 40 CFR 270 EPA Administered Permit Programs: The Hazardous Waste Permit Program

9. 40 CFR 273 Standards for Universal Waste Management

10. 40 CFR 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

11. 40 CFR 178 Specifications for Packagings

C. State Requirements: State requirements which govern hauling and disposal of hazardous waste materials include but are not limited to the following:

HIOSH - Toxic Materials and Harmful Physical Agents - Title 12, Subtitle 8, Chapter 202

D. Local Requirements: Comply with local requirements which govern hauling and disposal of hazardous waste and universal waste.

1.4 DEFINITIONS

A. Industrial Hygienist (IH): A certified industrial hygienist or industrial hygienist retained by the Contractor who has minimum of five years of experience in hazardous materials and hazardous wastes. The IH shall possess minimum Bachelor's Degree in public health, natural science, engineering, or related fields.

B. Leak: Leak or leaking means any instance in which a PCB article, PCB container, or PCB equipment has any PCBs on any portion of its external surface.

C. Lamps: Lamp, also referred to as "universal waste lamp," is defined as the bulb or tube portion of an electric lighting devise. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infra-red regions of the electromagnetic spectrum. Examples of common universal waste electric lamps include, but are not limited to, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium, and metal halide lamps.

D. Polychlorinated Biphenyls (PCBs): PCBs as used in this Section shall mean the same as PCBs, PCB containing light ballasts, and PCB container, as defined in 40 CFR 761, Section 3, Definitions.

E. Spill: Spill means both intentional and unintentional spills, leaks, and other uncontrolled discharges when the release results in any quantity of PCBs running off or about to run off the external surface of the equipment or other PCB source, as well as the contamination resulting from those releases.

F. Universal Waste: Universal Waste means any of the following hazardous wastes that are managed under the universal waste requirements 40 CFR 273:

1. Batteries as described in Sec. 273.2

2. Pesticides as described in Sec. 273.3

3. Thermostats as described in Sec. 273.4

4. Lamps as described in Sec. 273.5

1.5 QUALITY ASSURANCE

A. Regulatory Requirements. Perform PCB related work in accordance with 40 CFR 761. Perform mercury-containing lamps storage and transport in accordance with 40 CFR 261, 40 CFR 264, 40 CFR 265, and 40 CFR 273.

B. Training. Certified industrial hygienist or industrial hygienist shall instruct and certify the training of all persons involved in the removal of PCB containing light ballasts and mercury-containing lamps. The instruction shall include: the dangers of PCB and mercury exposure, decontamination, safe work practices, and applicable OSHA and EPA regulations. The trainer shall review and approve the PCB and Mercury-Containing Lamp Removal Work Plan.

C. Regulation Documents. Maintain at all times one copy each at the office and one copy each at the jobsite of 29 CFR 1910.1000, 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 265, 40 CFR 268, 40 CFR 270, and 40 CFR 273 and of the Contractor removal work plan and disposal plan for PCB and for associated mercury-containing lamps.

1.6 SUBMITTALS

A. Documents

1. Qualification of the Contractor’s Competent Person. Submit the name, address, telephone number, and a qualification statement of the Competent Person selected to perform the duties onsite.

2. Training certifications for workers.

3. PCB and Lamp Removal Work Plan. Submit a job-specific plan minimum 20 calendar days prior to the pre-construction meeting of the work procedures to be used in the removal, packaging, and storage of PCB-containing light ballasts and associated mercury-containing lamps and switches. Include in the plan: requirements for personal protective equipment (PPE), spill cleanup procedures and equipment, eating, smoking and restroom procedures. The Plan shall be

approved and signed by the IH. Obtain approval of the plan by the Engineer or Officer in Charge prior to the start of PCB and/or lamp removal work.

4. PCB and Lamp Disposal Plan. Submit a PCB and lamp disposal plan minimum 20 calendar days prior to the pre-construction meeting. The Disposal Plan shall comply with applicable requirements of federal, state, and local PCB and Universal waste regulations and address the following:

   a. Estimated quantities of wastes to be generated, disposed of, and recycled.

   b. Names and qualifications of each Contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location. Furnish two copies of EPA and state PCB and mercury-containing lamp waste permit applications and EPA identification numbers, as required.

   c. Names and qualifications (experience and training) of personnel who will be working onsite with PCB and mercury-containing lamp wastes.

   d. Spill prevention, containment, and cleanup contingency measures to be implemented.

   e. Work plan and schedule for PCB and mercury-containing lamp waste removal, containment, storage, transportation, disposal and/or recycling. Wates shall be cleaned up and containerize daily.

B. Closeout Submittals

1. Notification to EPA of PCB waste activities and EPA ID numbers

2. Transporter certification

3. Certificate of Disposal and/or Recycling

4. Testing results

1.7 PERSONAL PROTECTION REQUIREMENTS

A. Use special clothing

1. Disposable gloves (polyethylene)

2. Eye protection

3. Personal protective equipment

B. Spill response kit (refer to paragraphs under 3.03)

1. Absorbent pads and rags

2. Waste containers

3. Fans (in case of mercury vapor spill)

1.8 SCHEDULING

Contractor shall notify the Engineer or Officer in Charge 20 days prior to the start of PCB and mercury- containing lamp removal work.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

3.1 WORK PROCEDURE

Furnish labor, materials, services, and equipment necessary for the removal of PCB containing light ballasts, associated mercury-containing fluorescent lamps or high intensity discharge (HID) lamps in accordance with local, state, or federal regulations. Do not expose PCBs to open flames or other high temperature sources since toxic decomposition by-products may be produced. Do not damage mercury containing fluorescent lamps or HID lamps.

3.2 WORK OPERATIONS

Ensure that work operations or processes involving PCB or PCB-contaminated materials are conducted in accordance with 40 CFR 761, 40 CFR 262, 40 CFR 263, and the applicable requirements of this section, including but not limited to:

A. Obtaining suitable PCB and mercury-containing lamp storage sites.

B. Notifying Engineer or Officer in Charge prior to commencing the operations.

C. Reporting leaks and spills to the Engineer or Officer in Charge.

D. Cleaning up spills.

E. Inspecting PCB and PCB-contaminated items and waste containers for leaks and forwarding copies of inspection reports to the Engineer or Officer in Charge.

F. Maintaining inspection, inventory, and spill records.

3.3 PCB SPILL CLEANUP REQUIREMENTS

A. PCB Spills. Immediately report to the Engineer or Officer in Charge any PCB spills.

B. PCB Spill Control Area. Rope off an area around the edges of a PCB leak or spill and post a “PCB Spill - Authorized Personnel Only” caution sign. Immediately transfer leaking items to a drip pan or other container.

C. PCB Spill Cleanup. 40 CFR 761, subpart G. Initiate cleanup of spills as soon possible, but no later than 24 hours of its discovery. Mop up the liquid with rags or other conventional absorbent. The spent absorbent shall be properly contained and disposed of as solid PCB wastes.

D. Records and Certification. Document the cleanup with records of decontamination in accordance with 40 CFR 761, Section 125, Requirements for PCB Spill Cleanup. Provide test results of cleanup and certification of decontamination.

3.4 REMOVAL

A. Ballasts. As ballasts removed from the lighting fixture, inspect label on ballast. Ballasts without a “No PCB” label shall be assumed to contain PCBs and containerized and disposed of as required under paragraphs 3.05 STORAGE FOR DISPOSAL and 3.07 DISPOSAL.

B. Lighting Lamps. Remove lighting tubes/lamps from the lighting fixtures and carefully place (unbroken) into appropriate containers (original transport boxes or equivalent). In the event of a lighting tube/lamp breaking, sweep and place waste in double plastic taped bags and dispose of as universal waste as specified herein.

3.5 STORAGE FOR DISPOSAL

A. Storage Containers for PCBs. In accordance with 49 CFR 178, store PCB in containers approved by U.S. Department of Transportation (DOT) for PCB.

B. Storage Containers for lamps. Store mercury containing lamps in appropriate DOT containers. The boxes shall be stored and labeled for transport in accordance with 40 CFR 273.

3.6 LABELING OF WASTE CONTAINERS

A. Indicate on containers the date the item was placed in storage and the name of the cognizant activity/building.

B. Affix labels to PCB waste container, “Caution - Contains PCB,” conforming to 40 CFR 761, Subpart C.

C. Label mercury-containing lamp waste in accordance with 40 CFR 273.

3.7 DISPOSAL

Dispose of the regulated wastes in accordance with EPA, DOT, and local regulations at a permitted site.

A. Identification Number. Federal regulations 40 CFR 761 and 40 CFR 263 require that generators, transporters, commercial storers, and disposers of PCB waste posses EPA identification numbers. The Contractor shall verify that the activity has an EPA generator identification number for use on the Uniform Hazardous Waste manifest. If not, the Contractor shall advise the Engineer or Officer in Charge that it must file and obtain an I.D. number with EPA prior to commencement of removal work.

B. For mercury containing lamp removal, Federal regulations 40 CFR 273 require that large quantity handlers of Universal Waste (LQHUW) must provide notification of universal waste management to the EPA (or state director in authorized states), obtain an EPA identification number, and retain for three years records of off-site shipments of universal waste. The Contractor shall verify that the Engineer or Officer in Charge has an EPA generator identification number for use on the Universal Waste manifest. If not, the Contractor shall advise the Engineer or Officer in Charge that it must file and obtain an I.D. number with EPA prior to commencement of removal work.

C. Transporter Certifications. Comply with disposal and transportation requirements outlined in 40 CFR 761 and 40 CFR 263. Before transporting the PCB waste, sign and date the manifest acknowledging acceptance of the PCB waste from the State. Return a signed copy to the Engineer or Officer in Charge before leaving the job site. Ensure that the manifest accompanies the PCB waste at all times. Submit transporter certification of notification to EPA of their PCB waste activities (EPA Form 7710-53).

D. Certificate of Disposal and/or Recycling. According to 40 CFR 761, certificate for the PCBs and PCB items disposed shall include:

1. The identity of the disposal and/or recycling facility, by name, address, and EPA identification number.

2. The identity of the PCB waste affected by the Certificate of Disposal including reference to the manifest number for the shipment.

3. A statement certifying the fact of disposal and/or recycling of the identified PCB waste, including the date(s) of disposal, and identifying the disposal process used.

4. A certification as defined in 40 CFR 761.

3.8 MEASUREMENT AND PAYMENT

Work performed under this Section shall not be measured or paid for separately, but shall be considered incidental to the lump sum price bid for the item of which it is a part in the Bid Schedule.

APPENDIX A

HAZARDOUS WASTE DISPOSAL LOG

(NAME OF PROJECT)
Street Address
City, State, Zip Code

YEAR	DESCRIPTION OF HAZARDOUS WASTE	APPROXIMATE WEIGHT IN POUNDS	SPECIAL HANDLING
JANUARY			
FEBRUARY			
MARCH			
APRIL			
MAY			
JUNE			
JULY			
AUGUST			
SEPTEMBER			
OCTOBER			
NOVEMBER			
DECEMBER			

_____
By Signature

_____
Print Name

APPENDIX B

PROJECT HAZARDOUS WASTE LOG
(Contractor to complete one per site)

PROJECT: _____
DOA JOB NO. _____
START DATE: _____ COMPLETION DATE: _____
GENERAL CONTRACTOR: _____
ADDRESS: _____
_____
TELEPHONE: _____ FAX NUMBER: _____
NAME OF SUPERINTENDENT FOR THIS PROJECT: _____

NAME OF GENERATOR (Facility): _____
ADDRESS: _____
_____
TELEPHONE: _____ FAX NUMBER: _____
DESCRIPTION OF HAZARDOUS WASTE: _____
APPROXIMATE WEIGHT (IN POUNDS): _____
MONTHLY DISPOSAL LOG:
MONTH: _____ WEIGHT IN POUNDS: _____
MONTH: _____ WEIGHT IN POUNDS: _____
MONTH: _____ WEIGHT IN POUNDS: _____
DISPOSAL SITE: _____

CONTRACTOR DISPOSING OF HAZARDOUS WASTE: _____
ADDRESS: _____
_____
TELEPHONE: _____ FAX NUMBER: _____

DISPOSAL CONTRACTOR IS A (CHECK ONE OF THE FOLLOWING):

CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR

SMALL GENERATOR

LARGE GENERATOR

APPROVAL:

STATE DESIGNATED COMPETENT PERSON: _____
COMPANY: _____
ADDRESS: _____
_____
TELEPHONE NUMBER: _____

SIGNATURE	DATE

END OF SECTION

SECTION 13288

TESTING/AIR MONITORING

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

Work shall consist of furnishing all labor, tools, materials, and equipment necessary and required to complete asbestos removal in place complete as indicated on the drawings and as specified herein.

1.2 SUMMARY

A. This Section describes Contractor's responsibility for compliance while conducting work which disturbs asbestos-containing material and lead-containing paint (LCP). Related sections are:

SECTION 13283 – LEAD HAZARD CONTROL for requirements of work which disturbs lead-containing paint.

B. Implement appropriate engineering controls and safety measures to prevent student, staff, site workers, occupants, other trades, the public, and the environment from exposure to hazardous materials.

C. Costs incurred due to Contractor inability to control hazards shall be borne by Contractor, including but not limited to, investigations, medical, legal, regulatory and public relations, clean-up, monitoring, and reporting.

D. An independent industrial hygiene (IH) firm, retained by the Contractor, will conduct the monitoring during the Contractor's work which disturbs LCP. IH firm shall have no affiliation with Abatement Contractor.

1.3 REQUIREMENTS

Testing and workers' breathing zone monitoring shall be conducted by the Contractor for the purpose of:

A. Verifying compliance with the applicable codes, regulations and laws regarding LCP abatement.

B. Ensuring that the legally-required documentation is collected in a timely manner.

C. Providing engineering controls during project.

1.4 TESTING/ AIR MONITORING/ INDUSTRIAL HYGIENE SUPERVISION AND AIR MONITORING

A. Industrial hygiene supervision and boundary air monitoring shall be performed by an independent IH firm retained by the Contractor. The laboratory used for sample analysis shall be proficient in:

1. The National Lead Laboratory Accreditation Program (NLLAP) for lead analysis.

B. Air monitoring and project supervision will be conducted under the direction of an Industrial Hygienist (IH) who has minimum 5 years of experience in hazard abatement project management. On-site monitoring may be conducted by a competent and qualified IH Technician with a minimum of 2 years of experience in hazardous material abatement, provided activities are conducted under the supervision of the IH.

C. Aforementioned air monitoring and project supervision shall not remove the Contractor's responsibility for his/her worker protection and required documentations.

1.5 COORDINATION WITH OTHER SECTIONS

Testing and monitoring requirements included in the scope of work for any testing/air monitoring consultants or inspectors shall be coordinated with:

SECTION 13282 – LEAD HAZARD CONTROL.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

3.1 COMPETENT PERSON RESPONSIBILITIES

A. Contractor's Competent Person shall prepare, a Lead Hazard Control Plan per Section 13282 Paragraph 1.04 B. State and training certifications shall be valid and reflect the anticipated workers on site.

B. If required by the landfill, Competent Person shall provide proof of waste characterization and disposal documents. In the event that the waste is determined to be hazardous, inform Engineer or Officer in Charge, obtain EPA ID number, and request equitable adjustment to the contract.

C. Refer to Section 13282 and part 3.03, below, for additional responsibilities.

3.2 CONTRCTOR RESPONSIBILITIES

A. Submit complete work plans for review and concurrence by the Engineer or Officer in Charge. Refer to Sections 13282 for requirements of the work plan.

B. Maintain worker monitoring and necessary records for the Contractor's employees as required by OSHA (29 CFR 1926.58), Hawaii Administrative Rules, and other applicable laws.

C. Obtain legally required documentation for air monitoring and submit a written respiratory protection program as part of the contract.

D. Costs involving investigations, air monitoring, legal, medical, regulatory and public relations, testing, and reporting due to Contractor inability to control hazards shall be borne by Contractor, and shall be deducted from the final contract payment.

E. Accommodate additional testing performed by the IH; however, this shall not remove Contractor's responsibility of monitoring required by law and contract specifications.

F. For final cleanup and decontamination following gross removal, remove the final polyethylene sheeting, or drop cloth, but leave the coverings for critical barriers, such as doors, windows, air ducts, etc., until successful clearance is obtained.

G. Lead Clearance by visual inspection, lead wipes, and soil testing

1. IH retained by the Contractor and the Contractor's Competent Person shall conduct visual inspection.

2. No visible emissions of lead paint debris or dust.

3. Interior lead wipe samples shall be collected from interior spaces affected by the work. Wipe samples shall be conducted as follows:

   a. Take one lead dust wipe sample from the floor or horizontal surface. Lead dust wipe sample results shall be less than 10 micrograms per square foot ($\mu g/ft^2$).

   b. Take one lead dust wipe sample on an interior window sill. Lead dust wipe sample results for sill shall be less than 100 $\mu g/ft^2$.

   c. If there is a porch associated, take one lead dust wipe sample from the porch floor. The results shall be less than 40 $\mu g/ft^2$.

   d. Clearance sample results will be obtained within 24 to 48 hours.

4. The IH will collect and analyze the surface soil samples in four decision units and compare the results against the baseline surface January 2017 soil data.

3.3 MONITORING AND INSPECTION BY COMPETENT PERSON

A. Duties of the Competent Person

1. Photographic Record of Project: Record work with representative photos. Photos shall become the property of the State and are to be accompanied by a detailed log.

2. Project Log: Competent Person shall be on site at all times and maintain daily field logs detailing key activities during LCP-related work and submit a summary of project activities to Engineer or Officer in Charge within 10 days of completion for each campus. Incorporate daily field reports with other project data into a final closeout report.

3. Visual Inspection of Controlled Areas: Conduct inspections of controlled areas, during the actual work performance, to document the work practices employed. Verify that scheduled abatement or mitigation work is completed, and the area was properly and promptly cleaned and ready for other trades involved in the project.

4. Change Order: If changes are necessary once construction begins, review request for change and make a recommendation for approval. Per Section 13282 Paragraph 3.18, removal activities and disposal of wastes will not be measured or paid separately, except for the hazardous waste determined by the waste characterization (Section 13282 Paragraph 3.15).

B. Site Monitoring by Competent Person

1. Onsite personnel air monitoring as required by OSHA, and the project specifications

2. Monitoring of decontamination procedures at control area entry/exit and of cleanup after each shift

3. Monitoring of controlled area maintenance and waste handling

4. Interface with IH, Designer of Records, representatives of regulatory agencies, and the Engineer or Officer in Charge

5. Ensure workers are trained, engineering controls in place, and proper respiratory protection is utilized by personnel within control areas

6. Relay to Engineer or Officer in Charge any discrepancies in Contractor's action with provisions of project specifications

3.4 TESTING/AIR MONITORING

A. IH retained by the Contractor shall have authority to stop work or to exercise engineering controls during the project.

B. IH may conduct additional testing and air monitoring at his/her discretion.

C. Monitoring activities will be documented and submitted to Engineer or Officer in Charge with test results, interpretations, follow-up actions, and final resolutions.

3.5 SAMPLE DESIGN

The following is a typical sampling design per control area during the construction. Number of sample quantities and volume may vary.

A. Work Area Samples: Low volume samples of a maximum of 480 liters each shall be taken in the work area. Ambient air samples shall be taken outside of work area to assess and ensure that engineering controls are effective and that the persons entering the work area are properly protected from airborne hazards. If monitoring results inside and outside the controlled area indicate airborne concentrations is greater than 30 $\mu g/m^3$ air for lead, Contractor shall correct the condition(s) causing the increase and ensure that Contractor maintains the ambient conditions to below the action levels.

B. Barrier Samples: As applicable, two samples may be taken per barrier.

C. Environmental Samples: Each removal area shall be controlled so that airborne dust cannot escape into student, staff, trade, and public access areas. Per the IH's discretion, high volume or low volume samples per controlled area will be taken.

3.6 MEASUREMENT AND PAYMENT

Work involving worker monitoring, waste characterization, and OSHA and EPA compliance shall not be measured or paid for separately but shall be considered incidental to the lump sum price bid for the item of which it is a part in the Bid Schedule.

END OF SECTION

SECTION 15080

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic hot-water piping.

2. Domestic recirculating hot-water piping.

3. Supplies and drains for handicap-accessible lavatories and sinks.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

B. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General" and "Indoor Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers. "ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

3. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

4. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.

2. Service Temperature Range: Minus 20 to plus 180 deg F.

3. Solids Content: 60 percent by volume and 66 percent by weight.

4. Color: White.

2.5 SEALANTS

A. Joint Sealants:
1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Permanently flexible, elastomeric sealant.
3. Service Temperature Range: Minus 100 to plus 300 deg F (Minus 73 to plus 149 deg C).
4. Color: White or gray.

B. ASJ Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.

2. Fire- and water-resistant, flexible, elastomeric sealant.

3. Service Temperature Range: Minus 40 to plus 250 deg F.

4. Color: White.

5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

2.7 TAPES

B. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Width: 3 inches.

2. Thickness: 11.5 mils.

3. Adhesion: 90 ounces force/inch in width.

4. Elongation: 2 percent.

5. Tensile Strength: 40 lbf/inch in width.

6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.8 SECUREMENTS

A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal or closed seal.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

C. Wire: 0.062-inch soft-annealed, stainless steel.

2.9 PROTECTIVE SHIELD GUARDS

D. Protective Shielding Piping Enclosures:

1. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

    1. Install insulation continuously through hangers and around anchor attachments.

    2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.

    3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

    4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

    1. Draw jacket tight and smooth.

    2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.

5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.

2. Testing agency labels and stamps.

3. Nameplates and data plates.

4. Cleanouts.

3.3 PENETRATIONS

A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section – 07 8400 FIRESTOPPING firestopping and fire-resistive joint sealers.

3.4 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.

2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.

4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.

5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.

7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

8. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.

2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.

3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.

4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.

3.5 INSTALLATION OF POLYOLEFIN INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.

2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.

4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.

2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.

2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.

3. Install insulation to flanges as specified for flange insulation application.

4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 FIELD-APPLIED JACKET INSTALLATION

A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.7 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section – 09 9123 INTERIOR PAINTING.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless-steel jackets.

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 PIPING INSULATION SCHEDULE GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.

2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

A. Water Cooler Drain Piping: Insulation shall be the following:

1. Polyolefin: 1 inch thick.

3.11 INDOOR FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed: None.

D. Piping, Exposed: None.

END OF SECTION

SECTION 15110

GENERAL DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bronze ball valves.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of valve.

1. Certification that products comply with NSF 61.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENT FOR VALVES

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B1.20.1 for threads for threaded end valves.

2. ASME B16.18 for solder-joint connections.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valve Actuator Types:

1. Handlever: For quarter-turn valves smaller than NPS 4.

2. Handlever: For valves NPS 6 and smaller.

H. Valves in Insulated Piping:

1. Include 2-inch stem extensions.

2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.

3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRONZE BALL VALVES

A. Two-Piece, Bronze Ball Valves with Full Port, and Bronze or Brass Trim:

1. Description:

a. Standard: MSS SP-110.

b. CWP Rating: 600 psig.

c. Body Design: Two piece.

d. Body Material: Bronze, dezincification resistance, lead-free.

e. Ends: Soldered or press-fit.

f. Seats: PTFE.

g. Stem: Stainless steel.

h. Ball: Stainless steel.

i. Port: Full

PART 3 - EXECUTION

3.01 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install swing check valves for proper direction of flow in horizontal position with hinge pin level.

3.02 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Soldered joint or Press-fit if indicated in valve schedules below.

3.03 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with press-fit joint ends instead of soldered ends.

2. Two-piece, bronze ball valves with full port and stainless steel trim.

END OF SECTION

SECTION 15140

DOMESTIC WATER PIPING

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes aboveground domestic water pipes, tubes, and fittings inside buildings.

1.2 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

1.3 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type Land ASTM B 88, Type K water tube, drawn temper.

B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.

C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

D. Copper Unions:

1. MSS SP-123.

2. Cast-copper-alloy, hexagonal-stock body.

3. Ball-and-socket, metal-to-metal seating surfaces.

4. Solder-joint or threaded ends.

E. Copper Pressure-Seal-Joint Fittings:

1. Fittings for NPS 2and Smaller: Wrought-copper fitting with EPDM-rubber, O-ring seal in each end.

2. Manufacturer: Viega Propress or approved equal.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.

2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys.

D. Flux: ASTM B 813, water flushable.

E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Standard: ASSE 1079.

2. Pressure Rating: 150 psig

3. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Standard: ASSE 1079.

2. Factory-fabricated, bolted, companion-flange assembly.

3. Pressure Rating: 150 psig

4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Nonconducting materials for field assembly of companion flanges.

2. Pressure Rating: 150 psig

3. Gasket: Neoprene or phenolic.

4. Bolt Sleeves: Phenolic or polyethylene.

5. Washers: Phenolic with steel backing washers.

E. Dielectric Nipples:

1. Standard: IAPMO PS 66.

2. Electroplated steel nipple complying with ASTM F 1545.

3. Pressure Rating and Temperature: 300 psig at 225 deg F

4. End Connections: Male threaded or grooved.

5. Lining: Inert and noncorrosive, propylene

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install shutoff valve immediately upstream of each dielectric fitting.

D. Install domestic water piping level without pitch and plumb.

E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

G. Install piping to permit valve servicing.

H. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections.

K. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

L. Install sleeves for piping penetrations of walls, ceilings, and floors.

M. Install sleeve seals for piping penetrations of concrete walls and slabs.

N. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.

2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.3 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2and Smaller: Use dielectric nipples or unions.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger, support products, and installation.

1. Vertical Piping: MSS Type 8 or 42, clamps.

2. Individual, Straight, Horizontal Piping Runs:

a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

b. Longer than 100 Feet MSS Type 43, adjustable roller hangers.

c. Longer than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support vertical piping and tubing at base and at each floor.

C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch

D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4and Smaller: 60 inches with 3/8-inch rod.

2. NPS 1 and NPS 1-1/4 72 inches with 3/8-inch rod.

3. NPS 1-1/2 and NPS 2 96 inches with 3/8-inch rod.

4. NPS 2-1/2 108 inches with 1/2-inch rod.

5. NPS 3 to NPS 5 10 feet with 1/2-inch rod.

6. NPS 6 10 feet with 5/8-inch rod.

7. NPS 8 10 feet with 3/4-inch rod.

E. Install supports for vertical copper tubing every 10 feet

F. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1 and Smaller: 32 inches with 3/8-inch rod.

G. Install hangers for vertical PEX piping every 48 inches

H. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

I. Supports exposed to the outdoors shall be stainless steel material.

J. For all other ferrous material connected to equipment exposed to the outdoors, these surfaces shall be coated with minimum two (2) coats of epoxy paint.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.

2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.

3. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

4. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2and larger.

3.6 IDENTIFICATION

A. Identify system components.

B. Label pressure piping with system operating pressure.

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.

b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.

2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Re-inspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for re-inspection.

d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.8 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.

2. Open shutoff valves to fully open position.

3. Open throttling valves to proper setting.

4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.

b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.

6. Remove and clean strainer screens. Close drain valves and replace drain plugs.

7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.

8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.

b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.

2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

d. Repeat procedures if biological examination shows contamination.

e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.10 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3and smaller, shall be the following:

1. Soft copper tube, ASTM B 88, Type K wrought-copper, solder-joint fittings or brazed copper pressure-seal fittings and pressure-sealed joints. Provide polyethylene jacket around pipe.

E. Under-building-slab, domestic water, building-service piping, NPS 4 to NPS 8and larger, shall be the following:

1. Soft copper tube, ASTM B 88, Type K wrought-copper, solder-joint fittings and brazed joints. Provide polyethylene jacket around pipe.

F. Under-building-slab, domestic water piping, NPS 2 and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type K wrought-copper, solder-joint fittings and brazed or copper pressure-seal-joint fittings; and pressure-sealed joints. Provide polyethylene jacket around pipe.

G. Under-building-slab, domestic hot water piping shall be the following:

1. Pre-insulated piping system.

H. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:

1. Hard copper tube, ASTM B 88, Type L cast- or wrought-copper, solder-joint fittings; and soldered joints.

2. Hard copper tube, ASTM B 88, Type L copper pressure-seal-joint fittings; and pressure-sealed joints.

I. Aboveground domestic water piping, NPS 2-1/2 to NPS 4 shall be one of the following:

1. Hard copper tube, ASTM B 88, Type L cast- or wrought-copper, solder-joint fittings; and brazed joints.

2. Hard copper tube, ASTM B 88, Type L copper pressure-seal-joint fittings; and pressure-sealed joints.

3. Hard copper tube, ASTM B 88, Type L grooved-joint, copper-tube appurtenances; and grooved joints.

END OF SECTION

SECTION 15150

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.

2. Specialty pipe fittings.

B. Related Section:

1. Section 02 5 30 - SANITARY SEWERAGE for sanitary sewerage piping and structures outside the building.

1.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

1. Standards: ASTM C 1277 and CISPI 310.

2. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

B. Heavy-Duty, Hubless-Piping Couplings:

1. Standards: ASTM C 1277 and ASTM C 1540.

2. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

C. Adhesive Primer: ASTM F 656.

1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Solvent Cement: ASTM D 2564.

1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.

2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

3. Unshielded, Non-pressure Transition Couplings:

a. Standard: ASTM C 1173.

b. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

c. Sleeve Materials:
1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.

2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 02300 - EARTHWORK.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

I. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

J. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

    1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent or 2 percent (see drawings) downward in direction of flow for piping NPS 4 and larger.

    2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.

    3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

K. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

L. Install aboveground PVC piping according to ASTM D 2665.

M. Install underground PVC piping according to ASTM D 2321.

N. Plumbing Specialties:

    1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Comply with requirements for cleanouts.

    2. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains.

O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves.

Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals.

R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons.

3.3 JOINT CONSTRUCTION

A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

B. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.

2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.4 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in OD's.

2. In Drainage Piping: Unshielded, nonpressure transition couplings.

3.5 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements below:

1. Install carbon steel pipe hangers for horizontal piping in indoor environments.

2. Install stainless steel pipe hangers for horizontal piping in outdoor environments.

3. Install carbon steel pipe support clamps for vertical piping in indoor environments.

4. Install stainless-steel pipe support clamps for vertical piping in outdoor environments.

5. Vertical Piping: MSS Type 8 or Type 42, clamps.

6. Install individual, straight, horizontal piping runs:

a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.

c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

8. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.

2. NPS 3: 60 inches with 1/2-inch rod.

3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.

4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.

5. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

F. Install supports for vertical cast-iron soil piping every 15 feet.

G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.

2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.

3. NPS 2-1/2: 108 inches with 1/2-inch rod.

4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.

5. NPS 6: 10 feet with 5/8-inch rod.

6. NPS 8: 10 feet with 3/4-inch rod.

H. Install supports for vertical copper tubing every 10 feet.

I. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.

2. NPS 3: 48 inches with 1/2-inch rod.

3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.

4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.

J. Install supports for vertical PVC piping every 48 inches.

K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

L. Supports exposed to the outdoors shall be stainless steel material.

M. For all other ferrous material connected to equipment exposed to the outdoors, these surfaces shall be coated with minimum two (2) coats of epoxy paint.

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.

2. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.

3. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

4. Comply with requirements for cleanouts and drains.

5. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.7 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping.

B. FIELD QUALITY CONTROL

C. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

D. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

E. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

F. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.9 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:

1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

2. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

C. Aboveground, soil and waste piping NPS 5 and larger shall be the following:

1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

2. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

D. Aboveground, vent piping NPS 4 and smaller shall be the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

E. Aboveground, vent piping NPS 5 and larger shall be the following:

1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

2. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.

2. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

G. Underground, soil and waste piping NPS 5 and larger shall be any of the following:

1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; coupled joints.

2. Solid-wall PVC pipe; PVC socket fittings; and solvent-cemented joints.

3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.

H. PVC piping shall not be used downstream of any equipment drains receiving water in excess of 140 deg F.

END OF SECTION

SECTION 16070

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.

2. Conduit and cable support devices.

3. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

4. Fabricated metal equipment support assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.

1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.

2. Material for Channel, Fittings, and Accessories: Galvanized steel.

3. Channel Width: Selected for applicable load criteria.

4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.

2. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA 1.

2. NECA 101

B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69 or spring-tension clamps.

2. To Light Steel: Sheet metal screws.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

END OF SECTION

SECTION 16120

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.

2. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

2. RoHS compliant.

C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

D. Conductor Insulation:

1. Type THHN/THWN: Comply with UL 83.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Branch Circuits:

1. Copper, Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Complete raceway installation between conductor and cable termination points according to Section 16130 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6-inches of slack.

END OF SECTION

SECTION 16130

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.

2. Boxes, enclosures, and cabinets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. RMC: Comply with ANSI C80.1 and UL 6.

3. EMT: Comply with ANSI C80.3 and UL 797.

B. Metal Fittings: Comply with NEMA FB 1 and UL 514B.

1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Fittings, General: Listed and labeled for type of conduit, location, and use.

3. Fittings for EMT:

a. Material: Steel or die cast.

b. Type: Setscrew or compression.

C. Joint Compound for RMC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

A. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.

B. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Indoors: Apply raceway products as specified below unless otherwise indicated.

1. Exposed, Not Subject to Physical Damage: EMT.

2. Exposed, Not Subject to Severe Physical Damage: EMT.

3. Exposed and Subject to Severe Physical Damage: RMC. Raceway locations include the following:

a. Warehouse below 10-feet above finish floor.

4. Boxes and Enclosures: NEMA 250, Type 1.

B. Minimum Raceway Size: 3/4-inch trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.

2. EMT: Use setscrew compression fittings. Comply with NEMA FB 2.10.

3.2 INSTALLATION

A. Comply with requirements in Section 16070 "Hangers and Supports for Electrical Systems" for hangers and supports.

B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter.

C. Do not fasten conduits onto the bottom side of a metal deck roof.

D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

E. Comply with requirements in Section 16070 "Hangers and Supports for Electrical Systems" for hangers and supports.

F. Arrange stub-ups so curved portions of bends are not visible above finished slab.

G. Install no more than the equivalent of three 90-degree bends in any conduit run.

H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.

I. Support conduit within 12 inches of enclosures to which attached.

J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes.

K. Mount boxes at heights indicated on Drawings.

L. Locate boxes so that cover or plate will not span different building finishes.

M. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. GFCI receptacles, 125 V, 20 A.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Comply with NFPA 70.

C. RoHS compliant.

D. Comply with NEMA WD 1.

E. Device Color:

1. Wiring Devices Connected to Normal Power System: As selected by Architect.

F. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Duplex GFCI Receptacles, 125 V, 20 A

1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.

2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Type: Non-feed through.

4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

2.4 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Unfinished Spaces: Galvanized steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Coordination with Other Trades:

1. Install wiring devices after all wall preparation, including painting, is complete.

C. Device Installation:

1. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.

2. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

D. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up and on horizontally mounted receptacles to the right.

3.2 FIELD QUALITY CONTROL

A. Tests for Receptacles:

1. Plug tester that tests for correct wiring, open ground, reverse polarity, open hot, open neutral, hot on neutral, hot and ground reversed with open hot in 3 wire, 120 VAC circuits

2. Simulates ground fault for testing GFCI

3. Using the test plug, verify that the device and its outlet box are securely mounted.

B. Wiring device will be considered defective if it does not pass tests and inspections.

END OF SECTION