

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

SPECIAL PROVISIONS, SPECIFICATIONS, PROPOSAL
FOR
REPLACE ADMIN TOWER 5TH FLOOR AC SYSTEM
DANIEL K. INOUE INTERNATIONAL AIRPORT
HONOLULU, OAHU, HAWAII

STATE PROJECT NO. CO1328-43

2023

NOTICE TO BIDDERS
(Chapter 103D, HRS)

SEALED BIDS for REPLACE ADMIN TOWER 5TH FLOOR AC SYSTEM, DANIEL K. INOUE INTERNATIONAL AIRPORT, HONOLULU, OAHU, HAWAII, PROJECT NO. CO1328-43 will begin as advertised on May 17, 2023, in HiePRO. Bidders are to register and submit bids through HiePRO only. See the following HiePRO link for important information on registering: <https://hiepro.ehawaii.gov/welcome.html>.

Deadline to submit bids is June 15, 2023, at 2:00 P.M., Hawaii Standard Time (HST). The complete bid Proposal Schedule shall be uploaded into HiePRO prior to bid opening date and time. All other confidential and proprietary documents shall be uploaded separately. Failure to upload the bid Proposal Schedule into HiePRO shall be grounds for rejection of the bid. Bids received after said due date and time shall not be considered.

The scope of work consists of replacing the existing 10-ton floor-mounted air handling unit with a new air handling unit with new variable frequency drive, distribution ductwork, variable air volume terminal units, air devices, return air fan, outside air fan, and related controls, and providing new acoustical ceiling at the Administration Tower of the Daniel K. Inouye International Airport. The estimated cost of construction is between \$500,000 to \$750,000.

” To be eligible for award, bidders shall possess a valid State of Hawaii General Building "B" license at the time of bidding.

The GENERAL PROVISIONS dated 2016 applicable to this project are available on the internet at <http://hidot.hawaii.gov/administration/con/>.

A pre-bid conference is scheduled for May 23, 2023, 10:00 A.M., HST. Due to the
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impacts of COVID-19, the pre-bid will be held via Microsoft Teams teleconference. All bidders that wish to attend must send an email indicating their interest to Mr. Steve Tagupa at steve.tagupa@hawaii.gov. They will be added to the Teams attendance list and will be sent an invitation email with a Teams web-link. This will allow each person to attend the pre-bid via the internet. The invitation will also contain teleconference information so they may call in instead. The deadline to sign up for the pre-bid conference is two (2) working days prior to the date of the pre-bid conference.

A site visit is scheduled for May 23, 2023, 10:00 A.M., HST. Please contact Mr. Steve Tagupa, our Airports State Project Manager at (808) 838-8805 or by email at steve.tagupa@hawaii.gov to confirm your attendance.

All prospective bidders or their representatives (employees) are encouraged to attend, but attendance is not mandatory. Anything said at the conference is for clarification purposes and any changes to the bid documents will be made by addendum and posted in HiePRO.

All Questions and requests for information (RFI) applicable to the bid documents shall be submitted via HiePRO no later than 14 calendar days before bid opening. Questions received after the deadline will not be addressed. Verbal RFIs will not receive a response.

Apprenticeship Preference. A 5% bid adjustment for bidders that are parties to apprenticeship agreements pursuant to §103-55.6, HRS, is applicable to this project.

Employment of State Residents on Construction Procurement Contracts. Compliance with §103B-3, HRS is a requirement for this project whereby a minimum of 80% of the bidder's work force on this project shall consist of Hawaii residents.

Campaign contributions by State and County Contractors. Contractors are hereby

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

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

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

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

For additional information, contact Mr. Steve Tagupa, our Airports State Project Manager at (808) 838-8805 or by email at steve.tagupa@hawaii.gov.

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



EDWIN H. SNIFFEN
Director of Transportation

Posted:

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

SPECIAL PROVISIONS

The following additional amendments to the General Provisions are applicable to this project:

1.3 DEFINITIONS is amended as follows:

The following definition shall be deleted in its entirety and replaced with the following:

“Subcontractor - An individual, partnership, firm, corporation, or joint venture, or other legal entity, as licensed or required to be licensed under Chapter 444, Hawaii Revised Statutes, as amended, which enters into an agreement with the Contractor to perform a portion of the work.

HAWAII ePROCUREMENT SYSTEM (HIePRO) - The State of Hawaii eProcurement System for issuing solicitations, receiving proposals and responses, and issuing notices of award.”

2.7 REQUEST FOR SUBSTITUTION OF SPECIFIED MATERIALS AND EQUIPMENT BEFORE BIG OPENING is amended as follows:

1. The last sentence in the first paragraph (line 147 to 152) shall be replaced with the following:

“Where a bidder intends to use a material or equipment of an unspecified brand, make, or model, the bidder must submit a request to the Department for review and approval at the earliest date possible. Requests shall be submitted via email to the Contact person listed in HIePRO for the solicitation and also posted as a question in HIePRO under the question/answer tab referencing the email with the request. The request must be posted in HIePRO no later than seventeen (17) calendar days before the bid opening date, not including the bid opening date.”

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

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

2.8 PREPARATION AND DELIVERY OF BID is amended as follows:

Last Paragraph (line 189 to 192) shall be replaced with the following:

“The bidder shall submit the proposal in HIePRO. The proposal shall be UPLOADED to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Original (wet ink) proposal documents are not

required to be submitted. The award will be made based on proposals uploaded in HIePRO. Any and all other additional documents explicitly designated and labeled as CONFIDENTIAL OR PROPRIETARY shall be UPLOADED SEPARATELY to HIePRO. If there is a conflict between this specification and its HIePRO solicitation, the specifications shall govern and control unless otherwise specified."

2.11 BID SECURITY is amended by deleting (a) and replacing it with:

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

- (1) A deposit of legal tender;
- (2) A valid surety bid bond, underwritten by a company licensed to issue bonds in the State of Hawaii; or
- (3) A certificate of deposit; credit union share certificate; or cashier's, treasurer's, teller's, or official check drawn by or a certified check accepted by a bank, savings institution, or credit union insured by the Federal Deposit Insurance Corporation (FDIC) or the National Credit Union Administration (NCUA) and payable at sight or unconditionally assigned to the Department. These instruments may be utilized only to a maximum of one hundred thousand dollars (\$100,000.00). If the required amount totals over one hundred thousand dollars (\$100,000.00), more than one instrument not exceeding one hundred thousand dollars (\$100,000.00) each and issued by different financial institutions shall be accepted.

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

2.12 PRE-OPENING MODIFICATION OR WITHDRAWAL OF BIDS is amended by deleting 2.12 PRE-OPENING MODIFICATION OR WITHDRAWAL OF BIDS in its entirety and replacing with the following:

"2.12 PRE-OPENING MODIFICATION OF WITHDRAWAL OF BIDS. A bidder may withdraw or modify a proposal after the bidder submits the proposal in HIePRO. Withdrawal or modification of proposal must

be completed before the time set for the receiving of bids."

2.14 PUBLIC OPENING OF BIDS is amended by deleting 2.14 PUBLIC OPENING OF BIDS in its entirety.

4.12 UTILITIES AND SERVICES is amended as follows:

Add the following after the last paragraph:

"(e) Repairs and Outages.

- (1) The Contractor shall have available on 24-hour call sufficient specialty contractors, such as electrical and plumbing contractors, to repair any damage to existing facilities that might occur as a result of construction operations regardless of when the damage might occur.
- (2) Outage: Written requests for power outage, communication changes, and water and sewer connection outages shall be submitted to the Engineer at least seven (7) days in advance or as specified in other sections of these specifications. Outages will be restricted to non-peak operational hours between midnight and 6:00 a.m."

5.16 SUBCONTRACTING is amended as follows:

Add the following after the last paragraph:

"(e) The Specialty Items of work for this project are as follows:

Electrical (C-13)
Asbestos removal (C-19)
Institutional Equipment (C-25)
Masonry (C-31)
Plumbing (C-37)
Structural Steel (C-48)
"

7.21 PUBLIC CONVENIENCE AND SAFETY - is hereby added to the General Provisions:

"It shall be especially noted by the Contractor that the area directly adjacent to the existing in use runways and taxiways, is an extremely hazardous area and that very strict controls will apply throughout the entire period required to complete all work within 500 feet from the edge of an in use runway and 180 feet from the edge of an in use taxiway.

The Contractor shall familiarize himself with the Airport Certification Manual available for review at the Airport Manager's Office and shall comply with its requirements.

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The Contractor is responsible for the security of access points to the Airport Operational Area that are located within the limits of construction and will be fined \$1,000 per incident for any breach of security at these locations. All gates leading into the AOA shall be kept locked and if required to be open, the Contractor shall provide professional security guards to attend gates. The guards must be approved by the Director and shall be required to attend a training session conducted by the Airport Manager prior to gate assignment."

8.20 LIMITATION OF OPERATIONS: is hereby added to the General Provisions:

"The following limitations shall be observed by the Contractor when operating within 75 feet from the edge of any taxiway.

General - The Contractor shall schedule his operations to minimize interference with the movement of aircraft or passengers as may be required by the Engineer. The Contractor shall be responsible to alert all of his personnel to the location of power and signal cables installed for the operation of the airport. The Contractor shall control his operations in a manner to preclude any possible damage to those cables. Utility companies shall be notified by the Contractor one week before commencement of work. The Contractor shall give notice to the Engineer in writing, at least 168 hours before operating within 75 feet from the edge of any taxiway and the Engineer will assure himself that the Airport Management personnel are notified in sufficient time to publish the warning (NOTAM). The Contractor shall immediately repair any damages to the existing perimeter fence to prevent inadvertent entry to the Airport Operation Area (AOA).

Work in Vicinity of Runways and Taxiways in Use - Under the terms of this contract, it is intended that work shall be completed without disturbing the paved surface of existing runways and taxiways, unless shown otherwise on the plans. Aircraft traffic shall not be interrupted. The Contractor shall schedule to work within 75 feet of the taxiway as directed by the Airport Management. No ruts, holes, or open trenches of 3 inches or more in depth and no objects or material 3 inches or more in height shall be permitted within the safety area when the airfield is in operation in conformance to Federal Aviation Regulation Part 139. The Contractor is also informed that Airport Zoning Regulations dictate that a 'clear zone' be maintained 500 feet on each side of an active runway, to be known as a hazardous area. The Contractor shall comply with all regulations governing ground operations within hazardous areas. The following FAA Advisory Circulars or later versions and FAA Regulations specify these requirements:

AC 150/5210-5C Painting, Marking, and Lighting Vehicles

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Used on an Airport, dated August 2007

AC 150/5340-1J Standards for Airport Markings

AC 150/5370-2E Operational Safety on Airports During
Construction, dated 1/17/03

FAA Regulations Objects Affecting Navigable Airspace Part
77

The Contractor shall keep all personnel and equipment off the areas not specifically designated for work under this Contract. At all times when the Contractor's equipment is not in use, the equipment shall be moved outside the hazardous areas to an area designated by the Engineer. Under no condition shall equipment be parked or material stored within the hazardous areas.

Failure on the part of the Contractor to abide by the above will result in suspension of work.

Authority of Control Tower Personnel - With the exception of actual construction methods, the airport control tower personnel will have full authority to control the Contractor's movements within the existing taxiway. When required, the Contractor shall maintain a constant radio vigil within all work areas and in addition shall keep at least one flagman on duty with the radio man. When notified by the control tower to temporarily halt operations, it shall be the duty of the flagman, through the use of appropriate methods (lighted flares shall not be used under any circumstances), to notify all operators of equipment and other personnel to cease work and move men and equipment off of hazardous areas.

Contractor shall provide, at his own expense, the necessary radio and equipment including a radio equipped mobile vehicle to maintain contact with control tower personnel at all times during job performance. A transceiver operating at a frequency designated by the Engineer to communicate with the Control Tower.

Marking of Hazardous Areas - The Engineer will designate areas that are hazardous for aircraft. The Contractor shall provide red blinker lights spaced not more than 50 feet apart around all hazardous areas and areas of work within 75 feet of any taxiway. Such systems shall be subject to approval by the Engineer. The Contractor shall have personnel on call 24 hours per day for the emergency maintenance of hazard markings.

The Contractor shall provide red flags not less than 20 inches square in addition to the red blinker lights. When danger flags are made of fabric, a wire stiffener shall be used to hold the flags in an extended position. Flags shall be so mounted

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that they do not produce a hazard. The red danger flags shall be spaced not more than 50 feet apart around all areas of work within 75 feet of any taxiway.

All systems proposed by the Contractor for lighting and barricading shall be submitted to the Engineer for review prior to installation. The Contractor shall install all flags, lighting and barricades as required by the Engineer. Such systems shall be subject to approval by the Engineer.

Storage of Equipment and Materials - At the end of each working shift, all of the Contractor's equipment shall be withdrawn to an area designated by the Engineer. The Contractor shall park all equipment in an orderly fashion and place a sufficient number of red flasher lights to identify these areas. Materials stored within the airport shall be so placed and the work shall, at all times, be so conducted as to cause no greater obstruction to the air and ground traffic than is considered necessary by the Engineer. No runways, taxiways or roadways shall be closed or opened, except by permission of the Engineer.

Blasting Operations - The Contractor shall notify the Engineer at least three (3) days before performing blasting operations as to the extent and timing of such operations, so that the Control Tower and other concerned parties can be informed.

Utilities - The Contractor shall provide for the protection of all utilities from damages in areas to be traversed by his vehicles and equipment. If required, buried cables and utility lines shall be protected by mounding earth over the cables or by any other method approved by the Engineer.

The Contractor shall notify representatives of the owner, agencies, and other affected organizations at least 48 hours prior to working in any area containing the facilities of these organizations.

Failure to notify the owning organization will prevent authorization to work in a specific area.

Archaeological Features - Any archaeological features such as petroglyphs, burial sites, and artifacts discovered or unearthed during the performance of the work shall immediately be brought to the attention of the Engineer and all work that would damage or destroy these features shall be discontinued. The Engineer will decide, after proper investigation, to salvage or abandon such artifacts."

8.21 OPERATION OF CONTRACTOR'S MOTOR VEHICLE AND PERSONNEL IN RESTRICTED AIR OPERATIONS AND MOVEMENT AREAS is hereby added to the General Provisions:

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"The Contractor shall conform with the all sections of the "State of Hawaii, Department of Transportation, Airports Division, Contractor's Training Guide" pertaining to access and operation in the Airport Operation Area (AOA) hereinafter described as follows:

"A. Motor Vehicles in Airport Operation Area

For safety reasons, the operation of motor vehicles in the AOA must conform with all applicable State Airport rules and regulations."

B. Motor Vehicle Access Permit

Each motor vehicle operated in the AOA is required to:

1. Meet all State licensing registration and safety requirements and be specifically licensed for operation in the AOA.
2. Meet all insurance requirements.
3. Be restricted to operation by those persons qualified to drive the vehicle and in possession of a current Ramp Driver's License and applicable Motor Vehicle Operator's License.

C. The operators of motor vehicles in the AOA shall be responsible for meeting the following insurance requirements.

1. Licensed Vehicles

As a condition for authorization to enter the AOA, the Contractor shall provide evidence of vehicle liability insurance in the form of a Certificate of Insurance issued by an authorized insurance carrier. Automobile Liability and general Liability (combined single limit, Bodily Injury and Property Damage, per occurrence) shall be required in the applicable minimum limits specified below:

a. Daniel K. Inouye International Airport

(1) Standard AOA clearance....\$5,000,000

(2) Limited AOA clearance.....\$1,000,000

Limited AOA clearance is defined as operations restricted to Diamond head and Ewa Concourses second level roadways and connecting third level main terminal roadway only, with entry and exit via Security

Access Point "C" (Primary) and Access Point "A" (Secondary)

b. Other Airports

Standard AOA clearance.....\$1,000,000

Standard AOA clearance is defined as any portion of a public Airport from which the public is restricted by fences or appropriate signs and not leased or demised to anyone for exclusive use and shall include runways, taxiways, all ramp and apron areas, aircraft parking and storage areas, fuel storage areas, maintenance areas, and any other area of a public Airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft or used for embarkation or debarkation of passengers.

2. Unlicensed Vehicles

Airport Liability (or General Liability) shall be required in the applicable minimum limits specified below:

a. Honolulu International Airport, Kahului Airport and Kona International Airport at Keahole

AOA clearance..... \$5,000,000

b. All other Airports

AOA clearance..... \$1,000,000

3. Specifically name the State of Hawaii as additionally insured.

4. Indicate that the Airport Engineer will be provided with a 30-day written prior notice of policy cancellation or material change in coverage or conditions.

D. Operator's Permit

1. No person shall operate a motor vehicle on the AOA unless he holds and carries on his person a current Airport Motor Vehicle operator's permit issued by the State of Hawaii, Department of Transportation, Airports Division.

2. Operator's permits will only be issued to persons who apply through the Airport District Security Office and pass a written exam covering those

portions of the Airport Rules and Regulation relating to the operation of vehicles in Airport Operations Areas.

E. Authorized Vehicles

1. Only vehicles considered operationally safe and necessary for the performance of this contract may be allowed to operate in the AOA.
2. All motor vehicles must be painted in such a manner so as to be easily identifiable and must carry the Contractor's name on each side. These signs may be of a temporary nature applied to the side windows or doors.

The lettering shall be in bold characters of a minimum of four (4) inches in height and one and one-half (1-1/2) inches in widths, the height of logos should be a minimum of six (6) inches.

3. The Contractor's operations on, over, across, and/or immediately adjacent to any runway and/or taxiway at a towered airport shall require the use of two-way radio communication. The Contractor shall obtain the necessary equipment at his own expense.
4. No person shall operate a motor vehicle on the AOA unless he holds and carries on his person a current Motor Vehicle Operator's Permit issued by the Airport Manager.
 - a. The Motor Vehicle Operator's Permit will be issued only to persons who apply through the Airport Security Section and pass a written exam covering those portions of the Airport Rules and Regulations relating to the operation of vehicles in the AOA.
 - b. Permits issued may be suspended or revoked for cause at any time by the Airports Division.

F. Airport Operation Area Construction Pass

1. Issuance of Airport Operation Area (AOA) Construction Passes shall be limited to contractors, subcontractors, companies, organizations, individuals engaged in authorized and approved construction activity which requires a continuing need for entry into the AOA or Airfield Movement Areas. Request letters for such passes must be made to the Airport District Manager's Office in accordance with the Contractors Training Guide or applicable District requirements.

2. As a condition for security area clearance, applicants must comply with Transportation Security Regulation 1542 which requires a ten-year background Criminal History Records Check for those individuals employed under this contract.

G. Access to Movement Areas

1. Movement areas shall mean all of the runways and taxiways of the Airport which are utilized for taxiing, takeoff, and landing of aircraft.
 - a. Any vehicle which requires access to the movement area shall be equipped with operational radio equipment capable of positive two-way contact with Tower/Ground Control.
 - b. Operators of vehicles in movement areas must possess knowledge and familiarity with restricted and airfield movement areas, operational rules, regulations, and procedures, or be under direct escort by individuals meeting all of the above requirements.
2. Vehicle Operations on Movement Areas
 - a. No vehicle shall proceed across any runway unless specifically cleared by Tower/Ground Control.
 - b. The operator of a vehicle in the movement area shall not leave his vehicle unless continuous radio contact is maintained with the Tower/Ground Control while he is away from his vehicle.
 - c. Any vehicle proceeding onto the movement area between the hours of sunset and sunrise shall be equipped with an overhead flashing light which is visible for one (1) mile, unless such vehicle is being escorted by another vehicle so equipped.
 - d. All vehicles operated on the movement area between sunrise and sunset except those being escorted, shall operate an overhead amber or red flashing beacon visible for at least one (1) mile; or display a flag at least three (3) feet square with orange and white checkered squares of not less than one (1) foot on each side.

H. Runway and Taxiway Closure

1. Requests for runway or taxiway closures, or for any

work which affect operational conditions at the airport must be made in writing through the Airport Engineering Branch.

2. Temporarily closed runways require placement of yellow "X" markings (constructed of material such as fabric or plywood or other acceptable material) on top of the runway identification numerals at both ends of the closed runway.
3. Taxiway closures require placement of barricades with alternate orange and white markings at each end of the closed taxiway segment. Barricades must be supplemented with flashing red lights. The intensity of the lights and spacing for barricades, and lights must adequately define and delineate the hazardous area.

I. Gate Guards Furnished by Contractors

1. If a contractor is permitted by the airport to maintain operational control of an AOA Access Gate, entry through such gate shall be controlled by the posting of a gate guard.
 - a. Written instruction will be provided, outlining the guard's duties to enforce those requirements and provisions prescribed by the airport's security program to include all personnel and vehicle entry and access requirements.
 - b. Procedures will be established to identify the actions which will be undertaken by the guard in calling for assistance.
 - c. An approved emergency communications procedure will be established.

J. Compliance

1. The contractor shall comply with all regulations and rules governing the Air Operations Areas during construction, as specified in the following or later versions:
 - a. Hawaii Revised Statutes, Title 19, Administrative Rules for Public Airports.
 - b. Federal Aviation Administration Advisory Circular AC 150/5340 1J
 - j, Marking of Paved Areas on Airport; AC 150/5370-2E, Operational Safety on Airports During Constructions.

K. Enforcement Authorization

Act 21, Section 1, Section 261-17(a), HRS; Federal Aviation Administration Regulations, Part 139, Part 107.

L. Right of Rejection or Revocation

The State of Hawaii, Airports Division, reserves the right to withhold, deny or revoke any airport security clearance, licenses or permits to any individual or organization who fails to meet the prescribed or required access area clearance criteria to include background investigation information, or fails to observe or comply with established rules, regulations, and directives.

It should be clearly understood that such denial or revocation is based solely on airport security or safety considerations and does not in any way constitute a determination by the State with regard to private employment by any individual or organization."

- END OF SECTION -

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HONOLULU, HAWAII

SPECIFICATIONS

PART I

GENERAL PROVISIONS

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

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

SPECIFICATIONS

PART II — TECHNICAL PROVISIONS

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01000 - DESCRIPTION OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Provision of the Contract, including the General Provisions for Construction Projects (2016) and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SCOPE OF WORK

A. The work involves removal of the existing 10-ton chilled water air handling unit and return air fan and providing new chilled water variable air volume air handling unit and appurtenances at the Daniel K. Inouye Airport – Admin Tower including but not limited to the following:

1. Provide new ductwork, terminal units, air devices, sensors, controls, and appurtenances.
2. Replace existing chilled water piping from point of removal to air handling unit connections, including new shutoff valves, control valve, and appurtenances.
3. Replace existing electrical disconnect switch, wiring, conduit, and appurtenances to new air handling unit, variable frequency drive, and appurtenances. Provide power wiring, conduits, and appurtenances to new air conditioning terminal units, sensors, control circuit.
4. Replace acoustical ceiling panels in the existing suspended metal ceiling grid system, patch wall openings as indicated and as damaged by contractor's work. Ceiling devices such as security cameras, light fixtures, exit signage, fire alarm devices, etc., shall be carefully removed and re-installed at the locations indicated to permit new ceiling installation. Broken devices shall be identified and reported to the DOT-A Construction Manager prior to removal.
5. Provide all required testing, start-up, and close-out procedures in accordance with the air handling unit manufacturer's requirements, including testing and balancing (TAB) of unit, chilled water flow, and air devices.

B. The work to be performed under this Contract shall also include preparing and obtaining all permits required to complete this project and other related works as called for on the plans and these specifications.

1.03 PERMITS

A. The Contractor is responsible for any permits, if required, before starting the construction. DOTA anticipates that the following permits will be required for this project.

1) None anticipated at this time.

If any of these permits are found to be unnecessary, the Contractor shall provide documentation from the appropriate permitting agency showing that the permit is not required for this project before any construction operations take place.

- B. The Contractor is responsible for the preparation and submittal of application document(s) to the appropriate permitting agency, payment of application fee(s), and all other work necessary to obtain all required permit(s) prior to starting construction operations at the project site. Construction operations shall not start until all required permits are approved by the appropriate permitting agencies and copies submitted to the Engineer for the record.
- C. Bidders are responsible for researching and confirming which permits are and are not necessary for this project. Bidders shall exercise due diligence in researching what permits, if any, are required beyond those mentioned in Part 1.3(A) above. If a permit beyond those mentioned in Part 1.3(A) above is found to be necessary for this project, then bidders shall factor the additional cost of obtaining this permit into their bid. Permits that are found to be required after bid opening shall be obtained at no additional cost to the State.
- D. All fines levied against this project as a result of failing to apply for a required permit prior to starting work shall be borne entirely by the Contractor.
- E. All work necessary for researching permits, determining their necessity for this project, preparation and submittal of permit application document(s), payment of application fee(s), etc. up to the issuance of the approved permit(s) are considered incidental to the Contract.

1.04 ALLOWANCE

- A. Allowance includes, but not limited to, works required for environmental measures, when required by the regulation(s); unforeseen conditions and other measures, such as temporary traffic controls, temporary safety measures, security measures, and material short supply when approved by the Engineer.
- B. Use the allowance only as directed by the Engineer for the airport's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- C. Contractor's overhead, profit, and related costs for products and equipment ordered by the Airport under the contingency allowance are included in the allowance and are not part of

the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

D. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

E. At project closeout, any unused amounts remaining in the Allowance will be credited back to the State.

1.05 HOURS OF WORK FOR CONSTRUCTION

A. Work hours for construction are subject to the following:

1. Normal work hours for Daniel K. Inouye International Airport are between 8:00 AM to 5:00 PM Monday to Friday. Bidders shall not assume that they will be given work windows during these hours. The Airport reserves the right to adjust work hours in order to provide minimum interruption to Airport Operations with no additional cost to the State.
2. Work hours shall be coordinated with the Airport Manager to provide minimum interruption to facility operations while performing work.
3. The Contractor will be required to shift to night work hours, at no additional cost to the State, for any work that negatively impacts airport operations especially passenger movement and or comfort. Night work hours may be from Sunday night to Friday morning 10:00 PM to 6:00 AM the following day. However, starting and ending times as well as duration may be adjusted by the Airport Manager depending on the actual flight schedules and airport operational considerations. Contractor vehicles and equipment are not allowed on the aircraft apron fronting the terminal from midnight to 6:00 AM.
4. Work hours shall be coordinated with the Airport Manager in order to protect the general public and airport employees from excessive dust and noise levels unless protective measures are taken by the Contractor (e.g. noise and/or dust control) to reduce the impact to a level acceptable to the Airport Manager.

B. The Contractor shall work continuously throughout the project duration. The Contractor shall apply and receive approval from the Engineer in writing of all work occurring outside of normal work hours. The Contractor shall coordinate their schedule with the Engineer if rescheduling of work or intermittent work is required, such work shall be performed at no extra cost to the State. If the Contractor elects to work overtime, compensation for State employees and for State representatives, as authorized by the State, shall be in accordance with Article VII, Section 7.5 of the General Provisions.

1.06 SITE VISIT

- A. The Contractor shall visit the work site and verify all conditions pertinent to the Contract he/she is bidding on.

1.07 COORDINATION

- A. The Contractor shall coordinate the work of different trades and shall be solely responsible for fulfillment of requirements specified herein.

1.08 SAFETY

- A. The Contractor shall take all necessary precautions to protect all his and/or her workmen and all other personnel from injuries. The rules and regulations promulgated by the Occupational Safety and Health Acts are applicable and made a part of these specifications.
- B. During the progress of the work, all debris, empty crates, waste, material drippings, etc., shall be removed by the Contractor at the end of each workday, and the work area shall be left clean and orderly.
- C. Outage: Written requests for power outage shall be submitted to the Engineer at least seven (7) days in advance or as specified in other sections of these specifications. Outage will be restricted to non-peak operational hours.
- D. Barricades and warning signs shall be erected by the Contractor in the work area to properly protect all personnel in the area.

1.09 VEHICLE PARKING

- A. Subject to availability of space and approval by the Airport Manager, parking may be made available for Contractor vehicle parking. The Contractor shall submit the parking requests for themselves and any subcontractors to the Airport Manager through the Engineer for review. Upon approval by the Airport Manager, a maximum of two (2) temporary parking passes per subcontractor and maximum of three (3) passes for the General Contractor will be issued at no charge. At the Airport Manager's discretion, the parking passes are good for either three (3) months or six (6) months and must be renewed before the passes expire.
- B. All passes will be signed out and become the responsibility of the General Contractor. The General Contractor will distribute the parking passes among their subcontractors.
- C. Additional parking passes beyond the temporary parking passes may be purchased. These passes are subject to approval by the Airport Manager and availability of parking spaces.
- D. All costs associated with obtaining parking passes shall be incidental to the Contract.

1.10 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

- A. Bidders shall not assume that a field office and or storage space will be available on the Airport Property by the Notice to Proceed date. Pending the availability, the State may issue a permit to the Contractor for the use of a space within the Airport Property, at no charge, to be used specifically for a field office and/or storage of materials and equipment. The State will make every effort to provide the Contractor with space on airport property, however, should the State determine that no space is available for such use(s), the responsibility shall then be on the Contractor to find space outside of airport property at no additional cost to the State.

1.11 PROTECTION OF EXISTING STRUCTURES AND IMPROVEMENTS

- A. The Contractor shall preserve and protect all structures, equipment, and vegetations on/or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this Contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limb or branches of trees are broken during Contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Engineer.
- B. The Contractor shall protect from damage all existing improvements and utilities at/or near the work site.

1.12 TEMPORARY CONSTRUCTION SIGNS

- A. The Contractor shall install temporary construction signs where the presence of planned construction areas will obstruct the existing signage or cause the closing of an existing method of egress or ingress and/or as directed by the State. Such signs shall be in accordance with the Department of Transportation – Airports Signage and Graphics Manual, highway standards for construction warning signs for background and text colors (white letters on fluorescent yellow background). Signs may be mounted on suitable approved material other than aluminum panels. The Contractor will be responsible to fabricate and install such signs. Costs related to this activity will be considered as incidental to and included in the bid price for the various items of work in this project.

1.13 OPERATION OF AIRPORT FACILITIES DURING CONSTRUCTION

- A. The Contractor shall coordinate the phases of work under this contract with the Engineer to permit the continuing operation of existing Airport facilities and to minimize disruption to pedestrian and vehicular traffic.

- B. Utility Maintenance: During the construction of this contract, existing utility services serving occupied or used facilities shall not be disrupted except where authorized in writing by authorities having jurisdiction. Contractor shall provide temporary services during interruptions to existing utilities, as acceptable to the Engineer. Damages to the existing utility facilities by the Contractor will be repaired at the Contractors expense.
- C. Outages for power, communications or any other utility, if necessary, shall be kept to a minimum and scheduled for off-peak hours, generally from 12:00 a.m. to 6:00 a.m. The Contractor shall submit written requests to the Engineer for such outages no later than fourteen (14) calendar days in advance. The request shall include a description of work and the duration of the outage. The Contractor shall not proceed with such outages until written approval is received from the State.

1.14 CONSTRUCTION STAKES, LINES AND GRADES

- A. The Contractor shall perform all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, grading, paving, drainage, sewer, water, and all other appurtenances required for the completion of the work.
- B. All construction staking shall be performed by qualified personnel under the direct supervision of a person with an engineering background who is experienced in the direction of such work and is acceptable to the Engineer.
- C. The Department may check the Contractor's control of the work at any times as the work progresses. The Contractor will be informed of the results of these checks, but the Department by doing so will in no way relieve the Contractor of his responsibility for the accuracy of the layout work. The Contractor shall at his expense correct or replace any deficient or inaccurate layout and construction work. If, as a result of these deficiencies or inaccuracies, the Department is required to make further studies, redesign, or both, all expenses incurred by the Department due to such deficiencies or inaccuracies, will be deducted from any payments due the Contractor.
- D. The Contractor shall furnish all necessary personnel, engineering equipment and supplies, materials, and transportation incidental to the accurate and satisfactory completion of this work.
- E. Unless otherwise provided, all requirements imposed by this section and performed by the Contractor shall be considered incidental to the various contract items and not separate or additional payment will be made thereof.

1.15 OPERATIONS AND STORAGE AREAS

- A. Storage & staging areas may be available on a limited basis. Due to the number of projects in progress or projected to be in progress, the State does not guarantee the availability of such

areas on airport property. The Contractor may request storage & staging area(s) within AOA fence once the Notice to Proceed date is set.

- B. The Contractor shall confine all operations (including storage of material) on the Airport premises to areas authorized or approved by the Engineer. The Contractor shall hold and save the Airports Division free and harmless from liability of any nature occasioned by the Contractor's performance.
- C. The Contractor shall use only established roadways. When materials are transported in prosecuting the work, vehicle shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local laws or regulations. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, and roadways.

1.16 CLEANING UP

- A. The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Airports Division. Upon completing the work, the Contractor shall leave the work area in clean, neat, and orderly condition satisfactory to the Engineer.

1.17 VERIFICATION OF DIMENSIONS

- A. The Contractor shall be responsible for the coordination and proper relation of his work to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Owner's Representative of any discrepancy between the field measurements and the plan dimensions before performing any work.

1.18 STANDARDS & CODES

- A. Wherever references are made in the contract to the respective standards, specifications and advisory circulars in accordance with which work is to be performed or tested, it is to be understood that the edition or revision of the standards, specifications and advisory circulars in effect on the date of the bidder's proposal shall apply unless otherwise expressly set forth in the contract. Unless otherwise specified, reference to such standards is solely for technical information.
- B. In case of conflict among any such referenced standards and codes or between any such standard(s) or code(s) and the requirements of the Contract, the stricter requirement shall govern.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAVEMENT

4.01 METHOD OF MEASUREMENT

A. Work under this section will be measured for payment and paid for at the pre-approved contract price.

4.02 BASIS OF PAYMENT

A. All payments shall be full compensations for all work described under this Section, and all materials, labors, tools, equipments, and incidentals needed to complete the Contract.

B. Payment will be made under:

| <u>Item No.</u> | <u>Item</u> | <u>Unit</u> |
|-----------------|------------------------------------|-------------------|
| 01000.1 | Temporary Traffic Signs & Controls | Allowance (ALLOW) |
| 01000.2 | Unforeseen Conditions | Allowance (ALLOW) |
| 01000.3 | Material Short Supply | Allowance (ALLOW) |

END OF SECTION

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work under separate contracts.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and drawing conventions.
8. Miscellaneous provisions.

B. Related Requirements:

1. SECTION 01580 TEMPORARY FACILITIES AND UTILITIES for limitations and procedures governing temporary use of Owner's facilities.

C. Conflicts:

1. In the event of conflicts between the requirements of this Section and any other Section of this Specification the stricter requirement in the judgement of the State Project Manager shall govern.

1.02 PROJECT INFORMATION

A. Project Identification: Project CO1328-43, Replace Admin Tower 5th Floor AC System

1. Project Location: Daniel K. Inouye International Airport,
300 Rodgers Blvd, Honolulu, HI 96819. Telephone (808) 836-6411

B. Owner: State of Hawaii Airport System owned and operated by the State of Hawaii, Department of Transportation, Airports Division

1. Owner's Representative: Mr. Roy Sakata, Oahu Air District Manager

1.03 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and described in Section 01000, Part 1

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.04 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's tenants, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.05 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site and existing adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day- to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other

occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.

2. Notify Owner not less than ten working days in advance of activities that will affect Owner's operations.

1.06 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Coordinate work hours with the Airport Manager
- C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 1. Notify Owner not less than ten working days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations. Contractors shall submit an "Outage Request Form" at Daniel K. Inouye International Airport and a written request at all other airports.
- D. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.07 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

- B. **DIVISION 01- GENERAL REQUIREMENTS:** Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. **Drawing Coordination:** Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. **Terminology:** Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. **Abbreviations:** Materials and products are identified by abbreviations
 3. **Keynoting:** Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 PROJECT DOCUMENTATION

- A. The contract will not be considered complete until required submittals have been received and accepted by the State.

1.03 DETAILED CONSTRUCTION SCHEDULE

- A. The Contractor shall submit a detailed construction schedule to the Engineer for review, no later than thirty (30) calendar days after award of the Contract. The detailed construction schedule shall be based on a detailed critical path analysis of construction activities and sequence of operations needed for the orderly performance and completion of any separable parts of any work and all work in accordance with the Contract. The schedule shall be Critical Path Method (CPM) type in the form of an arrow diagram and activity listing or comprehensive bar graph. The network diagram shall show in detail and in orderly sequence all activities on a time scale, their descriptions, durations and dependencies, necessary and required to complete all work and any separable parts thereof. The schedule shall show in detail the following information for each activity:

1. Identification by code numbers and description;
2. Duration;
3. Craft and Equipment;
4. Earliest start and finish dates;
5. Latest start and finish dates;
6. Total and free float time; and
7. Highlighted Critical Path

- B. The construction schedule shall be complete in all respects, covering in addition to activities at the site of work, off-site activities such as design, fabrication, and

procurement of equipment; the scheduled delivery dates of such equipment; submittal and approval of shop drawings and samples; ordering and delivery of materials; inspections; and testing. The schedule shall also include a manpower forecast by crafts. The detailed construction schedule shall be supplemented by a three-week schedule prepared by the Contractor and submitted to the Engineer on a weekly basis. The Contractor shall promptly inform the Engineer of any proposed change in the schedule and shall furnish the Engineer with a revised schedule and cash flow diagram within fifteen (15) calendar days after approval of such change.

- C. The schedule shall be kept up to date, taking into account the actual progress of work and shall be updated if necessary, every thirty (30) calendar days. The updated schedule shall, as determined by the Engineer, be sufficient to meet the requirements for the completion of the separable parts of work and the entire projects as set forth in the contract.
- D. Upon commencing work, the Contractor shall submit at the start of each week to the Engineer for review, a detailed two (2) week construction schedule.
- E. If at any time during the progress of the Work, the Contractor's actual progress appears to the Engineer to be inadequate to meet the requirements of the contract, the Engineer will notify the Contractor of such imminent or actual noncompliance with the contract. The Contractor shall thereupon take such steps as may be necessary to improve his progress and the Engineer may require an increase in the labor force, the number of shifts, and/or overtime operations, days of work and/or the amount of construction plants all without additional cost to the State. Neither such notice by the Engineer nor the Construction Manager's failure to issue such notice shall relieve the Contractor from his obligation to achieve the quality of work and rate of progress required by the contract. Failure of the Contractor to comply with instructions of the Engineer under these provisions may be grounds for determination by the State that the Contractor is not prosecuting work with such diligence as will assure completion within the times specified. Upon such determination, the State may employ labor and equipment and charge the Contractor for the cost thereof, including depreciation for plant and equipment or may terminate the Contractor's right to proceed with the performance of the contract, or any separable part thereof, in accordance with the applicable provisions of the contract.
- F. The Contractor shall submit to the Engineer one (1) reproducible and three (3) prints of the detailed construction schedule and of each revised schedule submitted thereafter.

1.04 SCHEDULE OF VALUES

- A. The Contractor shall submit the Schedule of Values to the Engineer for review, no later than thirty (30) calendar days after award of the Contract.
- B. Format and Content: Use the Project Specifications table of contents as a guide to

establish the format for the Schedule of Values. Provide at least one line item for each Specification Section. Provide a breakdown of the contract sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principle work or subcontract amounts down into several smaller identifiable items of work.

- C. Identification: Include the following Project identification on the schedule of values:
 - 1. Project name and location
 - 2. Project number
 - 3. Contractor's name and address
 - 4. Contract No.
 - 5. Date of submittal

- D. Arrange the Schedule of Values in tabular form with separate columns to indicate the following items listed:
 - 1. Related Specification Section or Division
 - 2. Description of work
 - 3. Dollar value and percent complete

- E. Correlate line items in the Schedule of Values with other required administrative schedules and forms including;
 - 1. Construction Schedule
 - 2. Application for Payment forms including continuation sheets
 - 3. List of Subcontractors
 - 4. List of principle suppliers and fabricators
 - 5. Schedule of submittals

- F. Round amount to nearest whole dollar; the total shall equal the contract sum.

- G. Provide a separate line item in the Schedule of Values for each part of the work where Applications for Payment may include materials or equipment, purchased, fabricated or stored, but not yet installed.

- H. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment or when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 OTHER SUBMITTALS REQUIRED BEFORE CONSTRUCTION

The Contractor shall submit the following items prior to or at the pre-construction meeting or unless otherwise noted:

1. Name, residence phone number, addresses and scope of authority for the following persons:
 - a. Superintendent
 - b. Contractor's authorized representative to sign documents
 - c. Two (2) additional persons who can be contacted during non-working hours for emergencies.
 - d. Field Office location and phone numbers (cellular, pager, fax, etc.)
2. Name of Safety Officer
3. Notice of Materials to be furnished
4. Three (3) copies each of Certificates of Insurance. The State of Hawaii, Department of Transportation, Airports Division shall be named as additionally insured. If canceled, thirty (30) days written notice to the State of Hawaii must be given. If certificates are not correct, work cannot proceed.
5. Three (3) copies each Insurance and Tax Rates.
6. List of apprentices who will be working on the project supported with the Statement of Apprenticeship or copy of the Apprenticeship Agreements registered with the State Board, for each apprentice.
7. List of equipment to be used on the job. Designate maximum working height and capacity of equipment involved and their respective rental rates.
8. Three (3) copies of an expenditure (cash flow) plan consisting of an anticipated work completion graph plotting contract time and gross payment anticipated.

1.06 SHOP DRAWINGS, SAMPLES, CATALOG CUTS, AND CERTIFICATES

- A. Submittal Schedule: Prior to the submission of any shop drawings or submittals, the Contractor shall submit to the Engineer for review, a submittal schedule. The schedule shall identify the subject matter of each submittal, the corresponding specification section number and the proposed date of submission. During the progress of work, the Contractor shall revise and resubmit the submittal schedule as directed by the Engineer.
- F. The Contractor shall submit for review to the Engineer, or to a representative designated by the Engineer, six (6) copies of all shop drawings, samples, catalog cuts and certificates. Three (3) copies will be returned to the Contractor with information of review action. The Contractor shall submit additional quantities for their subcontractor's or supplier's use. Each shop drawing, certificate of compliance, sample, and equipment list shall be checked and certified correct by the Contractor, and shall be identified with the applicable information specified hereinafter under "Submittal Identification."
- G. Revisions to the drawings may be made, and when deemed necessary by the Engineer during progress of the work, additional detailed drawings will be furnished to the Contractor. These additional drawings will be considered as forming part of the Contract.
- H. Items are to be reviewed prior to commencing fabrication or delivery of material to the job site.
- I. Each copy of the drawings, certificates, catalog cuts, and lists reviewed by the Engineer will be stamped "REVIEW ACTION" with the appropriate action noted therein. The review of the Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Acceptance of such drawings will not relieve the Contractor the responsibility of conforming to the contract drawings and specifications or for any error or omission which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Each shop drawing submitted for review shall have, in the lower right-hand corner just above title, a white space 4" x 4" in which the Engineer can place the stamp and indicate action taken. The Contractor shall also inform their subcontractors to provide this space in their preparation of shop drawings.
- J. The Contractor shall furnish working drawings for structures which shall consist of the detailed plans required to control the work. The working drawings to be furnished by the Contractor shall include, but not be limited to, stress sheets, anchor bolt layouts, shop details, erection plans, cribs, cofferdams, falsework, centering, form work, and other temporary work and methods of construction.
- K. The Contractor shall be responsible for the accuracy of dimensions and details, and for

agreement of dimensions and details. The Contractor shall also be responsible for the agreement and conformity of the working drawings with the plans and specifications.

- L. All working drawings shall be accepted by the Engineer prior to implementation on the project and such acceptance shall not operate to relieve the Contractor of responsibility under the Contract for the successful completion of the work.

1.07 MAINTENANCE DATA AND OPERATING INSTRUCTIONS

- A. Six (6) copies of maintenance data and operating instructions shall be submitted by the Contractor at the conclusion of the equipment installation. The manuals shall be assembled in one or more binders, each with a title page, typed table of contents, and heavy section dividers with numbered plastic index tabs. The binders shall be a minimum of 2 inches thick, three ring, "D slant" with hard covers. All data shall be punched for binding and composition and printing shall be arranged so that punching does not obliterate any data. The project number, project title, and Airport shall be inserted in the front and backbone binder cover.
- B. The Contractor shall submit a draft to the Engineer for review prior to the submission of the final copies.
- C. The manual shall include separate sections describing each equipment. Provide a general description of the equipment, instructions for operation, maintenance, recommended inspection points and periods for inspection, testing, adjustments, calibration procedures with illustrations, wiring diagrams, trouble shooting situations and solutions, and repair methods in a practical, complete, and comprehensive manner.
- D. For each equipment, include information on detailed parts listings (part numbers and costs) with the manufacturer's name, address, contact person, e-mail address and phone/fax numbers. Provide the contact name, address, e-mail address and phone/fax numbers of the distributor in the State of Hawaii for each equipment.
- E. Include a separate section on warranty information on all products and equipment. Provide this information in a tabular format with a listing on all products and equipments with warranty start and completion dates for each item. Include separate sections on all approved submittals, test reports, certifications, etc.
- F. All information shall be arranged in a logical, orderly sequence. Manuals submitted by the manufacturer will not be accepted.

1.08 TEST REPORTS

- A. Six copies of test reports for any material used in this Contract shall be submitted when specified or required by the Engineer.

1.09 SUBMITTAL IDENTIFICATION

- A. To avoid rejection and to clarify each submittal, the General Contractor shall have a rubber stamp made up in the following format:

General Contractor's Name

PROJECT TITLE: _____

AIRPORT: _____

STATE PROJECT NO: _____

AIP PROJECT NO: _____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR
AND IS CERTIFIED CORRECT AND IN COMPLIANCE WITH THE CONTRACT
DRAWINGS AND SPECIFICATIONS.

ITEM NO. _____

SUBMITTAL NUMBER _____

DATE RECEIVED _____

SPECIFICATION SECTION # _____

SPECIFICATION PARAGRAPH # _____

DRAWING NUMBER _____

SUBCONTRACTOR NAME _____

SUPPLIER NAME _____

MANUFACTURER NAME _____

CERTIFIED BY _____
(Contractor's Signature, Date)

(Contractor's Name and Title)

- C. This stamp "filled in" should appear on each reproducible shop drawing, on the cover sheet of copies of test and mill reports, certificates of compliance, catalog cuts, brochures, etc. The stamp should be placed on a heavy stock paper merchandise (approximately 3" x 6") and one tag tied to each sample submitted for approval. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample they can be matched up again. The back of this tag will be used by the Engineer for receipt, approval, and log stamp for any comments that relates to the sample.
- D. Submission Number: Each submission is to be sequentially numbered in the space provided in the Contractor's stamp. Correspondence and transmittal will refer to this number.
- E. The Contractor shall ensure that all submittals, including shop drawings, are complete

and in conformance to the requirements of the Contract specifications prior to submission to the State for review and acceptance. Incomplete submittals will not be processed by the State and returned to the Contractor for correction. Any cost impacts and delays in the Project schedule as a result of incomplete submittals shall be the responsibility of the Contractor.

1.10 AS-BUILT DRAWINGS

- A. The Contractor shall maintain at the job site one (1) copy of the specifications, addenda, approved shop drawings, change orders and other modifications in good order and marked to record all changes made during construction.
- B. The Contractor shall maintain on the job site two (2) sets of full-size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction.
- C. Actual location of work shall be clearly recorded as the work progresses including all changes to the contract and equipment size and type. Drawings shall be available at the site at all times for inspection.
- D. The Contractor at his own expense, shall incorporate all field changes, Post Construction Document (PCD) changes, etc. in a clearly legible manner utilizing the symbols of the Contract drawings onto the red-line contract drawings. All underground stubouts shall be dimensionally located from the building structure.
- E. The Contractor shall be responsible for the accuracy of dimensions and details, and for agreement of dimensions and details. The Contractor shall also be responsible for the agreement and conformity of the working drawings with the plans and specifications.
- F. Where a choice of material or method is permitted herein or where variations in scope of character of work from that of the original contract or authorized, the drawings shall be marked to define the construction actually provided. Where equipment installation is involved, the size, manufacturer's name, model number, power input or output characteristics as applicable shall be shown on the as-built drawings.
- G. The representation of such changes shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction.
- H. The drawings shall be maintained and updated on a daily basis. The Contractor shall stamp, sign, and date each sheet with the following stamp:

AS-BUILT DRAWINGS/SPECIFICATIONS

This certifies that the dimensions and details shown on this sheet reflect the dimensions and details, and specifications as constructed in the field.

CONTRACTOR'S NAME

Signature

Date

- F. Monthly and final payments to the Contractor shall be subject to prior approval of the drawings. On completion of the work, both sets of marked-up drawings shall be delivered to the Engineer, and shall be subject to approval before acceptance.

1.11 GUARANTEES

- A. Guarantee periods shall start at time of acceptance in writing by the State.
- B. All guarantees and warranties shall be made out to the "State of Hawaii." Supplier and subcontractor guarantees shall be co-signed by the Contractor.
- C. The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor's own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.
- D. Organize guarantees and warranties into an orderly sequence based on the Table of Contents of the Project Manual.
 - 1. Bind guarantees and warranties in heavy-duty, 3-ring, vinyl covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 x 11 inch paper (letter size).
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate guaranty/warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "GUARANTEE AND WARRANTIES", project name, and name of Contractor.

Additional Copies: Provide additional copies of each guaranty and warranty to include in each operation and maintenance manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

SECTION 01400 - CONTRACTOR QUALITY CONTROL PROGRAM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 GENERAL

- A. The Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.
- B. The intent of this section is to enable the Contractor to establish a necessary level of control that will:
 - 1. Adequately provide for the production of acceptable quality materials.
 - 2. Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.
 - 3. Allow the Contractor as much latitude as possible to develop his or her own standard of control.
- C. The Contractor shall be prepared to discuss and present, at the pre-construction conference, his/her understanding of the quality control requirements. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed and approved by the Engineer. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been reviewed and approved.

1.03 DESCRIPTION OF PROGRAM

- A. General Description. The Contractor shall establish a Quality Control Program to perform inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests

required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of quality control.

- B. Quality Control Program. The Contractor shall describe the Quality Control Program in a written document which shall be reviewed and approved by the Engineer prior to the start of any production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review no later than thirty (30) calendar days after award of the Contract.
- C. The Quality Control Program shall be organized to address, as a minimum, the following items:
 - 1. Quality control organization;
 - 2. Submittals schedule;
 - 3. Inspection requirements;
 - 4. Quality control testing plan;
 - 5. Documentation of quality control activities; and
 - 6. Requirements for corrective action when quality control and/or acceptance criteria are not met.
 - 7. A listing of the definable features of work for the project.
- D. The Contractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all production and/or construction processes required by this contract.

1.04 QUALITY CONTROL ORGANIZATION

- A. The Contractor's Quality Control Program shall be implemented by the establishment of a separate quality control organization that is not a part of the production organization.
- B. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel. The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work. At the top of the chart, an overall Contractor Quality Control System Manager, CQCSM, shall be named and his/her subordinates shall follow thereafter.
- C. The quality control organization shall consist of the following minimum personnel:
 - 1. Contractor Quality Control System Manager
 - a. The CQCSM shall be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCSM shall have a minimum of 5 years of experience in airport and/or paving and building construction and shall have had prior quality control experience on a project of comparable size and scope as the contract. The CQCSM shall be on the project full time and

shall have no production duties. The CQCSM shall NOT be the point of contact for the production organization.

The CQCSM shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical specifications including authority to independently stop any work not in compliance with the contract. The CQCSM shall report directly to a responsible officer of the construction firm, such officer not being the project superintendent or foreman. The CQCSM may supervise the Quality Control Program on more than one project provided that person can be at the job site within 2 hours after being notified of a problem and a Quality Control Technician is present on the job site full time.

2. Quality Control Technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall be either engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate fields and shall have a minimum of 2 years of experience in their area of expertise.
 - a. The quality control technicians shall report directly to the CQCSM and shall perform the following functions:
 - i. Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by Section 1.06.
 - ii. Performance of all quality control tests as required by the technical specifications and Section 1.07.
3. Staffing
 - a. The Contractor shall provide sufficient qualified quality control personnel to monitor each work activity at all times. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state where different technicians will be required for different work elements.
 - b. All personnel shown on the organizational chart shall have, in resume form, all information regarding their education, any licenses, their present position, previous work experience, etc. included in the Quality Control Program written documentation. These resumes shall be verified by the CQCSM.

1.05 SUBMITTALS SCHEDULE

- A. The Contractor shall submit a detailed listing of all submittals (e.g., mix designs, material certifications, color samples) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include:
 1. Specification item number;
 2. Item description;
 3. Description of submittal;

4. Specification paragraph requiring submittal; and
5. Scheduled date of submittal.

1.06 INSPECTION REQUIREMENTS

- A. Quality control inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor.
- B. Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work.
- C. Before any definable feature of work is started, the CQCSM shall notify the Engineer of such work at least 48 hours in advance. Upon notification, the Engineer shall determine if a meeting shall be held to discuss the condition of the work area, material and equipment status, what is to be expected and any questions or possible problems. No definable feature work shall commence without the consent of the Engineer.

1.07 QUALITY CONTROL TESTING PLAN

- A. As a part of the overall Quality Control Program, the Contractor shall implement a quality control testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification item, as well as any additional quality control tests that the Contractor deems necessary to adequately control production and/or construction processes.
- B. The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:
 1. Specification item number;
 2. Item description (e.g., concrete cylinder test);
 3. Test type (e.g., concrete compressive strength);
 4. Test standard (e.g., ASTM or AASHTO test number, as applicable);
 5. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated);
 6. Responsibility (e.g., plant technician, independent lab); and
 7. Control requirements (e.g., target, permissible deviations).
- C. The testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D 3665. The Engineer shall be provided the opportunity to witness quality control sampling and testing. The CQCSM shall make every effort to inform the Engineer at least 24 hours, or more if stated in the specifications, before such testing occurs.
- D. All quality control test results shall be documented by the Contractor as required by Section 1.08.

1.08 DOCUMENTATION

- A. The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.
- B. These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCSM.
- C. Specific Contractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:
 - 1. Daily Inspection Reports. Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and Subcontractor operations on a form acceptable to the Engineer. These technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following:
 - a. Technical specification item number and description and location of work performed;
 - b. A comprehensive breakdown of the work force including the number of workers and total hours for each trade.
 - c. Compliance with approved submittals;
 - d. Proper storage of materials and equipment;
 - e. Proper operation of all equipment;
 - f. Adherence to plans and technical specifications;
 - g. Review of quality control tests; and
 - h. Safety inspection.
 - 2. The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.
 - 3. The daily inspection reports shall be signed by the responsible quality control technician and the CQCSM. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.
 - 4. Daily Test Reports. The Contractor shall be responsible for establishing a system which will record all quality control test results. Daily test reports shall document the following information:
 - a. Technical specification item number and description;

- b. Test designation;
- c. Location;
- d. Date of test;
- e. Control requirements;
- f. Test results;
- g. Causes for rejection;
- h. Recommended remedial actions; and
- i. Retests.

Test results from each day's work period shall be submitted to the Engineer prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical quality control charts. The daily test reports shall be signed by the responsible quality control technician and the CQCSM.

1.09 CORRECTIVE ACTION REQUIREMENTS

- A. The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.
- B. The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.
- C. When applicable or required by the technical specifications, the Contractor shall establish and utilize statistical quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

1.10 SURVEILLANCE BY THE ENGINEER

- A. All items of material and equipment shall be subject to surveillance by the Engineer at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed herein and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to surveillance by the Engineer at the site for the same purpose.
- B. Surveillance by the Engineer does not relieve the Contractor of performing quality control inspections of either on-site or off-site Contractor's or subcontractor's work.

1.11 NONCOMPLIANCE

- A. The Engineer will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer or his/her authorized representative to the Contractor or his/her authorized representative at the site of the work, shall be considered sufficient notice.

- B. In cases where quality control activities do not comply with either the Contractor's Quality Control Program or the Contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer, the Engineer may:
 - 1. Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors in accordance with Section 8.5 of the General Provisions.
 - 2. Order the Contractor to stop operations in accordance with Section 8.6 of the General Provisions.
 - 3. Determine work performed by the Contractor during periods of noncompliance to be unacceptable and subject to inspection, removal or non-payment in accordance with Section 5.8 of the General Provisions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 01533 - BARRICADES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 BARRICADES

- A. The contractor shall take precaution to protect people and property from injury and damage. He shall erect barricades to delineate his work areas and provide the appropriate signing, hazard lights, and temporary paint striping as directed by the Engineer, to aid public and airport pedestrian and vehicular traffic around his work areas. Barricades shall be traffic cones, delineators, blinker barricades, caution tape, sawhorses, plywood barricades or other barriers as approved by the Engineer to effectively provide proper protection.
- B. The contractor shall be responsible for his own security and protection of his property, including mobilization yard barricades.
- C. Barricades, in general, shall be neat and in good condition, as required for protection. In areas frequented by the general public, the barricades shall be visually presentable and plywood partitions shall be painted. Where dust is a problem, the Contractor shall erect floor to ceiling dust proof partitions
- D. The Contractor shall coordinate and sequence this work with the Engineer to permit the continuing operation of the existing Airport facility. Barricades shall be removed upon the completion and acceptance of work and the premises left clean and operational.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 01560 - ENVIRONMENTAL CONTROLS

PART I – GENERAL

1.1 RELATED DOCUMENTS

- A. The General Provisions, Special Provisions, and Technical Provisions, apply to the work specified in this section. Special attention is directed to the following Articles:
1. State of Hawaii, Air and Water Transportation Facilities Division, General Provisions for Construction Projects, Article VI, Control of Materials, Paragraph 6.8 Non-Conforming Materials.
 2. State of Hawaii, Air and Water Transportation Facilities Division, General Provisions for Construction Projects, Article VII, Legal Relations and Responsibility to Public, Paragraph 7.14 Pollution Control and Protection of Archeological Historical, and Burial Sites.
 3. State of Hawaii, Air and Water Transportation Facilities Division, General Provisions for Construction Projects, Article VII, Legal Relations and Responsibility to Public, Paragraph 7.17 Contaminated or Hazardous Items and Material; Regulated Items and Material; Waste.
 4. Section 01561 Construction Site Runoff Control Program.
 5. Section 01562 Management of Contaminated Media.
- B. The latest version of the State of Hawaii, Department of Transportation, Airports Division (DOTA) Construction Activities BMP Field Manual.

1.2 ENVIRONMENTAL PROTECTION

With the exception of those measures set forth elsewhere in these specifications, environmental protection shall consist of the prevention of environmental pollution as the result of construction operations under this contract. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utilization of the environment for aesthetic and recreational purposes.

1.3 APPLICABLE REGULATIONS

In order to provide abatement and control of environmental pollution arising from the construction activities of the Contractor and their Subcontractors in the performance of this contract, the work performed shall comply with the intent of all applicable Federal, State, and Local laws and regulations concerning environmental pollution control and abatement, including, but not limited to, the following regulations:

- A. State of Hawaii, Department of Health, Administrative Rules, Chapter 55, WATER POLLUTION CONTROL; Chapter 54, WATER QUALITY STANDARDS.
- B. State of Hawaii, Department of Health, Administrative Rules, Chapter 59, AMBIENT AIR QUALITY, Chapter 60.1, AIR POLLUTION CONTROL.
- C. State of Hawaii, Department of Health, Administrative Rules, Chapter 42, VEHICULAR NOISE CONTROL.
- D. State of Hawaii, Department of Health, Administrative Rules, Chapter 46, COMMUNITY NOISE CONTROL.
- E. State of Hawaii, Occupational Safety and Health Standards, Title 12, Department of Labor and Industrial Relations, Subtitle 8, Division of Occupational Safety and Health, Part 3 Construction Standards, Chapter 145 Asbestos.
- F. Environmental Protection Agency, Code of Federal Regulations Title 40, Part 61, Subpart M (Revised Subpart B), NATIONAL EMISSION STANDARDS FOR AIR POLLUTANTS and Subpart B, NATIONAL EMISSION STANDARDS FOR ASBESTOS; Final Rule dated November 20, 1990.
- G. State of Hawaii, Department of Health, Title 11, Chapter 501, Asbestos Requirements.
- H. U.S. Department of Labor - Occupational Safety and Health Administration (OSHA) Asbestos Regulations, Code of Federal Regulations Title 29, Parts 1910, 1915 and 1926, Occupational Exposure to Asbestos, Final Rule dated August 10, 1994.

1.4 SUBMITTALS

The Contractor shall submit the following items within 30 calendar days after the Notice to Proceed Date:

- A. Submit proposed means, methods, techniques and procedures to be used for environmental control.
- B. Submit a State of Hawaii Department of Health Asbestos Notification of Demolition and Renovation Form for all demolition projects (including facilities which no asbestos is present) and renovation projects per HAR 11-501.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 AIR POLLUTION CONTROL

- A. Emission: The Contractor shall not be allowed to operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments are made, as determined by the Engineer.
- B. Dust: The Contractor, for the duration of the contract, shall maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within or without the project limits free from dust which would cause a hazard to the work or operations of other Contractors, or to persons or property. Industry-accepted methods of stabilization suitable for the area involved, such as sprinkling or similar methods, will be permitted. Chemical or oil treating shall not be used.
- C. Burning on Airport property shall not be permitted.

3.2 WATER POLLUTION CONTROL

- A. Wastes: The Contractor shall not deposit, at the airport site or in its vicinity, solid waste or discharge liquid waste, such as fuels, lubricants, bituminous waste, untreated sewage, and other pollutants which may contaminate the body of ground water.
- B. Spillages: No petroleum products, bituminous materials, or other deleterious substances, including debris, are allowed to fall, flow, leach, or otherwise enter the sewage systems or storm drains. All spills shall be immediately reported by following the instructions found on the Spill Reporting Fact Sheet for the appropriate airport and completing the Spill Reporting Form. The Spill Reporting Fact Sheet and Form can be found at:

<http://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program>

Any fines assessed to DOTA, as a result of Contractor's spillages or the Contractor's failure to report spillages, shall be paid by the Contractor.

Reference Specification Section 01562, Paragraph 3.3(C) Release Reporting for additional information and requirements.

- C. Erosion: The Contractor shall provide any necessary temporary drainage, dikes, and similar facilities to prevent erosion damage to the site. Run-off shall be controlled to prevent damage to the surrounding area.

3.3 NOISE CONTROL

- A. At all times keep objectionable noise generation to a minimum by:
 - 1. Equipping air compressors with silencing packages.
 - 2. Equipping jackhammers with silencers on the air outlet.
 - 3. Equipment that can be electrically driven instead of gas or diesel is preferred. If noise levels on equipment cannot reasonably be brought down to criteria, listed as follows, either the equipment will not be allowed on the job or use time will have to be scheduled subject to approval of the Engineer.
 - 4. All construction vehicles and equipment on the project operating between 10:00 p.m. and 7:00 a.m. shall be equipped with an ambient noise sensing variable volume backup alarm system. The system shall be in compliance with Title 29 of the Code of Federal Regulations, Part 1926.601(b)(4)(i).
- B. Objectionable noise received on neighboring properties is defined as any noise exceeding the noise limits of State Regulations (Title 11, Hawaii Administrative Regulations, Department of Health, Chapter 46 – Community Noise Control) or City and County of Honolulu ordinance, as stated below, or as any noise causing a public nuisance in a residential area, as determined by the State and community representatives, or by the nuisance provisions of local ordinances.
 - 1. The noise limitations established are as set forth in the following table after any applicable adjustments provided for herein are applied:

RECEIVING PROPERTY

| <u>Noise Source</u> | <u>Residential</u> | <u>Commercial</u> | <u>Industrial</u> |
|---------------------|--------------------|-------------------|-------------------|
| Airport | 50 dBA | 65 dBA | 70 dBA |

- 2. Between the hours of 6:00 pm to 5:00 am on weekdays and weekends, the noise limitations above may be exceeded for any receiving property by no more than:
 - a. Five dBA for a total of 15 minutes in any one hour period; or
 - b. Ten dBA for a total of 5 minutes in any one hour period; or
 - c. 15 dBA for a total of 1.5 minutes in any one hour period.
- C. In addition to the noise controls specified, demolition and construction activities conducted within 1,000 feet of residential areas may have additional noise controls required.

- D. The Contractor and its subcontractor operations shall, at all times, comply with all State of Hawaii and City and County of Honolulu requirements.
- E. For work conducted within Airport buildings, noise levels from work activities shall not exceed 85 dBA on the slow scale at the project boundary.

3.4 DISPOSAL

Construction waste, such as crates, boxes, building materials, pipes, and other rubbish shall be properly disposed of at a licensed landfill. Please consult with the local landfill to ensure that objects meet the specific landfill's requirements for size, type, etc. Other areas or methods proposed by the Contractor will be approved only if the Engineer determines that their effect on the environment is equal to or less than those described herein.

3.5 HAZARDOUS MATERIALS CONTROL

- A. The use of hazardous materials, i.e., asbestos and PCB, in the construction of this project shall be strictly prohibited. Any corrective action to remove and replace the hazardous material and contaminated work shall be at the sole expense of the Contractor.

B. DEFINITIONS

1. HAZARDOUS SUBSTANCE – Any substance designated pursuant to Section 311(b)(2)(A) of the Clean Water Act; any element, compound, mixture, solution, or substance designated pursuant to Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act; any toxic pollutant listed under Section 307(a) of the Clean Water Act; any hazardous air pollutant listed under Section 112 of the Clean Air Act, as amended (42 U.S.C. §§7401-7626); any imminently hazardous chemical substance or mixture regulated under Section 7 of the Toxic Substances Control Act, as amended (15 U.S.C. §§2601-2671), oil, trichloro propane, and any other substance or pollutant or contaminant designated by rules adopted pursuant to this chapter (Chapter 128D, Hawaii Revised Statutes)
2. OIL – Oil Waste of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, oil mixed with waste, crude oil or any fraction or residue.
3. POLLUTANT OR CONTAMINANT – Any element, substance, compound, or mixture, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism either directly from the environment or indirectly by ingestion through food chains, will or may

reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformation, in such organism or their offspring.

PART 4 – MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT AND PAYMENT

All work specified in this Section shall not be measured nor paid for separately but shall be considered incidental to item 01561, Construction Site Runoff Control Program.

END OF SECTION

SECTION 01561 – CONSTRUCTION SITE RUNOFF CONTROL PROGRAM

PART 1 – GENERAL

1.01 DESCRIPTION.

This Section describes the following:

- (A) The Contractor shall comply with the following referenced documents:
- State of Hawaii, Department of Transportation, Airports Division (DOTA) Construction Activities Best Management Practices (BMP) Field Manual, in developing, installing, and maintaining Site-Specific BMPs for all projects.
 - DOTA's Storm Water Programs (SWMPP) for the Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG), as applicable.
 - Hawaii Administrative Rules (HAR) Chapters 11-54, 11-55, and 11-60.
 - Honolulu's City and County "Rules Relating to Water Quality" for all projects on Oahu. Use respective Soil Erosion Guidelines for Maui, Kauai and Hawaii projects.
 - Applicable Federal, State and Local Permit Conditions.
 - All other documents referenced in this Section.

For any conflicting requirements between the referenced documents and applicable bid documents, the stricter requirement will prevail and govern. Should a requirement not be clearly described within the applicable bid documents, notify the Engineer immediately for interpretation. For the purposes of clarification, "applicable bid documents" include the construction plans, specifications, and Permits.

- (B) Detailed plans, diagrams, and written Site-Specific Best Management Practices (BMPs); construction, maintenance, and repair of temporary water pollution, dust, and erosion control measures at the project site, including local material sources, work areas, and haul roads; removal and disposal of hazardous wastes; control of fugitive dust (defined as uncontrolled emission of solid airborne particulate matter from any source other than combustion).
- (C) Work associated with construction stormwater, dewatering, and hydrotesting activities and compliance with conditions of the Notice of General Permit Coverage (NGPC) or National Pollutant Discharge Elimination System (NPDES) permit(s) authorizing discharges associated with construction stormwater, dewatering, and hydrotesting activities.
- (D) Potential pollutant identification and mitigation measures, listed in Appendix A for use in the development of the Contractor's Site-Specific BMP.

Requirements of this Section also apply to construction support activities including: concrete or asphalt batch plants, rock crushing plants, equipment staging yards/areas, material storage areas, excavated material disposal areas, and borrow areas located both inside and outside of the Airport Property and State Right-of-Way. For areas serving multiple construction projects or operating beyond the completion of the construction project in which it supports, the Contractor shall be responsible for securing the necessary permits, clearances, and documents, and following the conditions of the permits and clearances, at no cost to the State.

The Contractor shall be responsible for all applicable subcontractors, suppliers and vendors, and shall ensure that the means and methods of construction activities of applicable subcontractors, suppliers and vendors are in full compliance with this Section.

PART 2 PRODUCTS.

2.01 MATERIALS

Comply with applicable materials described in the current DOTA “Construction Activities BMP Field Manual” and Section 3 and 4 of the current City and County of Honolulu “Storm Water Best Management Practice Manual.” Refer to FAA Advisory Circulars and DOTA District, including Wildlife Hazard Management Plan, for additional guidance and conditions.

In addition, materials shall comply with the following:

- (A) **Grass.** The FAA and USDA recommend the following grass species when requiring grass: “No-Mow” bermudagrass (“Green Velvet”) (*Cynodon dactylon*) or Seashore paspalum (*Paspalum vaginatum*). These species both possess higher than average drought resistance, saline soil tolerances, and, most importantly, do not produce seed heads attractive to the majority of hazardous avian species. It is recommended that stolons, sprigs, or plugs be used to avoid providing hazardous species with a readily available food source. The use of seeds shall not be allowed.

Alternative grass species shall only be applied with the approval of the DOTA Environmental Section. This includes, but not limited to, sodding, cuttings, and planting. Grass shall be a quick-growing species. Grass shall be suitable to the area and provide a temporary cover that will not compete later with permanent cover. The grass label or tag shall be provided to the DOTA Environmental Section.

Irrigation of these grass shall be done during the hours of darkness to avoid providing another hazardous wildlife attractant.

- (B) **Fertilizer and Soil Conditioners.** Fertilizer and soil conditioners shall conform to Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Subsection 619.02(H)(1) – Commercial Fertilizer. Fertilizers shall not be applied during inclement weather or rain events.

The use of alternative types of fertilizer and soil conditioners shall be subject to the approval of the DOTA Environmental Section.

- (C) **Hydro-mulching.** Hydro-mulching used as a temporary stabilization measure shall consist of specially processed fiber which shall form a homogeneous slurry after addition and agitation in hydro-mulch applicator equipment.

1. Mulches shall be recycled materials including bagasse, hay, straw, wood cellulose bark, wood chips, or other material acceptable to the DOTA Environmental Section. Mulches shall be clean and free of noxious weeds and deleterious materials.
2. Potable water shall meet the requirements of Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Subsection 712.01 – Water. Submit alternate sources of irrigation water to the Engineer for acceptance by the DOTA Environmental Section if deviating from 712.01 – Water.
3. Soil and Mulch Tackifier shall meet the requirements and installation in accordance with portions of Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Section 641 – Hydro-Mulch Seeding, including 641.02(D) – Soil and Mulch Tackifier. The use of seeds in the hydro-mulch mixtures shall not be allowed.

Alternative materials or methods to control, prevent, remove, and dispose pollution are allowable if acceptable to the DOTA Environmental Section.

PART 3 EXECUTION

3.01 PRECONSTRUCTION REQUIREMENTS

- (1) **Water Pollution, Dust, and Erosion Control Meeting.**
Schedule a water pollution, dust, and erosion control meeting with the Engineer after the Site-Specific BMP Plan is submitted to the Engineer and accepted in writing by the DOTA Environmental Section. The meeting shall be scheduled a minimum of 14 calendar days prior to the Start Work Date. At a minimum, the meeting shall be attended by the Contractor, applicable subcontractors, Engineer, DOTA Environmental Section and/or any authorized representatives of the

designated attendees. The meeting will discuss the sequence of work, and plans and proposals for water pollution, dust, and erosion controls.

(2) **Water Pollution, Dust, and Erosion Control Submittals.**

Submit a Site-Specific BMP Plan within 30 calendar days of Contract Execution to the Engineer for acceptance by the DOTA Environmental Section. Submission of the complete and acceptable Site-Specific BMP Plan is the sole responsibility of the Contractor, and additional contract time will not be issued for delays due to incompleteness.

Include the following:

(a) Written description of activities to minimize water pollution and soil erosion into drainage systems, sewer systems, and State waters. Include proposed means, methods, techniques, and procedures to be used for environmental control. BMP shall include, but not limited to, the following:

1. An identification of potential pollutants and their sources.
2. A list of all materials and heavy equipment to be used during construction.
3. Descriptions of the methods and devices used to minimize the discharge of pollutants into drainage systems, sewer system, and State waters.
4. Details of the procedures used for the maintenance and subsequent removal of any erosion or siltation control devices.
5. Methods of removing and disposing hazardous wastes encountered or generated during construction.
6. Methods of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydro-demolition water.
7. Spill Control and Prevention, and Emergency Spill Response Plan.
8. Fugitive dust control, including dust from earth-disturbing, hauling, grinding, sweeping, or brooming off operations, or combination thereof.
9. Methods of storing and handling of oils, paints, and other products used for the project.

10. Material storage and handling areas, and other staging areas, including storage of reinforcing steel and building material.
11. Concrete truck washouts.
12. Concrete waste and asphalt concrete waste control.
13. Fueling and maintenance of vehicles and other equipment.
14. Tracking of sediment offsite from project entries and exits.
15. Litter management. Prevention of Foreign Object Debris (FOD) is essential.
16. Sanitary/Septic Waste Management and Facilities.
17. Stockpiles of Aggregates, Soils, Asphalt Concrete Material, Concrete Waste, and Asphalt Concrete Waste.
18. Methods of Handling and Removal of Contaminated Soils and Groundwater encountered or generated during construction.
19. Methods and Procedures for Dewatering.
20. Methods and Procedures for Hydro-Testing.
21. Methods and Practices for proper Housekeeping, including excessive sawdust; concrete spill prevention and removal; and collection and removal of building materials waste, such as tie wires, reinforcing steel, and lumber.
22. Other factors that may cause water pollution, dust, and erosion control.

(b) Plans indicating location of water pollution, dust and erosion control devices; plans and details of BMP measures and devices to be installed or utilized; identify areas of soil disturbance in cut and fill; indicate areas used for construction staging and storage, including items (1) through (22) above, storage of aggregate (indicate type of aggregate), asphalt cold mix, soil or solid waste, equipment and vehicle parking, and areas where vegetative practices are to be implemented. Indicate intended drainage pattern on plans. Include flow arrows. Include separate drawing for each phase of construction that alters drainage patterns.

- (c) Dates when BMP measures will be installed and removed.
- (d) Name(s) of specific individual(s) designated responsible for the Contractor's Construction Site Runoff Control Program. Include cellular and business telephone numbers, fax numbers, and e-mail addresses. These individuals shall be available 24 hours a day, 7 days a week.
- (e) Description of fill material to be used.
- (f) For projects with an NGPC or NPDES Permit for Construction Activities, submit information to address all sections in the Storm Water Pollution Prevention Plan (SWPPP), as described in HAR Chapter 11-55, Appendix C, Section 7.
- (g) For projects with an NGPC or NPDES Permit, submit information required for compliance with the conditions of the Notice of General Permit Coverage (NGPC)/NPDES Permit.
- (h) Date and sign the Site-Specific BMP Plan.

Modify, as necessary, and resubmit amended Site-Specific BMP plans and construction schedules to the Engineer for acceptance by DOTA Environmental Section. Modify the Site-Specific BMP Plan to address, but not limited to, the following.

1. To correct conditions that develop during construction which were unforeseen during the design and pre-construction stages.
2. Changes to the Contractor's Means and Method of Construction.
3. Omitted conditions that should have been allowed for in the accepted Site-Specific BMP Plan.
4. A Site-Specific BMP measure that replaces an accepted Site-Specific BMP measure that was not satisfactorily performing.
5. Revised dates of installation and/or removal of Site-Specific BMP measures.

The modifications shall be submitted to the Engineer and accepted in writing by DOTA Environmental Section before implementing the revised Site-Specific BMPs in the field. Amendments to the Site-Specific BMP Plan shall be included with the original Site-Specific BMP Plan.

A copy of the accepted original Site-Specific BMP Plan and all accepted amended Site-Specific BMP Plans, with the signed certification by the authorized representative listed in the NGPC or NPDES Permit, shall be kept on site or at an accessible location so that it can be made available at the time of an on-site inspection, or upon request by the Engineer, DOTA Environmental Section, DOTA's Third Party Inspector, and/or DOH/EPA Representative.

- (3) **Discharges of Stormwater Associated with Construction Activities.** If the project scope consists of ground disturbing activities and the total work area, including all construction support activity areas (i.e. storage and/or staging areas), is one acre or more, an NPDES Permit authorizing Discharges of Storm Water Associated with Construction Activity (CWB-NOI Form C) or Individual Permit authorizing stormwater discharges associated with construction activity is required from the Department of Health Clean Water Branch (DOH-CWB).

Do not begin construction activities until all required conditions of the permit are met and submittals detailed in Subsection 01561.3.01(2) – Water Pollution, Dust, and Erosion Control Submittals are completed, submitted to the Engineer and accepted in writing by the DOTA Environmental Section.

- (4) **Discharges Associated with Hydrotesting Activities.** If hydrotesting activities require effluent discharge into State waters or drainage systems, an NPDES Hydrotesting Waters Permit (CWB-NOI Form F) or Individual Permit authorizing discharges associated with hydrotesting is required from the DOH-CWB.

Do not begin hydrotesting activities until the DOH-CWB has issued an Individual NPDES Permit or Notice of General Permit Coverage (NGPC). Conduct Hydrotesting operations in accordance with the conditions of the permit or NGPC.

- (5) **Discharges Associated with Dewatering Activities.** If dewatering activities require effluent discharge into State waters or drainage systems, an NPDES Dewatering Permit (CWB-NOI Form G) or Individual Permit authorizing discharges associated with dewatering is required from the DOH-CWB.

Do not begin dewatering activities until the DOH-CWB has issued an Individual NPDES Permit or Notice of General Permit Coverage (NGPC). Conduct dewatering operations in accordance with the conditions of the permit or NGPC.

- (6) **Solid Waste Disclosure.** Submit the Solid Waste Disclosure Form for Construction Sites, if applicable, to the Engineer within 30 calendar days of Contract Execution or upon the discovery of the solid waste. Provide a copy of all the disposal receipts from the facility permitted by the Department of Health to receive solid waste to the Engineer. This should also include documentation from any intermediary facility where solid waste is handled or processed.

- (7) **Construction BMP Training.** The Contractor's representative(s), identified in Section 01561.3.01(2)(d), responsible for the Contractor's Construction Site Runoff Control Program, site managers, and appropriate subcontractors' personnel shall be properly trained on environmental compliance by attending a designated DOTA training seminar (e.g. HDOT's Protect Our Water Conference) or viewing the DOTA construction and post-construction training available at:

<http://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program>

Submit completed Training Roster and Construction Training Quizzes to the DOTA Environmental Section (fax: 808-838-8017 or email to dot.air.environmental@hawaii.gov) prior to the start of construction activities.

Individual workers must be trained on their site-specific BMPs by the Contractor's representative(s) and managers who are knowledgeable in the proper manufacturer's installation, maintenance, and repair of the BMP product, or the manufacturer's authorized instructor. The Contractor shall keep training logs updated and readily available.

- (8) **Health and Safety Plan.** A site-specific Health and Safety Plan for excavation work conducted in the known or suspected area of contamination shall be prepared and submitted at least 15 calendar days prior to initiating any excavation work. The Plan shall be applicable to Federal and State regulations.

The Contractor shall retain and pay for the services of a Certified Industrial Hygienist (CIH), certified by the American Board of Industrial Hygiene, to certify training, and review and approve the Health and Safety Plan, excavation procedures, including the determination of the need for personal protective equipment.

The Health and Safety Plan shall describe methods, techniques, and phases for handling the contaminated soil and groundwater, if present, including:

- (a) A sequence of operations
- (b) Method of excavation, transporting, and disposal.
- (c) Soil Stockpiling and Groundwater Storage procedures.
- (d) Proposed equipment.
- (e) Provisions to ensure that chemical and petroleum constituent concentrations, both airborne and in the soil, are below the Department of Health Environmental Action Level (EAL), Permissible Exposure Limit

(PEL) and below the Lower Explosive Limit (LEL). Provide soil testing, air monitoring, personnel monitoring, and air sampling to ensure worker safety as determined by CIH. If airborne concentrations exceed the PEL or the LEL at the control area boundary, then, work must stop immediately and the Engineer and DOTA Environmental Section notified.

3.02 CONSTRUCTION REQUIREMENTS

Do not begin work until submittals detailed in Subsection 01561.3.01(2) – Water Pollution, Dust, and Erosion Control Submittals are completed, submitted to the Engineer and accepted in writing by the DOTA Environmental Section, and required conditions of the NPDES Permit and other applicable permits are met.

Do not expose or disturb surface area of earth material, or initiate any ground-disturbing activities (including clearing and grubbing) until BMPs are installed, functional and accepted in writing by DOTA Environmental Section and/or their designated authorized representative. Only the soil, to the extent that is required to install the BMP measures and devices, shall be disturbed and minimized to the extent possible.

Install, maintain, monitor, repair and replace BMPs, such as for water pollution, dust, and erosion control; installation, monitoring, and operation of hydrotesting activities; removal and disposal of hazardous waste indicated on plans, concrete cutting slurry, concrete curing water; or hydro-demolition water. Address all comments received from the Engineer, DOTA Environmental Section and/or DOTA's Third-party inspector.

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

Protect temporarily or permanently disturbed soil surface from rainfall impact, runoff, and wind before the end of each work day. Coordinate and schedule the work to the maximum extent possible to minimize the amount of exposed or disturbed surface area of earth material.

Immediately *initiate* stabilizing exposed soil areas upon completion of earth disturbing activities for areas permanently or temporarily ceased on any portion of the site. Earth-disturbing activities have permanently ceased when clearing and excavation within any area of the construction site that will not include permanent structures has been completed. Earth-disturbing activities have temporarily ceased when clearing, grading, or excavation within any area of the site will not resume for a period of 14 or more calendar days, but such activities will resume in the future. The term "immediately" is used in this section to define the deadline for *initiating* stabilization measures. "Immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

Any of the following types of activities constitutes initiation of stabilization:

- (1) Prepping the soil for vegetative or non-vegetative stabilization;
- (2) Applying mulch or other non-vegetative product to the exposed area;
- (3) Planting the exposed area;
- (4) Starting any of the activities in items (1) – (3) above on a portion of the area to be stabilized, but not on the entire area; and
- (5) Finalizing arrangements to have stabilization product fully installed in compliance with the deadline for completing initial stabilization activities.

After the initiation of stabilization, stabilization activities shall be completed by the following deadline.

- (1) For projects with an NGPC or NPDES Permit for Construction activities:
 - (a) For construction areas discharging into waters not impaired for nutrients or sediments, complete stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities.
 - (b) For construction areas discharging into nutrient or sediment impaired waters, complete stabilization within 7 calendar days after the temporary or permanent cessation of earth-disturbing activities.
- (2) For projects without an NGPC or NPDES Permit for Construction activities, complete stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities.

Any of the following types of activities constitutes completion of stabilization activities:

- (1) For vegetative stabilization, all activities necessary to initially plant the area to be stabilized; and/or
- (2) For non-vegetative stabilization, the installation or application of all such non-vegetative measures.

If the Contractor is using vegetative cover for temporary or permanent stabilization and is unable to meet the deadlines above due to circumstances beyond the Contractor's control, the Contractor shall notify and provide documentation of the circumstances to the Engineer for acceptance by DOTA Environmental Section. The Contractor shall include in their documentation the schedule that the Contractor will follow for initiating and

completing stabilization. If agreed to by DOTA Environmental Section, the Contractor may, instead, comply with the following stabilization deadlines:

- (1) Immediately initiate, and complete within the timeframe shown above, the installation of temporary non-vegetative stabilization measures to prevent erosion;
- (2) Complete all soil conditioning, planting, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on the site.

Follow the applicable requirements of the contract documents including Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Section 619 and Section 641, as amended.

Where necessary to prevent erosion on the planted area, immediately install non-vegetative erosion controls that provide cover (e.g., mulch, rolled erosion control products) to the area while vegetation is becoming established.

Protect exposed or disturbed surface area with mulches or hydro-mulch with no seeds. Spray mulches at a rate of 2,000 pounds per acre. Add tackifier to mix at a rate of 85 pounds per acre. For hydro-mulch, use the ingredients and rates required for mulches. Apply fertilizer, if applicable, per the manufacturer's recommendations. Mulches, hydro mulch, and/or fertilizers shall not be applied during inclement weather or rain events. Submit recommendations from a licensed Landscape Architect when deviating from the application rates above or manufacturer's recommendations.

Install velocity dissipation measures when exposing erodible surfaces greater than 15 feet in height.

BMP measures shall be in place and operational at the end of each work day or as required by Section 01561.3.01(2).

Install and maintain stabilized construction entrances, including any wheel washes, to minimize tracking of dirt and mud onto roadways, sidewalks, and other paved areas. Restrict traffic to stabilized construction entrance areas only. Clean dirt, mud, or other material tracked onto the road, sidewalk, or other paved area by the end of the same day in which the track-out occurs. If tracking is excessive or sediment is being transported farther along the pavement or sidewalk by other vehicles traveling outside of the construction site, then, conduct cleaning and sweeping immediately. Modify stabilized construction entrances, as needed, to prevent mud from being tracked onto road. Stabilize entire access roads if necessary.

Maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within the project limits free

from dust which would cause a hazard to the work, airport operations, operations of other contractors, or to persons or property. Chemicals may be used as soil stabilizers for erosion and dust control. Submit the manufacturer's product data sheets of the chemicals to the Engineer for acceptance by the DOTA Environmental Section. Oil treating shall not be used. When using water for dust control, only potable water, that conform to Hawaii Standard Specifications for Road and Bridge Construction 2005 or latest edition, Subsection 712.01 – Water, shall be used. Dust screens and fabrics are not allowed on, or inhibit the view of, the TSA and AOA Security Fences.

Cover exposed surface of materials completely with tarpaulin or a similar device when transporting aggregate, soil, excavated material, or other materials that may be a source of fugitive dust.

Provide temporary slope drains of rigid or flexible conduits to carry runoff from cuts and embankments. Provide portable flume at the entrance. Shorten or extend temporary slope drains to ensure proper function.

Protect ditches, channels, and other drainageways leading away from cuts and fills at all times by either:

- (1) Hydro-mulching the lower region of embankments in the immediate area.
- (2) Installing check dams and siltation control devices.
- (3) Other methods acceptable to the DOTA Environmental Section.

Provide for controlled discharge of waters impounded, directed, or controlled by project activities or erosion control measures.

Cleanup and remove any pollutant that is attributed to the Contractor. Deposit of solid waste or the discharge of liquid waste, such as fuels, lubricants, bituminous waste, untreated sewage and other pollutants which may contaminate the body of ground water shall not be permitted. Care shall be taken to ensure that no petroleum products, bituminous materials, or other deleterious substances, including debris, are allowed to fall, flow, leach, or otherwise enter the sewage systems or storm drains.

Burning of matter or waste material on Airport property shall not be permitted.

The use of hazardous materials is prohibited without the approval of the Engineer. Any corrective actions to remove and replace the hazardous material and contaminated work shall be at the sole expense of the Contractor. Hazardous materials shall be properly stored and handled.

3.03 **INSPECTIONS**

For all projects with earth-disturbing activities, including construction support activity areas, the following inspections shall be conducted:

- (1) **Initial Inspection of BMPs.** Prior to the start of construction activities, the DOTA Environmental Section, or their designated authorized representative, will conduct an initial site inspection of the BMPs.

The Contractor shall submit their request for this inspection in writing to the Engineer. The inspection is subject to the availability of the DOTA Environmental Section or their designated authorized representative.

Prior to this inspection, only the soil, to the extent that is required to install the BMP measures and devices, shall be disturbed. During the inspection, the inspector will note any deficiencies in the BMP measures and devices, including identifying any site conditions that have the potential to result in the discharge of pollutants. The Contractor is responsible for the correction of the deficiencies. Corrective Action shall be documented and submitted to the Engineer for acceptance by the DOTA Environmental Section and/or their designated authorized representative. The deficiencies must be corrected and accepted before construction activities are allowed to commence.

Initial Inspections shall be conducted separately for each new construction phase, new work areas, and additional construction support areas that occur during the construction period.

- (2) **Contractor's Inspection of BMPs.** Commencing immediately after the Initial BMP Inspection and until the acceptance of the Final BMP Inspection, the Contractor shall conduct inspections of the sites to ensure that BMPs are effective and activities do not have the potential of causing a polluted discharge.

The Contractor's Inspections shall be conducted at the following intervals:

- (a) Weekly.
- (b) Within 24 hours of any rainfall of 0.25 inch or greater which occurs in a 24-hour period.

The Contractor shall use on-line rainfall measurements data sources and providers. Rainfall measurements shall be taken from the same airport as the location of the project or within one (1) mile distance from the disturbed areas. Submit the identity of the provider, with the location of their

measuring device, to the Engineer for approval by DOTA Environmental Section.

In lieu of using any on-line rainfall provider or if there are no measuring device of an on-line provider on the airport or within one (1) mile from the disturbed area, the Contractor shall furnish and install a rain gauge in a secure location prior to field work including installation of site-specific BMPs. Provide a rain gauge with a tolerance of at least 0.05 inches of rainfall. Install the rain gauge on the project site in an area that will not deter rainfall from entering the gauge opening. Do not install in a location where rain water may splash into the rain gauge. The rain gauge installation shall be stable and plumbed. Maintain rain gauge and replace any rain gauge that is stolen, does not function properly or accurately, is worn out, or needs to be relocated. Do not begin field work until the rain gauge is installed and Site-Specific BMPs are in place. Rain gauge data logs shall be readily available.

Submit rain gage data logs weekly with the Contractor's BMP Inspection Report to the Engineer for acceptance by the DOTA Environmental Section.

- (c) When existing erosion control measures are damaged or not operating properly as required by Site-Specific BMP.

Prepare a written report of the inspection and submit a copy of the report within 24-hours to the Engineer for acceptance by the DOTA Environmental Section. The report must include any deficiencies of the Site-Specific BMPs observed and the correction of these deficiencies. Corrective actions can be documented in a separate report and submitted upon completion of the corrective actions. Submit the report(s) to the Engineer for acceptance by DOTA Environmental Section.

The initiation of the work to repair or correct the deficiency shall begin immediately. However, except for those deficiencies that pose an immediate threat for the discharge of pollutants to the drainage system, surface waters, or receiving water, if the deficiency is identified at a time in the day in which it is too late to initiate the work, the initiation of the work shall begin on the following day.

After the initiation of the work to repair or correct the deficiency, the work shall be completed as follows:

- (a) If the deficiency poses an immediate threat for the discharge of pollutants to the drainage system, surface waters, or receiving waters, the work to fix the deficiency shall be completed by the close of the same day of discovery of the deficiency. Examples of these deficiencies included, but not limited to, illicit discharge, absence of perimeter controls in an area with evidence

of sediment transporting off-site, and spills near a drain or waterway that have not been cleaned.

- (b) If the deficiency poses a significant threat for the discharge of pollutants to the drainage system, surface waters, or receiving waters, the work to fix the deficiency shall be completed by five (5) calendar days or before the next forecasted rain event, whichever is sooner. Examples of these deficiencies include, but not limited to, perimeter controls that are not functional or require maintenance, drain inlet protections that are not functional or require maintenance, installation of a new pollution prevention control, and deficiencies requiring significant repair for the correction of the deficiency.
- (c) If the deficiency does not pose a threat for the discharge of pollutants to the drainage system, surface waters, or receiving waters, but are not in strict conformance with the SWPPP, SSBMP Plan, or DOTA's Construction Activities BMP Field Manual, the work to correct the deficiency shall be completed by ten (10) calendar days or within the time specified by the Engineer, whichever is sooner. These deficiencies include all deficiencies except those deficiencies included in (1) and (2), above.
- (d) If it is infeasible to complete the correction of the deficiency or installation of a new pollution prevention control within the respective timeframe above, notify the Engineer who will consult with DOTA Environmental Section. Document why it is infeasible to complete the work within the required timeframe. Complete the work as soon as practicable and as agreed to by both the Engineer and DOTA Environmental Section.

Retain copies of these inspection reports on-site or at an accessible location for the duration of the project so that they can be made available at the time of an on-site inspection, or upon request by the Engineer, DOTA Environmental Section, DOTA's Third Party Inspector, and/or DOH/EPA Representative. Present these inspection reports to the DOTA's Third-Party Inspectors at the time of their inspection for review.

- (3) **Final Inspection / Post-construction BMP Initial Inspection.** The DOTA Environmental Section, or their designated authorized representative, shall conduct a Final Inspection / Post-Construction BMP initial inspection when the Contractor has completed construction, including installing permanent BMPs and stabilizing exposed soil.

The Contractor shall submit the request for this inspection in writing to the Engineer. The inspection is subject to the availability of the DOTA Environmental Section or their designated authorized representative.

All deficiencies noted must be addressed before the Contractor can remove temporary BMPs and close the site. The Contractor is responsible for correction of the deficiencies. Corrective Action shall be documented and submitted to the Engineer for acceptance by the DOTA Environmental Section. Any deficiencies noted during the final inspection must be corrected before the State will issue the project final acceptance and make final payment.

Partial Final Inspection of construction phases or partial areas of the project shall be conducted during the construction of the project for areas that are to be transferred for DOTA's use.

- (4) **Routine Inspections Conducted by DOTA.** The Contractor's designated representative specified in Subsection 01561.3.01(2)(d) shall address any Site-Specific BMP deficiencies brought up by the Engineer or their authorized representative (i.e. Quality Control Engineer, Project Inspector, etc.) taking all reasonable measures to minimize or prevent discharge of pollutants until a permanent solution is installed and made operational.

The initiation of the work to repair and correction of the deficiency shall be completed within the same timelines as required in Subsection 01561.3.03(2).

- (5) **DOTA's SWMPP Inspections.** For Projects located at the Daniel K. Inouye International Airport (HNL) or the Kahului Airport (OGG) that have a NGPC or NPDES Permit, or disturb one acre or more, including the construction support activity areas, the following additional inspections shall be conducted:

- (a) **Third-Party Inspections.** The DOTA Environmental Section's Third-Party inspector will conduct routine inspections. Third-party inspections shall be conducted monthly. The frequency of the inspections may increase if deficiencies are identified as determined by the inspector. Deficiencies must be corrected within the timeline defined in DOTA's SWMPP, Section C, Construction Site Runoff Control Program, which can be downloaded from the website:

<http://hidot.hawaii.gov/airports/doingbusiness/engineering/environmental/construction-site-runoff-control-program/>

The Contractor shall be responsible for the correction of ALL deficiencies identified during any of the above inspections. Corrective Action shall be documented and submitted to the Engineer for acceptance by the DOTA Environmental Section or their designated authorized representative.

If the Contractor fails to satisfactorily address Site-Specific BMP deficiencies, the DOTA reserves the right to employ outside assistance or use the State's own labor forces to provide necessary corrective measures. The Contractor will be fully responsible for all

cost and time. The State will charge the Contractor such incurred costs plus any associated project engineering costs and will make appropriate deductions from the Contractor's monthly progress payment.

Failure to apply or maintain Site-Specific BMP measures may result in the assessment of liquidated damages (Appendix B). Depending on the severity of the deficiencies, additional enforcement actions, such as, suspension of work and/or termination of the contract (with the Contractor's Surety being fully responsible for all additional costs incurred by the State) can be conducted and assessed against the Contractor.

For all citations or fines received by the DOTA for non-compliance, including non-compliance with NGPC/NPDES Permit conditions, the Contractor shall reimburse the State within 30 calendar days for the full amount of outstanding cost that the State has incurred, or the State shall deduct all incurred costs from the Contractor's monthly progress payments.

The Contractor shall be responsible for all citations, fines and penalties levied by DOH or EPA against the State due to the Contractor's failure to satisfactorily address Site-Specific BMP deficiencies and/or any Contractor's illicit discharges. The State will make the appropriate deductions from the Contractor's monthly progress payment.

PART 4 MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

The work specified in this Section will be paid for at the contract lump sum price. Payment shall be full compensation for work prescribed in this Section and contract documents, including but not limited to, all labor, materials, tools, equipment, and all incidentals necessary to install, maintain, monitor, repair, replace, modify, and remove Site-Specific BMP measures.

| <u>Item No.</u> | <u>Item</u> | <u>Unit</u> |
|------------------------|--|--------------------|
| 01561.1 | Construction Site Runoff Control Program | Lump Sum |

Partial payments shall be paid in the Monthly Progress Payment as follows:

1. 20% of the line item price shall be paid upon DOTA Environmental Section's acceptance in writing of the Site-Specific BMP Plan and the satisfactory completion of the Initial Inspection of BMPs defined in Section 01561.3.03(1), above.
2. 60% of the line item price shall be paid in equal monthly payments over the duration of the contract. Failure to satisfactorily apply, maintain, or modify BMP

measures and devices, and/or submittals shall result in the withholding of monthly progress payments for this line item.

For projects located at the Daniel K. Inouye International Airport (HNL) or the Kahului Airport (OGG) that have a NGPC or NPDES Permit, or disturb one (1) acre or more, including construction support activity areas, payments shall be made only after the DOTA's Third-Party Inspection defined in Section 01561.3.03(4), above, have been satisfactorily completed and accepted by the DOTA Environmental Section. Any deficiencies classified as Major or above will result in the withholding of monthly progress payments for this line item.

3. The remaining 20% of the line item price shall be paid after all BMP measures have been satisfactorily removed.

Payment will be made only after the satisfactory completion of the Final Inspection / Post-Construction BMP Initial Inspection defined in Section 01561.3.03(3), above, and acceptance of the Post-Construction BMPs by the DOTA Environmental Section.

Liquidated Damages, up to \$25,000 per day (Appendix B), shall be assessed for each non-compliance of the BMP requirements described in this Section. The Contractor shall not be entitled to recover any Liquidated Damages assessed, even after the deficiencies have been corrected.

Appendix A

The following is the current DOTA's Construction Activities Best Management Practices Field Manual. The manual identifies potential pollutant sources and BMPs that can be used to mitigate the pollutants.

Additional information can be obtained from the DOTA's Environmental Website at <http://hidot.hawaii.gov/airports/doing-business/engineering/environmental/>. The website includes the Stormwater Water Programs for the Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG), and the Construction Site Runoff Control Program.

Appendix B Liquidated Damages Schedule for Non-Compliances.

| Non-Compliance | Amount |
|--|--|
| Failure to submit a Notice of Intent or otherwise obtain a permit for Staging and/or Storage Area beyond the project limits. | \$1,000 per calendar day per violation |
| Failure to comply with the conditions specified in the Notice of General Permit Coverage (NGPC) or Individual NPDES Permit, or any other applicable permit. | \$1,000 per calendar day per violation |
| Failure to have the accepted SSBMP Plan and Amendments or the accepted SWPPP and Amendments available at a project construction site. | \$1,000 per calendar day per violation |
| Failure to install a BMP specified by the SSBMP Plan or SWPPP, or permit. | \$2,000 per calendar day per violation |
| Failure to properly install or maintain appropriate Site-Specific BMPs in accordance with applicable plans, permits, and guidance documents. | \$2,000 per calendar day per violation |
| <p>Failure to have an accepted Amendment to the SSBMP Plan or an accepted Amendment to the SWPPP prior to implementation of the proposed BMPs.</p> <p>Note: Advance review and acceptance can be provided via email which will satisfy this non-compliance. However, the written Amendment must still be formally submitted for certification and signature by the authorized representative identified in the NGPC or NPDES Permit.</p> | \$2,000 per calendar day per violation |
| Failure to conduct required inspections. | \$1,000 for each of the first ten violations, \$2,500 for each of the next ten violations, \$5,000 for each subsequent violation |
| Failure to submit required reports such as BMP inspection reports, rain gauge data logs, etc. | \$500 per calendar day for the first ten days of each violation, \$1,000 per calendar day for the next ten days of each violation, \$2,500 per calendar day for each subsequent day of violation |
| Any "major" or "critical" non-compliance violation with the applicable plans, permits, and guidance documents. | Up to \$25,000 per calendar day per violation |
| Any violation resulting in a polluted discharge. | Up to \$25,000 per calendar day per violation |

Note: Liquidated Damages shown in the Table shall be assessed at the discretion of the DOTA.

Assessment of Liquidated Damages for Non-Compliance:

The Contractor may be assessed liquidated damages by issuance of an Enforcement Letter. The Enforcement Letter shall indicate the amount of liquidated damages that are assessed for the non-compliances which shall be deducted from the Contractor's next progress payment. The Enforcement Letter will be sent electronically via e-mail and a hard copy to the Contractor's designated representative(s), identified in Section 01561.3.01(2)(d), responsible for the Contractor's Construction Site Runoff Control Program. An Enforcement Letter may be issued with or without a previous Verbal Notification, Warning Letter, or Notice of Apparent Violation (NAV).

Liquidated Damages may be assessed for the following:

- Non-compliances listed in the Table, herein, included in Appendix B.
- Non-compliances have not been corrected in the timeframes noted.
- Corrective actions are not completed after a Verbal Notification, Warning Letter, or Notice of Apparent Violation is issued.
- Contractors are non-responsive to DOTA's directives.
- Repeated non-compliance.
- A polluted discharge has occurred.

The number of days used for the liquidated damages calculations shall start on the day that the non-compliance was required to be corrected and shall end on the day that the non-compliance is corrected and accepted. If DOTA's personnel are not able to go out in the field to verify that the BMP deficiencies are corrected in the timeframe specified, the Contractor can send photographs showing the corrected deficiency via e-mail to the Engineer and DOTA Environmental Section along with documentation on how the deficiency was corrected. The Engineer and DOTA Environmental Section may visit the site to verify the corrective actions are acceptable. If the corrective actions are acceptable, then the clock stops on the day that the documentation was received.

END OF SECTION 01561



Best Management Practices

Construction Activities BMP Field Manual



**PROTECT
OUR WATER**
MĀLAMA I KA WAI
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

STATE OF HAWAII, DEPARTMENT OF
TRANSPORTATION, AIRPORTS DIVISION
400 Rodgers Boulevard, Suite 700
Honolulu, Hawaii 96819-1880



August 2018

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ACRONYMS

| | |
|--------|--|
| AIR-EE | State of Hawaii Department of Transportation, Airports Division, Environmental Engineering Section |
| AOA | Airport Operations Area |
| AST | Aboveground Storage Tank |
| BMP | Best Management Practice |
| C&D | Construction and Demolition |
| CIH | Certified Industrial Hygienist |
| CWB | Clean Water Branch |
| DOH | State of Hawaii, Department of Health |
| DOT | State of Hawaii, Department of Transportation |
| DOTA | State of Hawaii, Department of Transportation, Airports Division |
| FAA | Federal Aviation Administration |
| FOD | Foreign Object Debris |
| HAR | Hawaii Administrative Rules |
| HEER | Health Hazard Evaluation and Emergency Response |
| HNL | Daniel K. Inouye International Airport |
| MS4 | Municipal Separate Storm Sewer System |
| SDS | Safety Data Sheet |
| NRC | National Response Center |
| OGG | Kahului Airport |
| SPCC | Spill Prevention, Control, and Countermeasure |
| SWMPP | Storm Water Management Program Plan |
| PCS | Petroleum-Contaminated Soil |
| PPE | Personal Protective Equipment |
| U.S. | United States of America |

1.0 INTRODUCTION

The purpose of this *Construction Activities Best Management Practices (BMP) Field Manual* is to provide guidance on BMP selection, installation, and maintenance procedures for construction activities. Implementation of these BMPs is intended to prevent or reduce the discharge of pollutants to the State of Hawaii, Department of Transportation, Airports Division (DOTA) municipal separate storm sewer system (MS4) thereby protecting State waters from pollutant discharges. This manual does not constitute an exhaustive list of all BMPs available for use. Designers and contractors may use other BMPs than those listed in this manual provided they are approved by DOTA.

This manual is intended for use by DOTA staff, consultants, and contractors involved in projects that require construction work within DOT Airports' properties. The BMPs included in this manual focus on the areas of erosion control, sediment control, tracking control, potential pollutant control, and materials and waste management control. Erosion control BMPs are devices installed or constructed by the contractor on disturbed soil to protect the ground surface from erosion due to wind, rain, or runoff. Sediment control BMPs are measures that intercept and detain sediment-laden runoff prior to discharge offsite or to the storm sewer system. These devices detain runoff to promote infiltration and/or sedimentation. Tracking control BMPs are devices or procedures that minimize the amount of sediment and debris that is tracked offsite by vehicles and equipment. BMPs that control potential pollutants from site activities or materials and waste handling control and are established practices and procedures to control potential pollutants at their source.

BMP selection should be determined by an evaluation of the existing conditions, requirements of the project area, and potential pollutants. It is advised to install multiple BMPs to effectively prevent pollution from entering the MS4. For example, drain inlet protection is considered the last defense and should be combined with other BMPs that are designed to prevent pollution at the source.

Each BMP measure provided in this manual consists of the following sections:

- Description
- Limitations
- Practice
- Maintenance and Inspection

The BMP measures should be maintained and only removed after the potential source of the discharge of pollutants is eliminated, removed and stabilized, or the area is restored to pre-construction conditions. These are not Permanent BMP measures.

For Permanent BMP measures, please refer to the following sources.

- Storm Water Permanent BMP Manual located at
 - Daniel K. Inouye Airport previously known as Honolulu International Airport (HNL) Storm Water Management Program Plan (SWMPP), Section D Permanent BMP Program, Attachment D.1.

- Kahului Airport (OGG) Construction and Post-Construction Storm Water Management Plan, Section 2 and Appendix G
- Permanent BMP Operations & Maintenance Manual
 - HNL SWMPP Section D Permanent BMP Program, Attachment D.4.
 - OGG Construction and Post-Construction Storm Water Management Plan, Section 2 and Appendix I
- HNL SWMPP Section D Permanent BMP Program, Attachment D.2 Post-Construction BMP Handout.

Disclaimer

The information presented in this Construction Activities BMP Field Manual was taken from available and most recent sources deemed to be representative of the acceptable BMPs and stormwater runoff control measures. This manual has been prepared as a reference guideline, however, due to site-specific conditions, the selection of the BMPs must be used in conjunction with the best professional judgment and sound engineering principles to assure proper function and performance of the BMPs contained herein. The author does not guarantee the accuracy or completeness of this document and will not assume any liability or responsibility for the use of, or for any damages resulting from the use of any information contained herein. The detail and the wording in this manual will not necessarily result in compliance with the Standard Specifications. Application of BMPs should comply with applicable federal, state, and county regulations.

2.0 EROSION CONTROL BMPS

2.1 C.1 Scheduling

Description

Proper scheduling of construction activities can reduce the area and duration of soil exposure to erosion by wind, rain, runoff, and vehicle tracking.

Limitations

None.

| Practice | | |
|--------------------------|------|--|
| <input type="checkbox"/> | C1.1 | Avoid rainy periods as much as possible. Schedule major grading operations during dry months (April through October). |
| <input type="checkbox"/> | C1.2 | Monitor the weather forecast for rainfall. Allow sufficient time before rainfall begins to stabilize the soil with vegetation or physical means or to install temporary sediment trapping devices. |
| <input type="checkbox"/> | C1.3 | Minimize area of soil exposed at any one time. Schedule projects to disturb only small portions of the site at a time. Complete grading as soon as possible. |
| <input type="checkbox"/> | C1.4 | Avoid creation of open-water areas or features that can attract wildlife that are hazardous to airport operations. |
| <input type="checkbox"/> | C1.5 | Stabilize the finished graded area within seven (7) calendar days after completion of grading or one (1) calendar day before an anticipated rainfall event. |
| <input type="checkbox"/> | C1.6 | Stabilize non-active exposed areas, where activity will not resume for a period of 14 or more calendar days, within three (3) calendar days from the end of soil-disturbing activities or one (1) calendar day before an anticipated rainfall event. |
| <input type="checkbox"/> | C1.7 | Backfill open trenches as soon as possible. Sequence trenching projects so open portions of the trench are backfilled before excavating the next trench section. |
| <input type="checkbox"/> | C1.8 | Minimize disturbance on steep slopes (greater than 15 percent in grade). If disturbance of steep slopes is unavoidable, phase disturbance and use stabilization techniques. |

| Maintenance and Inspection | | |
|----------------------------|------|--|
| <input type="checkbox"/> | M1.1 | Verify that the work is in accordance with the construction schedule. If the work deviates from the schedule, take corrective actions. |
| <input type="checkbox"/> | M1.2 | Update the construction schedule as specified in the contract or as needed for unforeseen changes. |

2.2 C.2 Preservation of Existing Vegetation

Description

Carefully planned preservation and protection of existing vegetation at construction sites minimizes the potential of harming or needlessly destroying existing trees, vines, shrubs and/or grasses that stabilize soil and control erosion. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. Vegetation also helps to keep soil from drying out and becoming susceptible to erosional wind sweeps. Identifying the type of vegetation desirable or ideal for the area to preserve can also contribute to the aesthetics of the post-construction site.

Limitations

- Topography, sub-surface geological characteristics, soil quality and a restrictive land development area are just a few site conditions that can make it difficult and expensive to preserve existing vegetation at a development site.
- Federal Aviation Administration (FAA) rules regarding aircraft clearances and lines of site may require the removal of existing vegetation. Reduced root systems equate to diminished anchoring of soil and a proportional increase in erosion via traffic (foot or vehicular/machinery).

| Practice | | |
|---|------|--|
| <input type="checkbox"/> | C2.1 | <p>Preservation of existing vegetation shall be practiced in the following locations:</p> <ul style="list-style-type: none"> • Areas within the project site where construction activities are not required. • Sensitive areas where natural vegetation exists and should be preserved, such as on steep slopes (e.g., steeper than 3:1), areas near watercourses, and wooded areas. • Areas where local, state, or federal governments require preservation, such as delineated wetlands, marshes, shorelines, conservation land, etc. • Swales and natural drainage ways and paths. |
| <input type="checkbox"/> | C2.2 | <p>The following criteria may be used for deciding which vegetation will remain on the site:</p> <ul style="list-style-type: none"> • Aesthetic values: Consideration should be given to foliage, flowering habits, bark and crown characteristics (for trees). • Freedom from disease and rot. • Life span of trees: Short-lived trees need not be preserved. • Environmental values: Habitat; screening; and buffers. • Sudden exposure: Save vegetation that grows in direct sunlight and is able to withstand radiated heat from proposed structures and pavement. • Space needed: Sufficient space must be provided between the vegetation and any structures, electric and telephone lines, water and sewer lines, driveways and roadways. |
| <input type="checkbox"/> | C2.3 | Do not include plant species that compete with the existing vegetation in landscaping plans. |
| <input type="checkbox"/> | C2.4 | Minimize disturbed areas or phase work to preserve pre-existing vegetation whenever feasible and for as long as possible. |
| <input type="checkbox"/> | C2.5 | Inspect swales and natural drainage ways prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | C2.6 | Preserve native topsoil where practicable. |
| <i>METHODS FOR PROTECTING EXISTING VEGETATION AND TREES INCLUDE:</i> | | |
| <input type="checkbox"/> | C2.7 | Protect trees and their root systems during construction by prohibiting soil disturbance within a specified distance identified in the project plans, which also helps prevent soil erosion. |

C.2 Preservation of Existing Vegetation (continued)

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C2.8 | Clearly mark, flag or fence areas where vegetation is to be preserved and trees to remain. |
| <input type="checkbox"/> | C2.9 | Stake off root system limits (dripline of tree). |
| <input type="checkbox"/> | C2.10 | Tree wells and retaining walls (permanent) help preserve existing vegetation, but must be large enough to protect the root system. |
| <input type="checkbox"/> | C2.11 | When grading under trees is necessary, excavation and fill is to be limited to one foot within the tree driplines |
| <input type="checkbox"/> | C2.12 | Do not locate construction traffic route, spoil stockpile, etc., in areas where significant adverse impact on existing vegetation may occur. |
| <input type="checkbox"/> | C2.13 | Prepare landscaping plans that preserve as much existing vegetation as possible and ensures the required care for this vegetation to thrive during and after construction. |
| <input type="checkbox"/> | C2.14 | Define and protect with berms, fencing, signs, etc., a setback area from vegetation to be preserved. Setback distance is to be based on the location, species, size, and age of the vegetation to be preserved and on the potential impact of adjacent construction activities or permanent improvement. No disturbance of any kind is to be allowed within the setback area around the vegetation to be preserved. |

| Maintenance and Inspection | | |
|----------------------------|------|---|
| <input type="checkbox"/> | M2.1 | Ensure that the limits of disturbance are clearly marked at all times. If damage to existing vegetation still occurs, consult with an arborist. |
| <input type="checkbox"/> | M2.2 | Provide training for personnel regarding which vegetation will be preserved and the methods of preservation. |

2.3 C.3 Location of Potential Sources of Sediment

Description

Proper location of potential sources of sediment can reduce erosion and the discharge of sediment from construction sites.

Limitations

- Prevention of sediment-laden runoff must be supplemented with mulching, planting, and structural controls such as berms, silt fences, and silt basins.
- Contaminated soil may need to be managed separately.

| Practice | | |
|--------------------------|------|---|
| <input type="checkbox"/> | C3.1 | Lay out the work site so that haul roads and stockpiles are buffered with vegetated areas to remove suspended sediment and other pollutants from runoff prior to discharging off-site. Vegetation along the perimeter of the site, especially on the downhill side for sloped sites, provides an effective buffer against sediment leaving the construction site. |
| <input type="checkbox"/> | C3.2 | Locate stockpiles away from waterways or low spots. |
| <input type="checkbox"/> | C3.3 | Redirect offsite runoff, where possible, so that it flows through or around the work site without contacting areas where the surface has been disturbed. |
| <input type="checkbox"/> | C3.4 | Properly maintain vegetation at swales and natural drainage ways. |
| <input type="checkbox"/> | C3.5 | If available, use naturally level areas for parking and equipment staging during construction. |

| Maintenance and Inspection | | |
|----------------------------|------|---|
| <input type="checkbox"/> | M3.1 | Verify that the work site lay out is in accordance with the project phasing plan. Update the layout per phase of work. An updated lay out plan should be submitted to the Construction Manager prior to the start of work for that phase. |
| <input type="checkbox"/> | M3.2 | Inspect swales and natural drainage ways prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | M3.3 | Educate personnel about proper locations of potential sources of sediment at the site. |

2.4 C.4 Earth Dike

Description

The temporary earth dike is a temporary berm or ridge of compacted soil, used to divert runoff or channel water to a desired location.

Earth dikes are typically used to divert concentrated runoff through disturbed areas into another BMP (e.g., sediment basins), to divert runoff away from disturbed or unstable slopes, to divert runoff from offsite and undisturbed areas around disturbed areas, and as containment for construction materials and wastes.

Limitations

Temporary dikes shall not be used for drainage areas greater than 10 acres, or along slopes greater than 10 percent. For larger areas, more permanent drainage structures shall be built. Additional limitations include the following:

- Earth dikes may create more disturbed area.
- Earth dikes must be stabilized immediately, which adds cost and maintenance concerns.
- Diverted stormwater may cause downstream damage.
- Dikes are not to be constructed of soils that erode easily.
- Regarding the site to remove the dike may add additional cost.

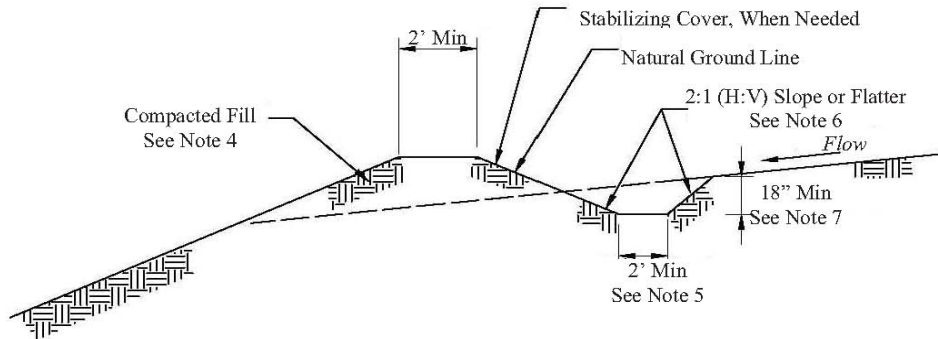
| Practice | | |
|--------------------------|------|---|
| <input type="checkbox"/> | C4.1 | The locations and size of temporary earth dikes should be reviewed and approved by the Airport Manager to prevent possible hazards and adverse impacts to aircraft and airport operations. |
| <input type="checkbox"/> | C4.2 | Dikes are to be well-compacted during construction. |
| <input type="checkbox"/> | C4.3 | All dikes are to divert runoff to an off-site area or sediment trapping device. |
| <input type="checkbox"/> | C4.4 | Dikes should have 2:1 or flatter side slopes, 18 inches minimum height, and a minimum top width of 24 inches. Top width may be wider and side slopes may be flatter at crossing for construction traffic. |
| <input type="checkbox"/> | C4.5 | When used to divert runoff through a disturbed area, dikes are to direct sediment-laden runoff into a sediment-trapping device. |
| <input type="checkbox"/> | C4.6 | Dikes surfaces are to be stabilized with vegetation, chemicals, or physical devices within one (1) calendar day after construction of the dikes has been completed. |
| <input type="checkbox"/> | C4.7 | Dikes are to remain in place until the disturbed areas are permanently stabilized. |
| <input type="checkbox"/> | C4.8 | Dikes must be onsite and must safely convey anticipated flood flows. |

Note: Example schematics are included herein for reference.

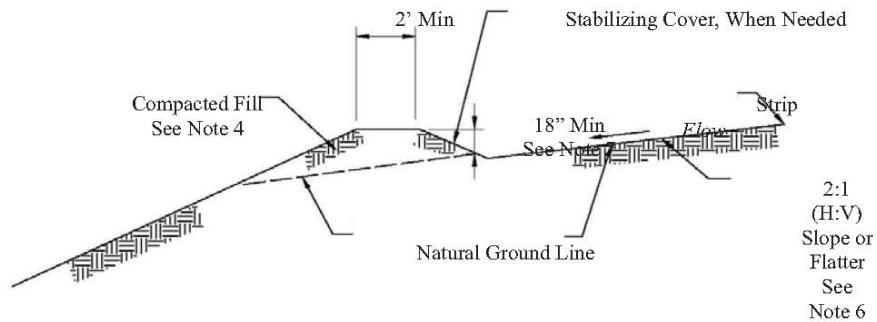
| Maintenance and Inspection | | |
|----------------------------|------|---|
| <input type="checkbox"/> | M4.1 | Inspect dikes prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | M4.2 | Repair damage sustained to the dike within seven (7) calendar days after the incident or before the next anticipated rainfall event, whichever comes first. |
| <input type="checkbox"/> | M4.3 | Provide training for personnel detailing the location and BMP requirements for any earth dikes the site. |

C.4 Earth Dike

(continued)



Drainage Swale Section "A"



Earth Dike Section "B"

Notes:

1. Place drainage swales above or below, not on, a cut or fill slope.
2. Drainage or swales should be laid at a grade of at least 1 percent, but not more than 15 percent.
3. Remove all trees, stumps, obstructions, and other objectionable material from the swale.
4. Fill material along the path of the swale should be compacted to at least 90% compaction.
5. Swale top and bottom width should be at least 2 ft.
6. Side slopes should be 2:1 or flatter.
7. Depth of the swale should be at least 18 in.
8. Construct the drainage swale with a positive grade to a stabilized outlet.
9. Use a lined ditch for high flow velocities.
10. Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%.
11. If rip-rap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

| Channel Grade | Riprap Stabilization |
|---------------|----------------------|
| 0.5-1.0% | 4 in. Rock |
| 1.1-2.0% | 6 in. Rock |
| 2.1-4.0% | 8 in. Rock |
| 4.1-5.0% | 8 in. – 12 in. Rock |

Drainage Swale and Earth Dike

Source: City and County of Honolulu BMP Manual, November 2011.

2.5 C.5 Temporary Drains and Swales

Description

Temporary drains and swales are used to divert offsite runoff around the construction site, divert runoff from stabilized areas around disturbed areas, and direct runoff into sediment basins or traps.

Limitations

- Temporary drains and swales, or any other diversion of runoff, shall not adversely impact upstream or downstream properties.
- Temporary drains and swales must conform to local flood plain management requirements.
- A licensed, qualified engineer must design a permanent drainage channel.

| Practice | | |
|--------------------------|------|--|
| <input type="checkbox"/> | C5.1 | At a minimum, the drain/swale shall conform to predevelopment drainage patterns and capacities. |
| <input type="checkbox"/> | C5.2 | Construct the drain/swale with an uninterrupted, positive grade to a stabilized outlet. |
| <input type="checkbox"/> | C5.3 | Provide erosion protection or energy dissipation measures if the flow out of the drain or swale can reach an erosive velocity. |
| <input type="checkbox"/> | C5.4 | Size temporary drainage swales using local drainage design criteria. |
| <input type="checkbox"/> | C5.5 | Use a lined ditch for high-flow velocities. |
| <input type="checkbox"/> | C5.6 | Use velocity dissipation devices at the outlet to minimize erosive flow velocities. |

Note: Refer to schematics provided in the earth dike BMP.

| Maintenance and Inspection | | |
|----------------------------|------|---|
| <input type="checkbox"/> | M5.1 | Inspect temporary drains and swales prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | M5.2 | Repair damage sustained to the swales within seven (7) calendar days after the incident or before the next anticipated rainfall event, whichever comes first. |
| <input type="checkbox"/> | M5.3 | Ensure required personnel are trained on maintenance and operation of temporary drains and swales. |

2.6 C.6 Dust Control

Description

Dust control measures are used to stabilize soil from wind erosion, and reduce dust generated by construction activities.

Limitations

- Watering prevents dust only for a short period and must be applied daily (or more often) to be effective.
- Excessive water usage for dust control may cause erosion.
- Oil is not to be used for dust control because the oil may migrate into a drainage way and/or seep into the soil.
- Certain dust suppression chemicals may make soil water repellent, increasing runoff. Chemical treatment of the soil shall not be allowed without the approval of the Engineer.

| Practice | | |
|--------------------------|-------|--|
| <input type="checkbox"/> | C6.1 | Schedule construction activities to minimize exposed areas. |
| <input type="checkbox"/> | C6.2 | Stabilize exposed soils until permanent BMPs are installed. If stabilizing by water, water continuously throughout the workday, and avoid over saturation to prevent excessive runoff. |
| <input type="checkbox"/> | C6.3 | Identify and stabilize key access points prior to commencement of construction. |
| <input type="checkbox"/> | C6.4 | Minimize the impact of dust by anticipating the direction of prevailing winds. |
| <input type="checkbox"/> | C6.5 | Direct most construction traffic to stabilized roadways within the project site. |
| <input type="checkbox"/> | C6.6 | Comply with State of Hawaii, Department of Health (DOH) requirements for dust control. |
| <input type="checkbox"/> | C6.7 | Chemical treatment of the soil shall not be allowed without the approval of the Engineer. |
| <input type="checkbox"/> | C6.8 | If using water or chemical treatment, maintain daily records of the date and time of application and number of gallons or loads of product applied. Provide records upon request by the Engineer. Oil is not to be used for dust control. |
| <input type="checkbox"/> | C6.9 | If dust screen or fence is used in conjunction with other dust control measures, the Airport Manager or Code 22 must approve the location. Screens located on or adjacent to the Airport Operations Area (AOA) fence line may not be allowed due to airport security concerns. |
| <input type="checkbox"/> | C6.10 | Dust screen and fence must be of proper size and height to contain airborne dust particles. It shall be of continuous length without gaps and firmly secured to posts and other supporting devices. |
| <input type="checkbox"/> | C6.11 | Locations for dust screen shall consider aircraft operations that can create localized high velocity wind gust. |

| Maintenance and Inspection | | |
|----------------------------|------|---|
| <input type="checkbox"/> | M6.1 | Inspect all areas that have been sprayed to ensure coverage. Ensure that excessive runoff is not generated. |
| <input type="checkbox"/> | M6.2 | Reapply water when soil becomes dry. |
| <input type="checkbox"/> | M6.3 | Inspect dust screens regularly. Repair any damage, such as rips and tears, within two (2) calendar days. Remove any accumulated dust at base of screen. |
| <input type="checkbox"/> | M6.4 | Provide personnel responsible for dust control with adequate training. |

2.7 C.7 Topsoil Management

Description

The salvaging, stockpiling and reapplication of topsoil or other selected material to be used as growth medium in the reclamation of surface disturbances.

Limitations

- Avoid installation and placement of topsoil during windy and rainy weather events.

| Practice | | |
|---|-------|---|
| <input type="checkbox"/> | C7.1 | Conduct a site-specific survey of the project area as a part of baseline investigations. The soil survey will identify the soils suitable for salvaging and their depth prior to disturbance. |
| <input type="checkbox"/> | C7.2 | Salvage all suitable topsoil and suitable material to be utilized in reclamation of the surface disturbance wherever feasible and stockpile for reapplication. |
| <input type="checkbox"/> | C7.3 | If conditions permit, apply topsoil or growth medium directly to disturbed areas. |
| <input type="checkbox"/> | C7.4 | Soil replacement depths are determined by several factors including: <ul style="list-style-type: none"> • Pre-disturbance soil depths; • Vegetation types; and • The physical and chemical properties of the material being covered. Generally speaking, the poorer the physical and chemical properties of the spoil or waste material, the greater the required depth of replacement soil. |
| <input type="checkbox"/> | C7.5 | Conduct soil testing (nutrients, pH and toxicity factors) of the replacement soils and the materials to be covered prior to application of topsoil. |
| <input type="checkbox"/> | C7.6 | Dust control measures, perimeter sediment controls, and storm drain inlet protection measures must be in place prior to and during placement of topsoil. |
| <input type="checkbox"/> | C7.7 | Stabilize exposed topsoil areas within three (3) calendar days after installation is complete. |
| <i>CONSIDERATIONS FOR DEVELOPING A TOPSOIL MANAGEMENT PLAN:</i> | | |
| <input type="checkbox"/> | C7.8 | The amount and quality of existing topsoil or growth medium. |
| <input type="checkbox"/> | C7.9 | The amount of surface disturbance (area), which will receive topsoil or growth medium and the required depth of application. |
| <input type="checkbox"/> | C7.10 | Methodology to be utilized for topsoil or growth medium salvage. |
| <input type="checkbox"/> | C7.11 | Storage location, the duration of storage of salvaged soils, and the protection of stockpiled soils to prevent erosion. |
| <input type="checkbox"/> | C7.12 | The feasibility of direct replacement of the salvaged soils. |
| <input type="checkbox"/> | C7.13 | Availability of additional growth media to supplement topsoil replacement. |

C.7 Topsoil Management (continued)

| Maintenance and Inspection | | |
|----------------------------|------|--|
| <input type="checkbox"/> | M7.1 | Review and update the topsoil management plan at the beginning of each workweek until all grading operations are completed. |
| <input type="checkbox"/> | M7.3 | Conduct periodic maintenance of topsoil stockpiles to prevent erosion. Cover the topsoil stockpiles with plastic or another substrate, or re-vegetated, to protect from wind, rain, and erosion. |
| <input type="checkbox"/> | M7.2 | Regularly inspect, maintain, and immediately repair dust control, perimeter sediment controls, and storm drain inlet protection measures until planting is fully established. |

2.8 C.8 Geotextiles and Mats

Description

Coverings made of natural or synthetic material are used to temporarily or permanently stabilize soil.

Limitations

- Matting is more costly than other BMP practices; therefore, it may be used in areas where other BMPs are ineffective (e.g., channels, steep slopes).
- Matting is not suitable for rocky sites or areas that will have vegetation that requires mowing (i.e., the matting and staple anchors can get caught in the mower).
- May delay seed germination due to reduction in soil temperature.
- Installation requires an experienced maintenance engineer to ensure soil stabilization and erosion protection.

| Practice | | |
|--------------------------|------|---|
| <input type="checkbox"/> | C8.1 | Applicable use for temporary stabilization of highly erosive soils such as channels, streams, and steep slopes. |
| <input type="checkbox"/> | C8.2 | Apply jute or straw matting to disturbed soils and where existing vegetation has been removed. |
| <input type="checkbox"/> | C8.3 | The following are examples of synthetic soil covers that may be used for either temporary or post-construction stabilization, both with and without vegetation: <ul style="list-style-type: none"> • Excelsior matting • Glass fiber matting • Mulch netting |
| <input type="checkbox"/> | C8.4 | When used on slopes, anchor geotextile or matting to the top of the slope in a 6-inch-deep trench and backfill, or per manufacturer's recommended procedures, whichever is more stringent. |
| <input type="checkbox"/> | C8.5 | Overlap the edges of the blankets approximately 2 to 3 inches and staple every 3 feet, or per manufacturer's recommended procedures, whichever is more stringent. Ensure close and continuous contact with the soil. |

| Maintenance and Inspection | | |
|----------------------------|------|--|
| <input type="checkbox"/> | M8.1 | Inspect matting prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | M8.2 | Repair damage sustained to the matting within seven (7) calendar days after the incident or before the next anticipated rainfall event, whichever comes first. |
| <input type="checkbox"/> | M8.3 | If washout or breakage occurs, reconstruct the slope or channel within seven (7) calendar days after the incident and immediately reinstall the matting. |
| <input type="checkbox"/> | M8.4 | Train required personnel about proper installation and maintenance of geotextile mats as well as the importance of preventing sediment discharge. |

2.9 C.9 Seeding and Planting

Description

Seeding of grasses and planting of trees, shrubs, vines, and ground covers provide long-term stabilization of soil. In some areas, with suitable climates, grasses can be planted for temporary stabilization.

Limitations

- Permanent and temporary vegetation may not be appropriate in dry periods without irrigation.
- Fertilizer requirements may have potential to create stormwater pollution if improperly applied.
- FAA regulations may prohibit the implementation of vegetation due to concerns over creating bird habitats and possible bird strikes with aircraft in movement areas of the airport. Consult with the DOTA Environmental Section (AIR-EE) for exemptions in these cases.
- Per FAA Regulations, seeds are not to be scattered or applied through hydroseeding.
- If vegetation is necessary, consult with the AIR-EE for recommended grasses and plants that are non-seeding.
- Fertilizers and soil conditioners shall not be applied during or prior to inclement weather or rain events.
- Do not over-apply fertilizers, herbicides, or pesticides. Over-application is expensive and environmentally harmful.
- Do not apply to stormwater conveyance channels with flowing water or within 6-feet of a water body.
- Excessive irrigation may cause erosion.

| Practice | | |
|---|-------|--|
| <i>GRASSES:</i> | | |
| <input type="checkbox"/> | C9.1 | Ground preparation: fertilize and mechanically stabilize the soil. |
| <input type="checkbox"/> | C9.2 | Tolerant of short-term temperature extremes and waterlogged soil conditions. |
| <input type="checkbox"/> | C9.3 | Appropriate soil conditions: shallow soil base, good drainage, slope of 2:1 or flatter. |
| <input type="checkbox"/> | C9.4 | Use grass plugs, sod or other methods that do not attract birds and other wildlife. |
| <input type="checkbox"/> | C9.5 | Mow, irrigate, and fertilize to promote vigorous grass growth. |
| <i>TREES AND SHRUBS:</i> | | |
| <input type="checkbox"/> | C9.6 | Selection Criteria: vigor, species, size, shape, and wildlife food source. |
| <input type="checkbox"/> | C9.7 | Other Factors: wind/exposure and irrigation needs. |
| <i>VINES AND GROUND COVERS:</i> | | |
| <input type="checkbox"/> | C9.8 | Ground preparation: lime and fertilizer preparation. |
| <input type="checkbox"/> | C9.9 | Use proper seeding rates. |
| <input type="checkbox"/> | C9.10 | Appropriate soil conditions: drainage, acidity, and slopes. |
| <input type="checkbox"/> | C9.11 | Generally, avoid species requiring irrigation. |
| <i>FERTILIZERS AND SOIL CONDITIONERS:</i> | | |
| <input type="checkbox"/> | C9.12 | Prepare only the amount needed for fertilizer, herbicide, or pesticide application. Follow the recommended usage instructions. |

C.9 Seeding and Planting (continued)

| Practice | | |
|--|-------|--|
| <i>FERTILIZIERS AND SOIL CONDITIONERS:</i> | | |
| <input type="checkbox"/> | C9.13 | Except on steep slopes, if possible, till fertilizer into the soil rather than surface spreading or spraying it. Apply surface dressings in several smaller applications, as opposed to one large application to allow time for infiltration and to avoid excess material being carried offsite by runoff. |
| <input type="checkbox"/> | C9.14 | Choose plants that minimize or eliminate the use of fertilizers or pesticides to sustain growth. |
| <input type="checkbox"/> | C9.15 | Follow federal, state, and local laws regarding fertilizer application. |
| <input type="checkbox"/> | C9.16 | Provide cover and dunnage when storing fertilizer to prevent contact with rainwater and runoff. |
| <input type="checkbox"/> | C9.17 | Store all hazardous pesticides with secondary containment and under cover. Review the Safety Data Sheet (SDS) to identify the chemical composition and hazard category. |
| <i>IRRIGATION SYSTEMS:</i> | | |
| <input type="checkbox"/> | C9.18 | Where possible, group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with no or low irrigation requirements. Native plant species are preferred. |
| <input type="checkbox"/> | C9.19 | Design timing and application methods of irrigation water to eliminate the runoff of excess irrigation water into the stormwater drainage system. |
| <input type="checkbox"/> | C9.20 | Employ rain-triggered shutoff devices to prevent irrigation during and after precipitation. |
| <input type="checkbox"/> | C9.21 | Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines. |

| Maintenance and Inspection | | |
|----------------------------|------|---|
| <input type="checkbox"/> | M9.1 | Inspect seeded areas for failures and re-fertilize and re-seed at not less than half the original application rate. |
| <input type="checkbox"/> | M9.2 | Inspect immediately after any rainfall event to ensure seeds have not washed away. |
| <input type="checkbox"/> | M9.3 | Maintain a log of fertilizer, herbicide, and pesticide applications. |
| <input type="checkbox"/> | M9.4 | Clean any spills from fertilizer, herbicide, and pesticide mixing or application. |
| <input type="checkbox"/> | M9.5 | Inspect fertilizer, herbicide, and pesticide storage areas regularly. |
| <input type="checkbox"/> | M9.6 | Repair broken sprinkler heads and lines immediately. |

3.0 SEDIMENT CONTROL BMPS

3.1 C.10 Sand Bag Barrier

Description

Stacking sand bags along a level contour creates a barrier that detains sediment-laden water, ponding water upstream of the barrier and promoting sedimentation.

Limitations

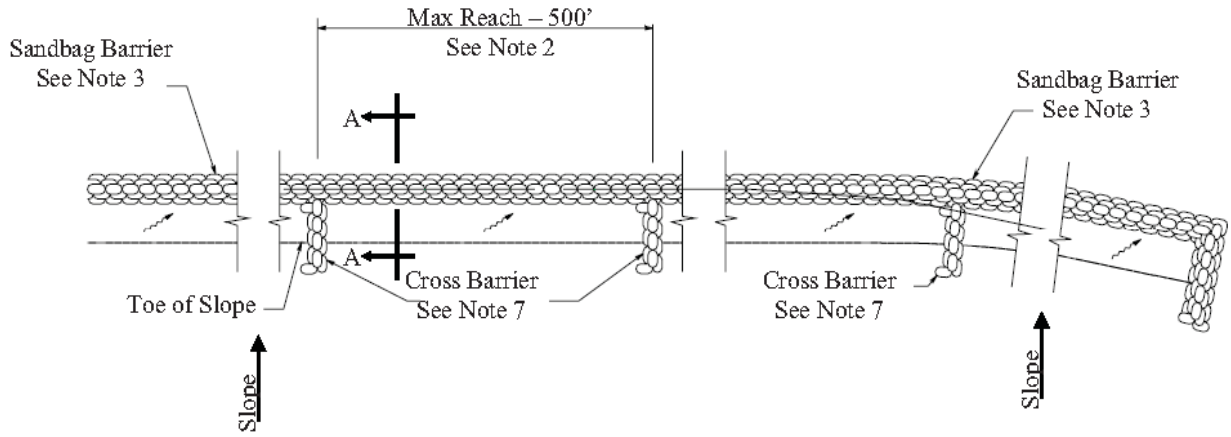
- Do not install sand bag barrier at locations that could compromise traffic safety.
- Sand bags are more expensive than other barriers, but also more durable.
- Do not use burlap for sand bags.

| Practice | | |
|--------------------------|-------|--|
| <input type="checkbox"/> | C10.1 | Sand bag barriers may be used in drainage areas up to 5 acres. |
| <input type="checkbox"/> | C10.2 | Install along a level contour. |
| <input type="checkbox"/> | C10.3 | Base of sand bag barrier shall be at least 48 inches wide. |
| <input type="checkbox"/> | C10.4 | Height of sand bag barrier shall be at least 18 inches. |
| <input type="checkbox"/> | C10.5 | Four-inch Polyvinyl Chloride (PVC) pipe may be installed between the top layers of sand bags to drain large flood flows. |
| <input type="checkbox"/> | C10.6 | Provide area behind barrier for runoff to pond and sediment to settle; size barrier according to sediment trap BMP criteria. |
| <input type="checkbox"/> | C10.7 | Place below the toe of a slope. |
| <input type="checkbox"/> | C10.8 | Use sand bags large enough and sturdy enough to withstand major flooding. |

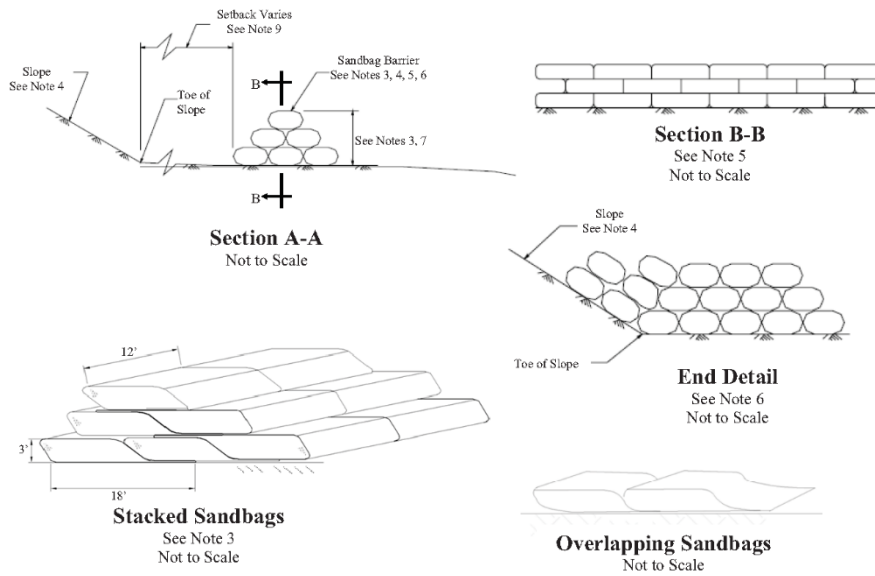
Note: Example schematics are included herein for reference.

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M10.1 | Inspect sand bags prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | M10.2 | Repair damage sustained to the sand bags within two (2) calendar days after the incident or before the next anticipated rainfall event, whichever comes first. |
| <input type="checkbox"/> | M10.3 | Remove sediment when accumulation reaches one-third the barrier height. |
| <input type="checkbox"/> | M10.4 | Provide education for required personnel about proper sand bag placement and maintenance. Train on the importance of preventing sediment discharge. |

C.10 Sand Bag Barrier (continued)



Detail "A" Not to Scale



Notes:

1. Drainage area should not exceed 5 acres.
2. Construct the length of each reach so that the change in base elevation along the reach does not exceed $\frac{1}{2}$ the height of the linear barrier. In no case shall the reach length exceed 500'.
3. Stack sandbags at least three bags high with proper side slopes using a pyramid approach.
4. Locate sandbag barriers on a level contour.
 - a. Slopes between 20:1 and 2:1 (H:V): Sandbags should be placed at a maximum interval of 50 ft. (a closer spacing is more effective), with the first row near the slope toe.
 - b. Slopes 2:1 (H:V) or steeper: Sandbags should be placed at a maximum interval of 25 ft. (a closer spacing is more effective), with the first row placed near the slope toe.
5. Overlap butt joints of row beneath with each successive row.
6. The end of the barrier shall be turned up slope.
7. Cross barriers shall be a min of $\frac{1}{2}$ and a max of $\frac{2}{3}$ of the height of the linear barrier.
8. Sandbag material must conform to ASTM designation D3786 and ASTM designation D4355.
9. Dimensions may vary to fit field condition.
10. For Sandbag and Fill Material Specifications see SE-8 Sandbag Barrier, Materials.

Sandbag Barrier

3.2 C.11 Compost Filter Berm or Sock

Description

A compost filter berm is a dike or compost product that is placed perpendicular to sheet flow runoff to retain sediment onsite. These are generally placed along the perimeter of a site and work to retain large volumes of water, and retain larger amounts of pollutants as water passes through the berm. The berm may either be vegetated or unvegetated.

Limitations

- Only applicable where flow does not exceed 1 cubic foot per second (cfs).
- Compost quality shall comply with all local, state, and federal requirements.
- Do not overlap berms by placing on top of each other.

| Practice | | |
|--------------------------|-------|--|
| <input type="checkbox"/> | C11.1 | Select the appropriate sized berm based on rainfall amount and slope. |
| <input type="checkbox"/> | C11.2 | Fill a mesh tube with composted material and tie knots at both ends of the sock. Ensure that the berm is at least 10 inches in diameter. |
| <input type="checkbox"/> | C11.3 | Install berm per manufacturers' recommended procedures and instructions. |
| <input type="checkbox"/> | C11.4 | Place perpendicular to flow along the base or slopes or site perimeter. Ensure that the berm has good contact with the ground. |
| <input type="checkbox"/> | C11.5 | When encountering a difference in elevation or "step" along the ground, such as curbs or wall, turn the end of the berm towards the flow along the face of the curb or wall. Extend the berm a minimum of 3-feet against the face of the curb or wall. Similarly, if the berm continues on the top of the curb or wall, turn the berm towards the flow for a minimum of 3-feet. Do not "bridge" the elevation difference, unless allowed per the manufacturer's recommended procedures and uses. |
| <input type="checkbox"/> | C11.6 | Overlap the berms a minimum of 6 inches and place them side-by-side. |
| <input type="checkbox"/> | C11.7 | Place stakes on the downstream side of berms that are located on slopes. |
| <input type="checkbox"/> | C11.8 | When complete, compost may be added to the site as a soil amendment with approval from the Airport Manager or AIR-EE. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M11.1 | Inspect berms prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | M11.2 | Repair damage sustained to the berms, such as ripped mesh, within two (2) calendar days after the incident or before the next anticipated rainfall event, whichever comes first. |
| <input type="checkbox"/> | M11.3 | Remove sediment when accumulation reaches one-third the barrier height. |
| <input type="checkbox"/> | M11.4 | Provide education for required personnel about proper berm installation and maintenance. Train on the importance of preventing sediment discharge. |

3.3 C.12 Storm Drain Inlet Protection

Description

Devices of various designs which detain sediment-laden runoff and allow the sediment to settle out of the water prior to discharge into a storm drain inlet or catch basin.

Limitations

- Inlet protection must not create a potential hazard to traffic and pedestrians.
- Drainage area shall not exceed 1 acre.
- Runoff may bypass protected inlets on slopes.
- Ponding will occur at a protected inlet, with possible short-term flooding.
- Straw bales are NOT effective for inlet protection.

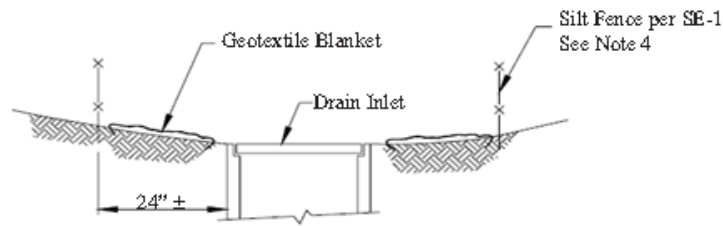
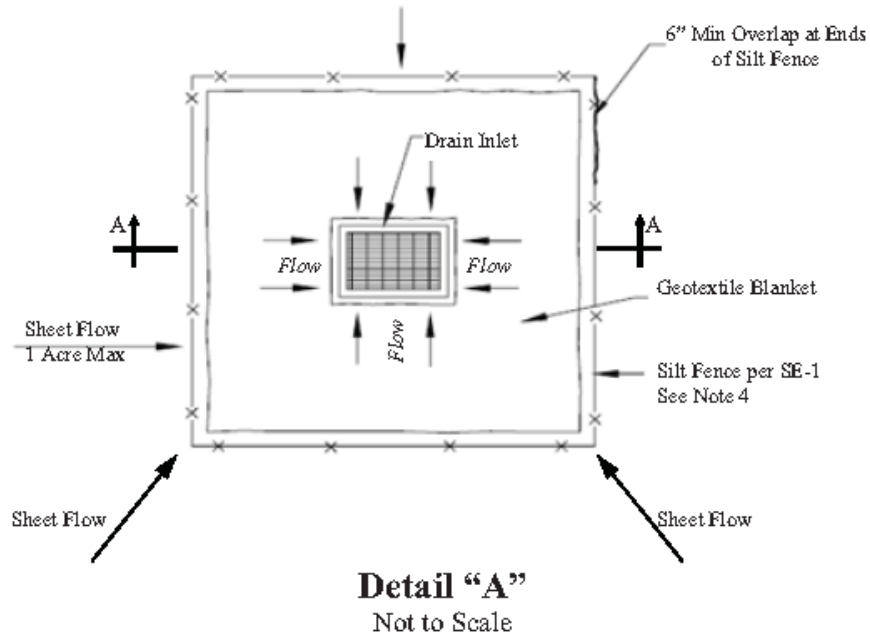
| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C12.1 | Protect every storm drain inlet potentially receiving sediment-laden runoff, either by covering the inlet or promoting sedimentation upstream of the inlet. |
| <input type="checkbox"/> | C12.2 | Five types of inlet protection are presented below; however, other effective methods and proprietary devices exist and may be selected: <ul style="list-style-type: none"> • Filter Fabric Fence: Appropriate for drainage basins less than one acre with less than a 5 percent slope. • Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs. • Gravel and Wire Mesh Filter: Used on curb or drop inlets where construction equipment may drive over the inlet. • Sand Bag Barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. • Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment. Use only for drainage areas smaller than one acre unless a sediment trap first intercepts the runoff. |
| <input type="checkbox"/> | C12.3 | Select the appropriate type of inlet protection as identified in C12.2 above and design as referred to or as described herein. <ul style="list-style-type: none"> • Filter Fabric: Must be of sufficient strength and permeability to allow stormwater to pass through and retain sediment. Must be anchored such that the fabric will not fall into the drain when the grate is removed for maintenance. |
| <input type="checkbox"/> | C12.4 | Install inlet protection per manufacturers' recommended procedures and instructions. |
| <input type="checkbox"/> | C12.5 | Provide area around the inlet for water to pond without flooding structures and property. |
| <input type="checkbox"/> | C12.6 | Remove inlet protection as directed by Airport Manager, Code 22 or other DOTA entity in anticipation of rain events or if they are creating an immediate safety impact to traffic or pedestrians at the Airport. Restore inlet protection devices immediately upon termination of rain event or notice from Airport. |

Note: Example schematics for inlet protection are included herein for reference.

C.12 Storm Drain Inlet Protection
(continued)

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M12.1 | Inspect inlet protection devices prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. During extended rainfall events inspect inlet protection devices daily. |
| <input type="checkbox"/> | M12.2 | Repair damage sustained to the inlet protection devices within two (2) calendar days after the incident or before the next anticipated rainfall event, whichever comes first. |
| <input type="checkbox"/> | M12.3 | Remove sediment after each rainfall event or once the containment device is ½ full of sediment. |
| <input type="checkbox"/> | M12.4 | Where there is evidence of sediment accumulation adjacent to the inlet protection measure or along the runoff flow pattern toward the inlet, such as a concrete gutter or swale, remove the deposited sediment by the end of the same day in which it is found or by the end of the following work day if removal by the same day is not feasible. |
| <input type="checkbox"/> | M12.5 | Report any inlet protection failures and pollutant discharges (including sediment) into the storm drains to AIR-EE. |
| <input type="checkbox"/> | M12.6 | Train required personnel about storm drain protection from sediment discharge and construction site contaminants. |

C.12 Storm Drain Inlet Protection
(continued)



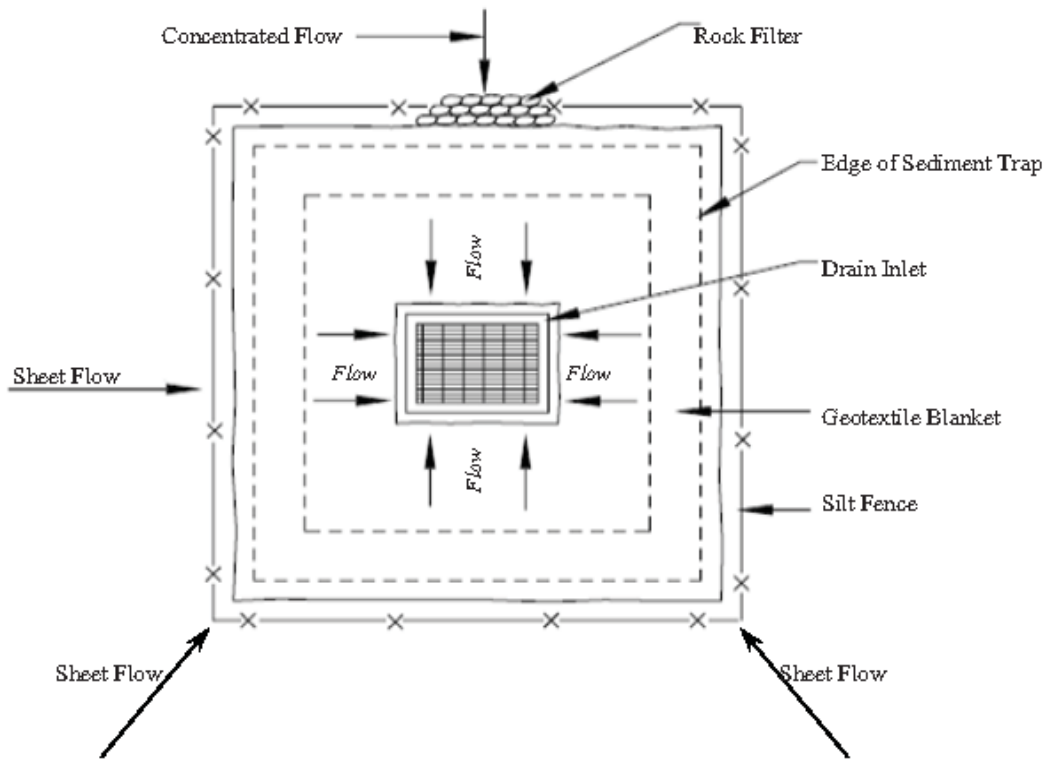
Notes:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable in concentrated flows.
4. Refer to BMP SE-1, Silt Fence for construction.

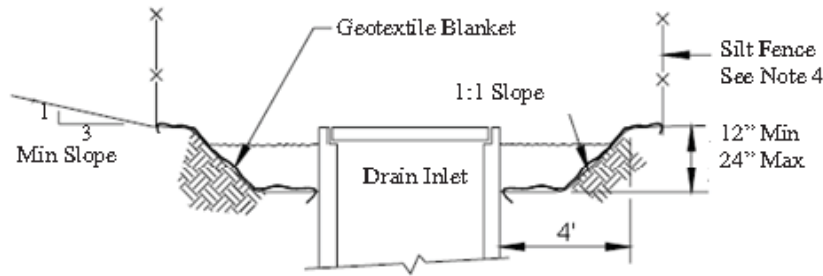
DI Protection Type 1, Filter Fabric Fence

Source: City and County of Honolulu BMP Manual, November 2011.

C.12 Storm Drain Inlet Protection (continued)



Detail "B"
Not to Scale



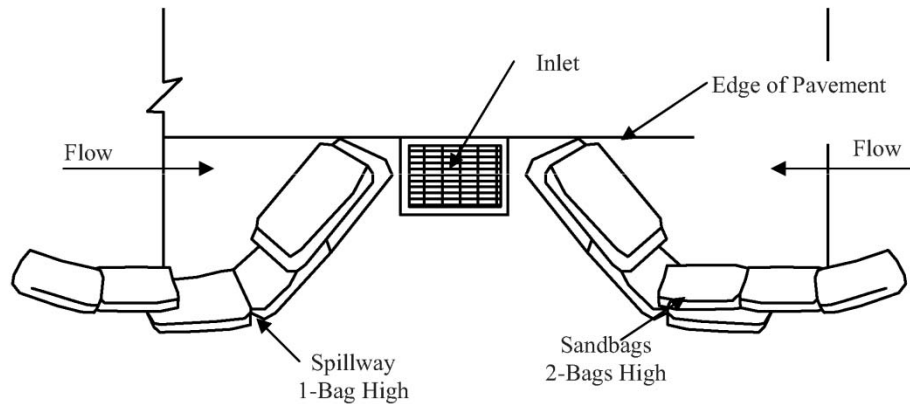
Notes:

1. For use in cleared and grubbed and in graded areas.
2. For concentrated flows, shape basin in 2:1 (L:W) ratio with length oriented towards direction of flow.
3. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd³/acre of drainage area.
4. Refer to BMP SE-1, Silt Fence for construction.

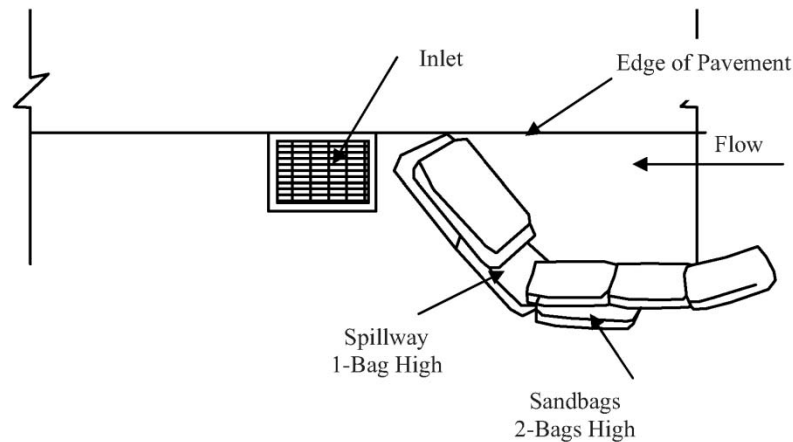
DI Protection Type 2, Excavated Drop Inlet Sediment Trap

Source: City and County of Honolulu BMP Manual, November 2011.

C.12 Storm Drain Inlet Protection (continued)



Typical Protection for Inlet on Sump, Detail "C"
Not to Scale



Typical Protection for Inlet on Grade, Detail "D"
Not to Scale

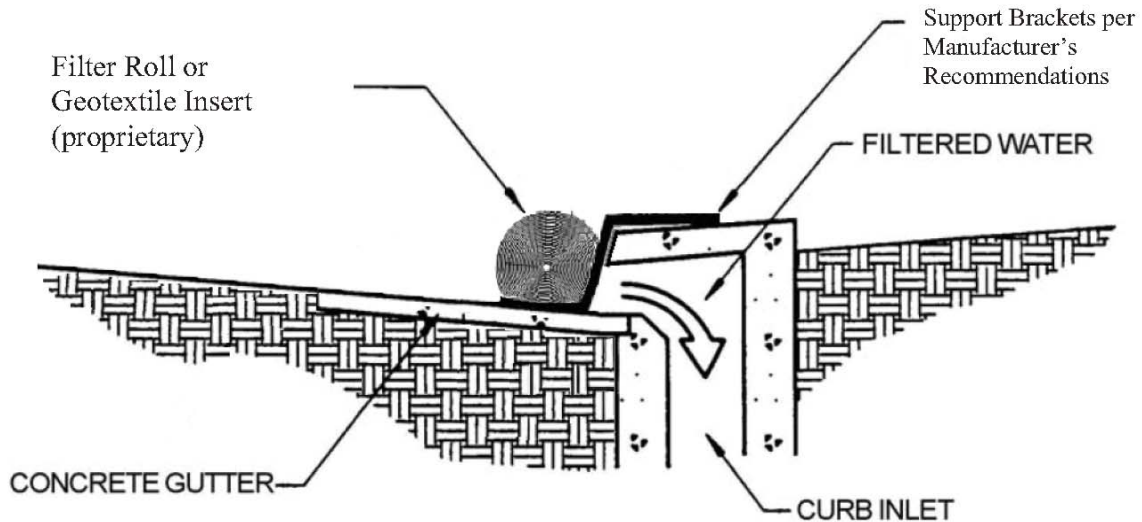
Notes:

1. Intended for short-term use. Not suitable for roads open to traffic.
2. Used to inhibit non-storm water flow.
3. Bags **should** be removed after adjacent operation is completed.
4. Not applicable in areas with high silts and clays without filter fabric.
5. Use sand bag made of geotextile fabric (not burlap) and fill with 0.75 in. rock or 0.25 in. pea gravel.
6. Construct on gently sloping street.
7. Leave room upstream of barrier for water to pond and sediment to settle.
8. Place several layers of sand bags - overlapping the bags and packing them tightly together.
9. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.
10. Do not use sandbags for roadways subject to traffic.
11. For traffic area, insert geotextile filter inserts instead of sandbags.

DI Protection Type 3, Gravel Bag

Source: City and County of Honolulu BMP Manual, November 2011.

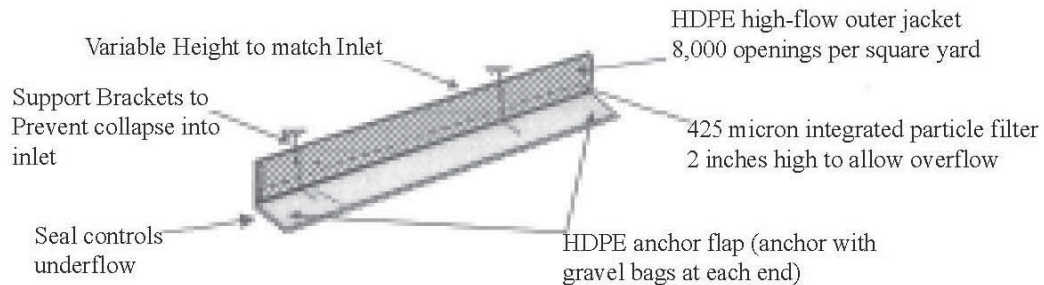
C.12 Storm Drain Inlet Protection
(continued)



Detail "F"

Not to Scale and May Use Various Types of Geotextile Inserts

DI Protection Type 5, Filter Roll or Geotextile Insert with Supports for Curb Inlet



Detail "G"

Not to Scale and May Use Various Types and Styles of Geotextile Inserts

DI Protection Type 5, Geotextile Insert with Supports for Curb Inlet

Source: City and County of Honolulu BMP Manual, November 2011.

3.4 C.13 Sediment Trap

Description

A sediment trap is a small, excavated or bermed area where runoff from small drainage areas is detained and sediment can settle.

Limitations

- Only use for drainage areas up to 5 acres.
- Sediment traps only remove coarse sediment (medium silt size and larger) unless sized like a sediment basin.

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C13.1 | The locations and size of temporary sediment trap should be reviewed and approved by the Airport Manager to prevent possible hazards and adverse impacts to aircraft and airport operations. The trap may create wetlands that may attract wildlife that is hazardous to aircraft. |
| <input type="checkbox"/> | C13.2 | Sediment traps are applicable for any disturbed area less than 5 acres. |
| <input type="checkbox"/> | C13.3 | Install along the perimeter of the site at locations where sediment-laden runoff is discharged off-site. |
| <input type="checkbox"/> | C13.4 | Install around and/or up slope from the storm drain inlet protection measures. |
| <input type="checkbox"/> | C13.5 | Install at any point within the site where sediment-laden runoff can enter stabilized or natural areas or waterways. |
| <input type="checkbox"/> | C13.6 | Build outside the area to be graded before clearing, grubbing, and grading begin. |
| <input type="checkbox"/> | C13.7 | Locate where the trap is easily cleared of sediment. |
| <input type="checkbox"/> | C13.8 | Trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency. |
| <input type="checkbox"/> | C13.9 | The larger the trap, the less frequently sediment must be removed. |
| <input type="checkbox"/> | C13.10 | The outlet or spillway of the trap must be stabilized with rock, vegetation, or another suitable material. |
| <input type="checkbox"/> | C13.11 | A stable emergency spillway must be installed to safely convey major floods. |
| <input type="checkbox"/> | C13.12 | Provide fencing to prevent unauthorized entry. |
| <input type="checkbox"/> | C13.13 | Design freeboard to accommodate the rainfall in accordance with local regulations. Incorporate a minimum of 1-foot into the sediment trap design. DOTA Engineer may require additional freeboard depending on site conditions. |
| <input type="checkbox"/> | C13.14 | Stabilize the bermed and exposed sloped surfaces of the sediment trap with vegetation, chemicals, or physical devices within one (1) calendar day after construction of the berm has been completed. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M13.1 | Inspect sediment trap and fencing prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. During extended rainfall events inspect daily. |
| <input type="checkbox"/> | M13.2 | Dewater sediment trap if infiltration has not completed within 72 hours. |
| <input type="checkbox"/> | M13.3 | Remove sediment when accumulation reaches one-third the sediment trap height and manage according to applicable federal, state, and local regulations. |
| <input type="checkbox"/> | M13.4 | Provide education for required personnel about proper sediment trap installation and maintenance. Train on the importance of preventing sediment discharge. |

3.5 C.14 Silt Fence

Description

A silt fence is made of a semi-impermeable fabric that has been entrenched, attached to supporting poles, and sometimes backed by a wire fence for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Limitations

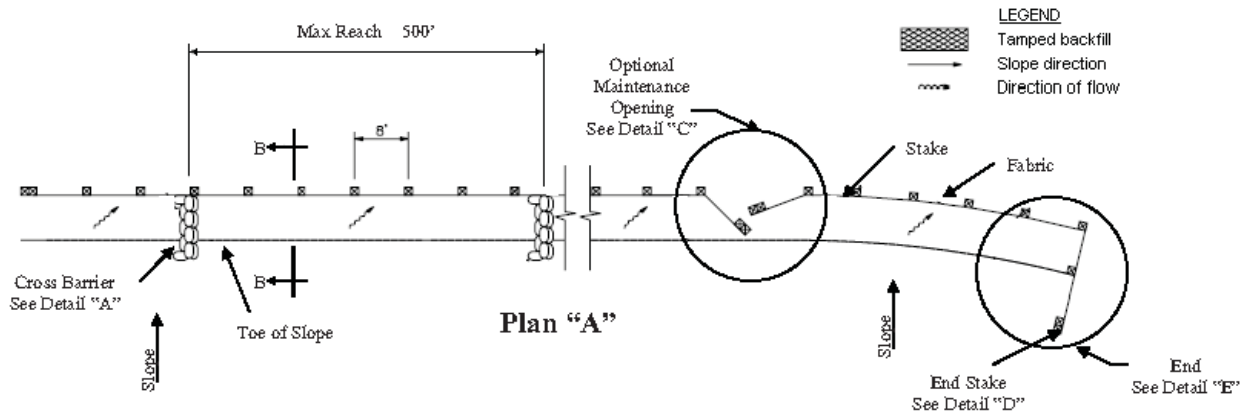
- Do not place fence on a slope, or across any contour line.
- Do not use in streams, channels or anywhere flow has concentrated.
- Do not use in locations where ponded water may cause flooding.
- No more than 1 acre, 100 feet, or 0.5 cfs of concentrated flow should drain to any point along the silt fence.

| Practice | | |
|--------------------------|-------|--|
| <input type="checkbox"/> | C14.1 | Use principally in areas where sheet flow occurs. |
| <input type="checkbox"/> | C14.2 | Install along a level contour so water does not pond more than 1.5 feet at any point. |
| <input type="checkbox"/> | C14.3 | Turn ends of the fence uphill. |
| <input type="checkbox"/> | C14.4 | Provide area behind the fence for runoff to pond and sediment to settle (approx. 1200 square feet per acre draining to the silt fence). |
| <input type="checkbox"/> | C14.5 | Select a fabric that retains 85 percent of the soil, by weight, based on sieve analysis, but is not finer than an equivalent opening size of 70. |
| <input type="checkbox"/> | C14.6 | Install appropriately by stretching silt fence tightly between posts spaced a maximum of 6 feet apart; key into the ground a minimum of 12 inches; overlap section a minimum of 6 inches or wrap sections to create a strong bond. |
| <input type="checkbox"/> | C14.7 | Reinforce the perimeter silt fence with chain link fence or concrete barriers, if needed. |

Note: Example schematics are included herein for reference.

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M14.1 | Inspect silt fence and posts prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. |
| <input type="checkbox"/> | M14.2 | Repair damage sustained to the silt fence or posts within two (2) calendar days after the incident or before the next anticipated rainfall event, whichever comes first. |
| <input type="checkbox"/> | M14.3 | Remove sediment when accumulation reaches one-third the fence height. |
| <input type="checkbox"/> | M14.4 | Provide education for required personnel about proper silt fence installation and maintenance. Train on the importance of preventing sediment discharge. |

C.14 Silt Fence (continued)



Notes:

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
3. Sandbag rows and layers shall be offset to eliminate gaps.
4. Setback dimension may vary to fit field condition. Typical 3' setback from top of slope.
5. Stakes shall be spaced at 8' maximum and shall be positioned on downstream side of fence, or as specified by the engineer.
6. Stake dimensions are nominal. Material as specified by engineer.
7. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples or wire.
8. Stakes shall be driven tightly together to prevent potential flow-through of sediment at joint. The tops of the stakes shall be secured with wire.
9. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples or wire.
10. Minimum 4 staples or wire per stake. Dimensions shown are typical.
11. Joining sections shall not be placed at sump locations.
12. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
13. The last 8' of fence shall be turned up slope to reduce breakthrough of sediment.

Silt Fence

Source: City and County of Honolulu BMP Manual, November 2011.

4.0 TRACKING CONTROL BMPS

4.1 C.15 Stabilized Construction Entrance/Exit

Description

A stabilized construction entrance/exit is a pad of aggregate underlain with filter cloth located where vehicles and/or equipment leave or enter a construction site to or from a paved surface. The purpose of a stabilized construction entrance/exit is to reduce the amount of sediment tracked offsite. The effectiveness of a stabilized construction entrance/exit is greatly increased if a wash rack is included for removing caked-on sediment from vehicles and equipment before they leave the site.

Limitations

- Periodic replenishment of surface aggregate is required.
- Additional street sweeping of adjacent roadways or other paved areas may also be required during the work. Ensure that storm drains and waterways are protected from discharges of street sweeping wastes.
- A wash rack and sediment trap can significantly increase the cost of a stabilized construction entrance.
- The effectiveness of a stabilized construction entrance is limited by the type and moisture content of construction site soils, whether or not a wash rack is included, and by the level of care taken to remove sediment from vehicles and equipment if a wash rack is used.

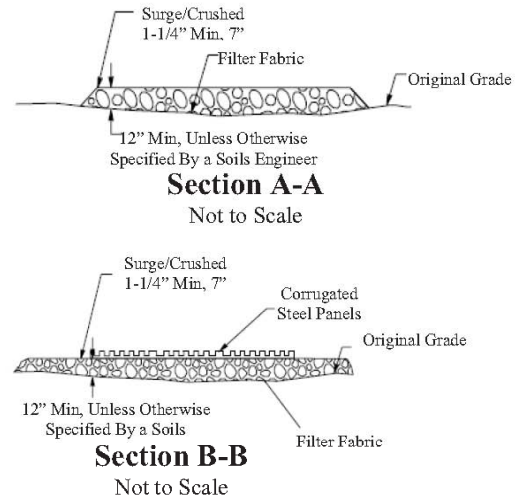
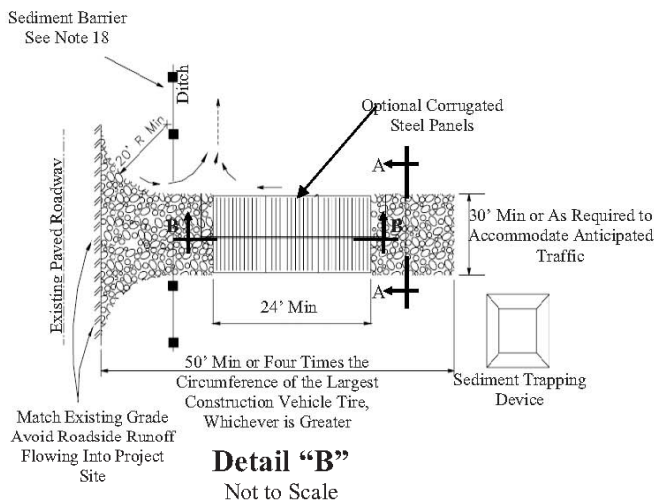
| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C15.1 | Construct stabilized construction entrances/exits on level ground where possible. |
| <input type="checkbox"/> | C15.2 | Grade the entrance/exit to prevent runoff from leaving the construction site. |
| <input type="checkbox"/> | C15.3 | Aggregate shall be 3- to 6-inch-diameter coarse aggregate. |
| <input type="checkbox"/> | C15.4 | Minimum depth of aggregate is to be 12 inches or as recommended by the soils engineer. |
| <input type="checkbox"/> | C15.5 | Stabilized construction entrances/exits are to be a minimum of 50-feet-long and 30-feet-wide. |
| <input type="checkbox"/> | C15.6 | Provide ample turning radii as part of the stabilized entrance/exit. |
| <input type="checkbox"/> | C15.7 | If a wash rack is provided, washing is to be done on paved or crushed stone pad that drains into a properly constructed sediment trap. Refer to C.13 Sediment Trap for the design, installation and maintenance of the sediment trap. |
| <input type="checkbox"/> | C15.8 | Include additional BMPs that remove sediment prior to exit when the minimum dimensions cannot be met. |
| <input type="checkbox"/> | C15.9 | The pavement shall not be cleaned by washing down the street. |
| <input type="checkbox"/> | C15.10 | Restrict vehicle use to properly designated exit points. |
| <input type="checkbox"/> | C15.11 | Provide drain inlet protection devices and/or perimeter sediment controls, as applicable. |
| <input type="checkbox"/> | C15.12 | Construct stabilized construction entrance/exits at all points that exit onto paved roads, other paved areas, and sidewalks. |

Note: Example schematics are included herein for reference.

C.15 Stabilized Construction Entrance/Exit
(continued)

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M15.1 | Inspect the stabilized construction entrance/exit and wash rack ditches at the end of each workweek. If the stabilized construction entrance/exit is clogged with sediment remove the aggregate and separate and dispose of the sediment. Reconstruct or repair the stabilized construction entrance within two (2) calendar days. |
| <input type="checkbox"/> | M15.2 | Inspect roadways and ensure that any tracking is swept and disposed properly. Ensure storm drains and waterways are protected from tracking discharges. |
| <input type="checkbox"/> | M15.3 | Remove sediment tracked onto the roads, paved areas, and sidewalk, at a minimum, by the end of the day in which the track-out occurs. |
| <input type="checkbox"/> | M15.4 | If tracking is excessive or sediment is being transported farther along the pavement or sidewalk by other vehicles traveling outside of the construction site, then, conduct sweeping immediately. |
| <input type="checkbox"/> | M15.5 | However, if sweeping is ineffective or it is necessary to wash the streets, wash water must be contained either by construction of a sump, diverting the water to an acceptable disposal area away from drainage facilities, or vacuuming the wash water. |
| <input type="checkbox"/> | M15.6 | Provide education for required personnel about proper stabilized construction entrance installation, use, and maintenance. Train on the importance of preventing sediment tracking. |

C.15 Stabilized Construction Entrance/Exit (continued)



Notes:

1. Construct on level ground where possible.
2. Select 3 to 6 in. diameter stones.
3. Use minimum depth of stones of 12 in. or as recommended by soils engineer.
4. Construct length of 50 ft. minimum, and 30 ft. minimum width.
5. Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
6. Provide ample turning radii as part of the entrance.
7. Limit the points of entrance/exit to the construction site.
8. Limit speed of vehicles to control dust.
9. Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
10. Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
11. Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.
12. Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
13. Place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but not exceeding 6 in. should be used.
14. Designate combination or single purpose entrances and exits to the construction site.
15. Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
16. Implement SE-7, Street Sweeping and Vacuuming, as needed.
17. All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.
18. Construct sediment Barrier and channel runoff to sediment trapping device as appropriate.

Source: City and County of Honolulu BMP Manual, November 2011.

4.2 C.16 Construction Road Stabilization

Description

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading and frequently maintained to prevent erosion and control dust. Efficient construction road stabilization not only reduces onsite erosion but can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather.

Limitations

- The roadway slope should not exceed 15 percent.
- The roadway must be removed or paved when construction is complete.
- Certain chemical stabilization methods may cause stormwater or soil pollution and should not be used (refer to C.6 Dust Control BMPs).
- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C16.1 | Road should follow topographic contours to reduce erosion of the roadway. |
| <input type="checkbox"/> | C16.2 | Gravel roads should be a minimum 4-inch-thick, 2-3 inch-coarse aggregate base applied immediately after grading, or as recommended by soils engineer. |
| <input type="checkbox"/> | C16.3 | Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (refer to C.6 Dust Control BMPs). |
| <input type="checkbox"/> | C16.4 | When evidence of erosion is noted, apply additional aggregate on gravel roads. |
| <input type="checkbox"/> | C16.5 | Water dirt construction roads three or more times per day during the dry season. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M16.1 | Inspect the stabilized construction roads at the end of each workweek and repair as needed before the start of the next workday. |
| <input type="checkbox"/> | M16.2 | Provide education for required personnel about proper construction road installation and maintenance. Train on the importance of preventing sediment discharge. |

5.0 SITE ACTIVITIES POTENTIAL POLLUTANT CONTROL BMPS

5.1 C.17 Dewatering Operations

Description

Prevent or reduce the discharge of pollutants to stormwater from dewatering operations by using sediment controls and by testing the groundwater for pollution.

There are two general classes of pollutants that may result from dewatering operations: sediment, and toxics and petroleum products. High sediment content in dewatering discharges is common because of the nature of the operation. On the other hand, toxics and petroleum products are not commonly found in dewatering discharges unless the surrounding area has been used for light or heavy industrial activities, or the area has a history of groundwater contamination. Petroleum contamination may be identified through discoloration, odors, or sheen on the groundwater. The presence of contaminated groundwater may indicate contaminated soil as well.

Limitations

None.

| Practice | | |
|--------------------------|-------|--|
| <input type="checkbox"/> | C17.1 | Use sediment controls to remove sediment from water generated by dewatering (refer to C.13 Sediment Trap) |
| <input type="checkbox"/> | C17.2 | Use filtration to remove sediment from a sediment trap. Filtration can be achieved by either of the following methods: <ul style="list-style-type: none">• Use a sump pit and a perforated or slit standpipe with holes and wrapped in filter fabric. The standpipe is surrounded by stones, which filter the water as it collects in the pit before being pumped out. Wrapping the standpipe in filter fabric may require an increased suction inlet area to avoid clogging and unacceptable pump operation.• Use a floating suction hose to allow cleaner surface water to be pumped out. |
| <input type="checkbox"/> | C17.3 | A weir tank may be used to filter the water through using multiple compartments to allow pollutants to settle out. |
| <input type="checkbox"/> | C17.4 | A gravity filter bag is a square or rectangular bag of geotextile fabric that will remove sediment from the water prior to discharge. Refer to manufacturer's instructions regarding flow rate and frequency of maintenance. |
| <input type="checkbox"/> | C17.5 | In areas suspected of having groundwater pollution, sample the groundwater near the excavation site and have the water tested for known or suspected pollutants. The testing laboratory shall use methods listed in 40 CFR Part 136, and have a quality assurance/quality control measures program. Check with the DOH for testing requirements and disposal options. |
| <input type="checkbox"/> | C17.6 | Notify the DOTA Engineer and AIR-EE when contaminated media is identified. |
| <input type="checkbox"/> | C17.7 | Notify the DOH Clean Water Branch (CWB) (808) 586-7309 at least 90 days prior to dewatering from known areas of contamination. |
| <input type="checkbox"/> | C17.8 | If discharge to a sanitary sewer is considered, check with the DOH and with the owner of the wastewater system for additional testing requirements and disposal options. With permits from the DOH and the owner of the wastewater system, it may be possible to treat pumped groundwater and discharge the treated effluent to the sanitary sewer. |

C.17 Dewatering Operations
(continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C17.9 | If the contractor elects to discharge dewatering effluent into State waters or existing drainage systems, the contractor shall prepare and obtain DOTA acceptance of a NOI/NPDES Permit Form G application for dewatering to DOTA and then to DOH CWB at least 30 calendar days prior to the start of Dewatering Activities. Follow all regulations on the Dewatering Permit as required by DOH CWB. |
| <input type="checkbox"/> | C17.10 | Submit and obtain a Permit to Discharge into the State Airport Drainage System Relating to Construction Projects from the DOTA, at least 30 calendar days prior to the start of Dewatering Activities. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M17.1 | Follow the maintenance and inspection guidelines for the temporary BMPs that have been chosen for the dewatering operations. |
| <input type="checkbox"/> | M17.2 | Check filtering devices frequently to ensure they are unclogged and operating correctly. Adjustments may be needed depending on the amount of sediment in the water being pumped. |
| <input type="checkbox"/> | M17.3 | Systems should be filled in or otherwise removed when permanent dewatering controls are in place and connected to an approved treatment and receiving system. |
| <input type="checkbox"/> | M17.4 | Provide education for required personnel about proper dewatering operations. |
| <input type="checkbox"/> | M17.5 | Report any overflows, upsets or discharges to the storm drain system to DOH and AIR-EE. |

5.2 C.18 Paving Operations and Waste Management

Description

Prevent or reduce the discharge of pollutants from paving operations by using measures to prevent stormwater pollution, properly disposing of wastes, and providing employee training.

Limitations

None.

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C18.1 | Avoid paving during wet weather. |
| <input type="checkbox"/> | C18.2 | Use asphalt emulsions as prime coat where possible. |
| <input type="checkbox"/> | C18.3 | Store materials away from drainage courses to minimize contact with stormwater runoff. |
| <input type="checkbox"/> | C18.4 | Protect drainage course, particularly in sloped areas, by employing BMPs to divert runoff or trap/filter sediment. This includes, but not limited to, prior to application of tack coat, seal coat, slurry seal, and fog seal. |
| <input type="checkbox"/> | C18.5 | Leaks and spills from paving equipment can contain toxic levels of heavy metal, oil, and grease. Place drip pans or absorbent materials under paving equipment when not in use. |
| <input type="checkbox"/> | C18.6 | Clean up spills promptly with absorbent materials. |
| <input type="checkbox"/> | C18.7 | Block/protect catch basins and cover manholes when applying seal coat, tack coat, slurry seal, fog seal, etc. |
| <input type="checkbox"/> | C18.8 | Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry. Slurry residue may be placed in a temporary pit (as described in the C.32 Concrete Operation and Waste Management BMP to promote evaporation). Dispose solid waste in accordance with the C.29 Solid Waste Management - Hazardous Waste and C.30 Solid Waste Management - Debris BMPs. |
| <input type="checkbox"/> | C18.9 | When removing existing asphalt pavement, properly dispose of removed material. |
| <input type="checkbox"/> | C18.10 | When stockpiling new asphalt pavement material or removed existing asphalt pavement, follow requirements for C.28 Protection of Stockpiles, as applicable. |
| <input type="checkbox"/> | C18.11 | If paving involves Portland Cement Concrete, refer to C.32 Concrete Operation and Waste Management BMPs. |
| <input type="checkbox"/> | C18.12 | If paving involves asphaltic concrete, follow these steps: <ul style="list-style-type: none"> • Sweep excess sand or gravel placed over new asphalt to prevent it from washing into storm drains, channels, or surface waters. Properly dispose of these wastes by referring to the Solid Waste Management BMP in this manual. • Old asphalt must be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible. • If paving involves an onsite mixing plant, follow the stormwater permitting requirements for industrial activities. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M18.1 | Inspect and maintain paving equipment daily to minimize leaks and drips. Follow requirements for C.20 Vehicle and Equipment Cleaning, C.21 Vehicle and Equipment Refueling, and C.22 Vehicle and Equipment Operation and Maintenance, as applicable. |
| <input type="checkbox"/> | M18.2 | Inspect drip pans daily. Clean, remove and properly dispose of the contents and rain accumulation. |
| <input type="checkbox"/> | M18.3 | Inspect drain inlet protection devices and maintain as necessary. |

5.3 C.19 Structure Construction and Painting

Description

Prevent or reduce the discharge of pollutants to stormwater from structure repair/ construction and painting by enclosing, covering or providing secondary containment around material storage areas, using good housekeeping practices, using less hazardous alternative products, and training employees.

Limitations

- Less hazardous alternative products may not be available, suitable, or effective in every case.

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C19.1 | Keep the work site clean and orderly. |
| <input type="checkbox"/> | C19.2 | Buy recycled or less hazardous products to the maximum extent practicable. |
| <input type="checkbox"/> | C19.3 | Conduct painting operations consistent with the state and federal safety (Occupational Safety and Health Administration) and air quality regulations. |
| <input type="checkbox"/> | C19.4 | Properly store paints, epoxy compounds, solvents, and other liquid chemicals in water-tight containers with closed lids or covers. All liquids, except for water, must be stored under cover and in proper secondary containment. Containers must be well-labeled. It is recommended to store materials in their original containers. |
| <input type="checkbox"/> | C19.5 | Properly store powder chemicals and materials, such as cement, in sealed container or bags that are well-labeled. Cover and immediately repair or replace damaged containers. It is recommended to store materials in their original containers. |
| <input type="checkbox"/> | C19.6 | Properly store and dispose waste materials generated from the activity. Refer to C.29 Solid Waste Management – Hazardous Waste, C.30 Solid Waste Management - Debris, and C.32 Concrete Operation and Waste Management BMPs. |
| <input type="checkbox"/> | C19.7 | Enclose or cover painting operations to avoid drift. |
| <input type="checkbox"/> | C19.8 | Use application equipment that minimizes overspray. |
| <input type="checkbox"/> | C19.9 | Clean up spills immediately. Keep ample supply of cleanup material onsite at designated locations. Do not clean surfaces or spill by hosing the area down. Eliminate the source of the spill to prevent discharge or a furtherance of an ongoing discharge. |
| <input type="checkbox"/> | C19.10 | Use a drop cloth to collect residue from scraping or sand blasting operations and dispose of the residue properly. |
| <input type="checkbox"/> | C19.11 | Paint chips containing lead or tributyltin are considered a hazardous waste. Refer to C.29 Solid Waste Management - Hazardous Waste BMPs. |
| <input type="checkbox"/> | C19.12 | Remove as much paint from the brushes on painted surface. Clean painting equipment in a sink that is connected to the sanitary sewer, if possible. If not, direct all wash water into a leak-proof container or leak-pit pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation. Properly dispose of wash water. |
| <input type="checkbox"/> | C19.13 | Designate and locate onsite wash area a minimum of 50 feet away, or as far as practicable, from storm drain inlets, open drainage facilities, or water bodies. |
| <input type="checkbox"/> | C19.14 | Mix paints in a covered, contained area whenever possible, in case of a spill. |
| <input type="checkbox"/> | C19.15 | Recycle/dispose according to applicable laws and regulations residual paints, solvent, lumber and other materials to the maximum extent practicable. |
| <input type="checkbox"/> | C19.16 | Dispose containers only after all of the product has been used. |
| <input type="checkbox"/> | C19.17 | Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids. |

C.19 Structure Construction and Painting
(continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C19.18 | Ensure that employees doing the work are properly trained. |
| <input type="checkbox"/> | C19.19 | Dispose of sand blasted material properly. Chips and dust from marine paints or paints containing lead are to be disposed of as hazardous waste. Paint chips and dust from non-hazardous dry stripping and sand blasting may be swept up and disposed of as trash. |
| <input type="checkbox"/> | C19.20 | Retain a complete set of SDS onsite at a designed location for easy access. |

| Maintenance and Inspection | | |
|-----------------------------------|-------|---|
| <input type="checkbox"/> | M19.1 | At the beginning and ending of each workday inspect and make sure materials are properly stored or covered. |
| <input type="checkbox"/> | M19.2 | Inspect the storm drain system in the immediate work area upon completion of the daily activity, and remove any dirt or debris collected. |
| <input type="checkbox"/> | M19.3 | Inspect and clean work areas at the end of each working day. |

5.4 C.20 Vehicle and Equipment Cleaning

Description

Prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning by using offsite facilities, washing in designated and contained areas only, eliminating discharges to the storm drain by infiltrating or recycling the wash water, and/or training employees.

Limitations

- Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades.

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C20.1 | Use offsite vehicle wash racks or commercial washing facilities as much as possible. These facilities are more adequately equipped to handle and dispose of the wash waters properly. Washing vehicles and equipment outdoors or in areas where wash water flows onto paved surfaces or into drainage pathways can pollute stormwater. |
| <input type="checkbox"/> | C20.2 | If washing must occur onsite, use designated, bermed and lined wash areas to prevent wash water contact with stormwater, streams, rivers, and other water bodies. The wash area can be sloped for wash water collection and subsequent proper disposal offsite. The Airport Manager and AIR-EE shall approve the location of wash area. |
| <input type="checkbox"/> | C20.3 | Use as little water as possible to avoid having to install erosion and sediment controls for the wash area. |
| <input type="checkbox"/> | C20.4 | Use phosphate-free, biodegradable soaps. |
| <input type="checkbox"/> | C20.5 | Prior to cleaning, check for leaks on the equipment and repair immediately. Repair all known leaks before cleaning. |
| <input type="checkbox"/> | C20.6 | Educate employees on pollution prevention measures. |
| <input type="checkbox"/> | C20.7 | Avoid steam cleaning in uncontained areas. Steam cleaning can generate significant pollutant concentrations. |
| <input type="checkbox"/> | C20.8 | Washing of personal vehicles at DOTA property is prohibited. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M20.1 | Inspect onsite wash areas at the end of each workweek. |
| <input type="checkbox"/> | M20.2 | Monitor employees and subcontractors throughout the duration of the construction project to ensure good housekeeping practices are implemented. |

5.5 C.21 Vehicle and Equipment Refueling

Description

Prevent fuel spills and leaks, and reduce their impacts to stormwater by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees.

Limitations

None.

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C21.1 | Use offsite fueling stations as much as possible. Fueling vehicles and equipment outdoors or in areas where fuel may spill/leak onto paved surfaces or into drainage pathways can pollute stormwater. For fueling a large number of vehicles or pieces of equipment, consider using an offsite fueling station. These businesses are better equipped to handle fuel and spills properly. |
| <input type="checkbox"/> | C21.2 | If fueling must occur onsite, use designated area located way from drainage courses to prevent stormwater contamination. The Airport Manager and AIR-EE shall approve the location of fueling area and associated Spill Prevention, Control, and Countermeasure (SPCC) Plan (if applicable). |
| <input type="checkbox"/> | C21.3 | Prepare and maintain an SPCC Plan onsite if the total combined capacity is greater than 1,320 gallons for all above-ground storage tanks (ASTs), with individual capacities equal to or greater than 55 gallons. |
| <input type="checkbox"/> | C21.4 | Discourage “topping-off” of fuel tanks. |
| <input type="checkbox"/> | C21.5 | Always use secondary containment, such as a drain pan or drop cloth, when fueling to catch spills/leaks. Clean up spills immediately. |
| <input type="checkbox"/> | C21.6 | Place a stockpile of spill cleanup materials where it will be readily accessible. |
| <input type="checkbox"/> | C21.7 | Use absorbent materials on small spills rather than hosing down or burying the spill. Remove and dispose of the absorbent materials promptly and properly. |
| <input type="checkbox"/> | C21.8 | Comply with all federal and state requirements regarding ASTs, including the requirement for secondary containment. |
| <input type="checkbox"/> | C21.9 | Avoid mobile fueling of construction equipment at the site. If possible, transport the equipment to designated fueling areas. |
| <input type="checkbox"/> | C21.10 | Train employees in proper fueling and cleanup procedures. |
| <input type="checkbox"/> | C21.11 | Store gasoline, diesel fuel, oil, hydraulic fluid, or other petroleum products or other chemicals in watertight containers, covered, and provide secondary containment. Containers are to be well-labeled. Dispose of containers only after all the product has been used. Dispose or recycle according to federal, state, and local requirements. |

C.21 Vehicle and Equipment Refueling
(continued)

| Maintenance and Inspection | | |
|-----------------------------------|-------|---|
| <input type="checkbox"/> | M21.1 | Inspect fueling areas and facilities at the end of each workday. |
| <input type="checkbox"/> | M21.2 | Ensure that the spill cleanup materials are fully stocked at the beginning of each workday. |
| <input type="checkbox"/> | M21.3 | Inspect vehicles and equipment for leaks at the beginning and end of each day. Repair leaks immediately. |
| <input type="checkbox"/> | M21.4 | If a spill occurs, clean it up immediately and properly dispose of the contaminated soil and cleanup materials. |
| <input type="checkbox"/> | M21.5 | Report all spills in accordance with the SPCC Plan or C.35 Spill Response Practices, whichever is stricter. |

5.6 C.22 Vehicle and Equipment Operation and Maintenance

Description

Outdoor vehicle or equipment maintenance is a potentially significant source of water pollution. Activities that can contaminate stormwater include vehicle and equipment repair and service, including changing and filling of fluids, and outdoor equipment storage and parking, which can result in dripping of fluids.

Prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment operation and maintenance by using offsite facilities, performing work in designated areas only, providing cover for materials stored outside, checking for leaks and spills, containing and cleaning up spills immediately, and training employees.

Limitations

None.

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C22.1 | Keep vehicles and equipment clean; don't allow excessive build-up of oil and grease. |
| <input type="checkbox"/> | C22.2 | Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Maintaining vehicles and equipment outdoors or in areas where vehicle or equipment fluids may spill or leak onto the ground can pollute stormwater. |
| <input type="checkbox"/> | C22.3 | If maintenance must occur onsite, use designated areas, located away from drainage courses, to prevent the contamination of stormwater runoff. Berm or protect maintenance areas to prevent runoff from entering the area. The Airport Manager and AIR-EE shall approve the location of the maintenance area, including a plan on how the area will be cleaned up and the materials disposed. |
| <input type="checkbox"/> | C22.4 | Always use secondary containment, such as an anchored drip pan or drop cloth, to capture spills or leaks when removing or changing fluids. |
| <input type="checkbox"/> | C22.5 | Place a stock of spill cleanup materials where it will be readily accessible. |
| <input type="checkbox"/> | C22.6 | Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly. |
| <input type="checkbox"/> | C22.7 | Inspect onsite vehicles and equipment daily for leaks, and repair immediately. |
| <input type="checkbox"/> | C22.8 | Inspect incoming vehicles and equipment (including delivery trucks, and employees' vehicles) regularly for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite. |
| <input type="checkbox"/> | C22.9 | Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic, and transmission fluids. |
| <input type="checkbox"/> | C22.10 | Dispose of all wastes from vehicle maintenance activities properly. Recycle waste materials to the extent practicable. |
| <input type="checkbox"/> | C22.11 | Train employees on proper maintenance and spill cleanup. Ensure employees are knowledgeable to the locations of the spill kits and SDS. |
| <input type="checkbox"/> | C22.12 | Place drip pans or similar containment device under vehicles or equipment when not in use or operating in a stationary position, such as light plants and trailer-mounted generators, to capture/absorb any potential leaks and prevent spills. |

C.22 Vehicle and Equipment Operation and Maintenance (continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C22.13 | Do not allow accumulation of contents and rainwater to overflow from drip pans or containment device. |
| <input type="checkbox"/> | C22.14 | If excess grease/oil is applied to equipment or evidence of a leak is observed on the equipment, prevent area from contact with rainwater or contain rainwater which contact grease/oil or leaked fluid with drip pans or similar containment device. |
| <input type="checkbox"/> | C22.15 | Do not clean surfaces or spills by hosing the area down. |
| <input type="checkbox"/> | C22.16 | Store diesel fuel, oil, hydraulic fluid, or other petroleum products or other chemicals in watertight containers, provide cover, and secondary containment. Do not remove original product labels. Have SDS located onsite and ensure employees are knowledgeable of the location. Follow BMPs in C.26 Material Delivery and Storage for storage of other materials. |
| <input type="checkbox"/> | C22.17 | Oil filter disposed in trash cans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Recycle oil filters if this service is available. |
| <input type="checkbox"/> | C22.18 | Dispose of containers only after all the product has been used. Deliver and store only sufficient quantity of products that is needed. Do not store excessive quantity of products. |
| <input type="checkbox"/> | C22.19 | Dispose of or recycle oil or oily wastes according to federal, state, and local requirements. |
| <input type="checkbox"/> | C22.20 | Comply with all federal and state requirements regarding AST, including the requirement for secondary containment if the facility operations qualify for an SPCC Plan. Maintain an SPCC Plan onsite. |
| <input type="checkbox"/> | C22.21 | Operation and use of equipment and vehicles that show excessive emissions of exhaust gases shall not be allowed until corrective repairs or adjustments are made. |
| <input type="checkbox"/> | C22.22 | Furnish construction equipment with suitable mufflers to maintain noise levels complying with applicable regulations. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M22.1 | Ensure that the spill cleanup materials are fully stocked at the beginning of each workday. |
| <input type="checkbox"/> | M22.2 | Inspect vehicles and equipment for leaks at the beginning and end of each day. Repair leaks immediately or remove them from the project site. |
| <input type="checkbox"/> | M22.3 | Inspect drip pans or drop cloths daily. Clean, remove and properly dispose of the contents and any rainwater accumulation. |
| <input type="checkbox"/> | M22.4 | If a spill occurs, clean it up immediately and properly dispose of the contaminated soil and cleanup materials. |
| <input type="checkbox"/> | M22.5 | Report spills of a certain size (volume of greater than 25 gallons of oil not contained within 72 hours) per Hawaii Administrative Rules (HAR) 11-451 to DOH Hazard Evaluation and Emergency Response (HEER) and the National Response Center (NRC). Refer to C.35 Spill Response Practices. |
| <input type="checkbox"/> | M22.6 | Procure a spill response contractor for any large spills that cannot be contained. |
| <input type="checkbox"/> | M22.7 | Maintain waste fluid containers in leak proof condition in secondary containment and in a covered area. |
| <input type="checkbox"/> | M22.8 | Inspect equipment maintenance areas regularly. |
| <input type="checkbox"/> | M22.9 | Train employees on proper maintenance of the equipment and spill procedures. |

5.7 C.23 Concrete Curing Water and Compounds Management

Description

Concrete curing is used in the construction of structure such as bridges, walls, columns, beams, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. Proper procedures reduce or eliminate the contamination of stormwater runoff during concrete curing.

Limitations

None.

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C23.1 | Use proper storage and handling techniques for concrete curing compounds. Refer to C.26 Material Delivery and Storage BMPs. |
| <input type="checkbox"/> | C23.2 | Protect drain inlets prior to the application of curing compounds. |
| <input type="checkbox"/> | C23.3 | Refer to C.34 Spill Prevention and Control BMPs. |
| <input type="checkbox"/> | C23.4 | Direct cure water away from inlets and watercourses to collection areas for infiltration or other means of removal in accordance with all applicable permits. |
| <input type="checkbox"/> | C23.5 | Collect cure water at the top of slopes and transport or dispose of water in a non-erodible manner. Refer to C.4 Earth Dike and C.5 Temporary Drains and Swales BMPs. |
| <input type="checkbox"/> | C23.6 | Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water. |
| <input type="checkbox"/> | C23.7 | Avoid overspray of the curing compound. Apply curing compound per manufacturer's recommended application rate and coverage. |
| <input type="checkbox"/> | C23.8 | Apply an amount of compound that covers the surface, but does not allow any runoff of the compound. |
| <input type="checkbox"/> | C23.9 | Avoid or minimize applying curing compound in windy conditions. Maintain proper distance between sprayer tip and concrete surface to minimize dissipation of the curing compound due to wind. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M23.1 | Inspect and verify that activity-based BMPs are in-place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation. |
| <input type="checkbox"/> | M23.2 | Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur. |
| <input type="checkbox"/> | M23.3 | Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds. |
| <input type="checkbox"/> | M23.4 | Inspect cure containers and spraying equipment for leaks. |

5.8 C.24 Hydrotesting Effluent Management

Description

Construction of new water lines may require hydrotesting and water-flushing of the pipes to clear it of all debris, sediment, and other pollutant that may have entered the pipe during manufacture, transport, and installation. In addition, new potable water systems require chlorination of the pipes to eliminate harmful bacteria in the pipes. The chlorinated waters are also harmful to aquatic life and plants.

Proper procedures reduce or eliminate the contamination of surface waters during hydrotesting, flushing and chlorination.

Limitations

- High levels of chlorine in water used to disinfect water pipe can kill aquatic life and plants.
- Flushing waters can contain sediment, chemical and residual oils that enter the pipe prior to and during installation.
- The volume of water during flushing and chlorination is depended upon the diameter of the pipe, length of pipe, rate of discharge and time. This volume of water must be considered when determining the size of the collection area and discharge. Flooding caused by the release of the water shall be prevented.

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C24.1 | Direct chlorinated water away from inlets and watercourses to collection areas for infiltration or other means of removal in accordance with all applicable permits. Do not direct chlorinated water to vegetated areas. |
| <input type="checkbox"/> | C24.2 | Collect and dechlorinate-treat chlorinated waters prior to it reaching any surface water and drainage system. |
| <input type="checkbox"/> | C24.3 | Properly deliver and store chemicals. Refer to C.26 Material Delivery and Storage BMPs. |
| <input type="checkbox"/> | C24.4 | Properly handle chemicals per the manufacturer's procedures and precautions. Refer to C.27 Material Use BMPs. |
| <input type="checkbox"/> | C24.5 | Prior to flushing the water line, provide Storm Drain Inlet Protection and/or Perimeter Sediment Controls, as applicable. |
| <input type="checkbox"/> | C24.6 | While flushing, treat, trap or collect sediment, particles, and any residual oils from the waters. |
| <input type="checkbox"/> | C24.7 | If the contractor elects to flush waterline or discharge effluent into State waters or drainage system, the contractor shall prepare and obtain DOTA's acceptance of a NOI/NPDES Permit Form F application and DOTA Discharge Permit for Construction Activities for DOTA submittal to DOH CWB at least 30 calendar days prior to the start of Hydrotesting Activities, if necessary. Site-specific BMPs must be included in the NOI/NPDES Permit Form F submittal. Refer to BMPs listed in C.17 Dewatering Operations. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M24.1 | Inspect stored material and chemicals for leaks and damage, daily. |

5.9 C.25 Water-Jet Wash and Hydro-Demolition Water Management

Description

Prevent the discharge of contaminants released from concrete or impervious surfaces during cleaning and demolition into the drainage system and surface water.

Limitations

- Water-jet washing may reduce or eliminate the contamination of stormwater runoff during rain events when used to clean impervious surfaces, potentially containing residue oil, chemicals, and fines. Jetting transfers these contaminants to the jetting wash waters. Proper procedures during water-jet washing will prevent contaminants from entering the storm drainage system and surface waters.
- Hydro-demolition wastewater, similar to concrete wash water, may have a high pH and contain metals, chemicals and fines.

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C25.1 | For Water-Jet Wash Water used to clean vehicles and equipment, use off-site wash racks or commercial washing facilities, when practical. |
| <input type="checkbox"/> | C25.2 | Refer to C.20 Vehicle and Equipment Cleaning BMPs. |
| <input type="checkbox"/> | C25.3 | For Water-Jet wash water used to clean impervious surfaces and Hydro-demolition wastewater, the runoff shall not be allowed to flow into storm drainage structures or surface waters. |
| <input type="checkbox"/> | C25.4 | Prior to water-jetting and hydro-demolition, clean surfaces by other means, if practicable, such as sweep or vacuuming. |
| <input type="checkbox"/> | C25.5 | Prior to operation, check area for any spills. Clean spill prior to water-jetting. |
| <input type="checkbox"/> | C25.6 | Collect or contain wastewater and properly dispose or allow to evaporate. Properly dispose of all sediment and residual solids. |
| <input type="checkbox"/> | C25.7 | For Hydro-Demolition, properly collect, stockpile, and dispose of solid waste. Refer to C.28 Protection of Stockpiles, C.30 Solid Waste Management - Debris, and C.32 Concrete Operation and Waste Management BMPs. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M25.1 | Check storage and containment of wastewater collection facilities daily for leaks and damage. Repair immediately. |

6.0 MATERIAL AND WASTE MANAGEMENT POLLUTION CONTROL BMPS

6.1 C.26 Material Delivery and Storage

Description

Prevent or reduce the discharge of pollutants to stormwater from material delivery and storage by minimizing the storage of hazardous materials onsite, storing materials in a designated area, installing secondary containment, conducting regular inspections, and training employees.

Limitations

Storage sheds often must meet building and fire code requirements.

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C26.1 | Designate areas of the construction site for material delivery and storage. <ul style="list-style-type: none"> • Locate storage areas near construction entrances and away from waterways. • Avoid transporting potential pollutants near drainage paths or waterways. • Surround storage areas for potential pollutants with earth berms or other approved containment devices. • Store potential pollutants in a paved area, if available. |
| <input type="checkbox"/> | C26.2 | Store reactive, ignitable, or flammable liquids in compliance with the local fire codes. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. Refer to the Flammable and Combustible Liquid Code, National Fire Protection Association, NFPA 30. |
| <input type="checkbox"/> | C26.3 | Keep an accurate, up-to-date inventory of materials used at work sites. <ul style="list-style-type: none"> • Minimize onsite inventory. • Minimize storage of hazardous materials. • Store materials in covered area or under covering. |
| <input type="checkbox"/> | C26.4 | Handle hazardous materials as infrequently as possible. |
| <input type="checkbox"/> | C26.5 | Maintain SDS at the work site. Keep SDS at a designated location and ensure employees are knowledgeable of the location. |
| <input type="checkbox"/> | C26.6 | Do not store material directly on the ground. Place materials on a pallet or dunnage, and when possible, in secondary containment. |
| <input type="checkbox"/> | C26.7 | Store all liquid materials within secondary containment. Cover or store under cover. |
| <input type="checkbox"/> | C26.8 | Provide secondary containment with adequate containment volume able to capture 100 percent of the capacity of the single largest container, if stored indoors, or 100 percent of the capacity of the single largest container plus the freeboard from the precipitation of a 25-year storm event, if stored outdoors. |
| <input type="checkbox"/> | C26.9 | Ensure the secondary containment is free of accumulation of rainwater and spills, and covered or stored under cover. In the event of spills or leaks, accumulated rainwater and spill shall be collected and placed in appropriate containers. These liquids shall be considered hazardous waste unless testing determines them to be non-hazardous. Properly dispose or recycle all liquids according to federal, state, and local requirements. |
| <input type="checkbox"/> | C26.10 | Store bagged and boxed materials on pallets or dunnage. Provide protection from wind, rain, and runoff. Store under cover or covered. |
| <input type="checkbox"/> | C26.11 | Prevent contact with wind, rain, and runoff for powder-form materials such as cement. Check packaging and containers for damage, and immediately repair, replace, or remove from site. |

C.26 Material Delivery and Storage (continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C26.12 | Store metal materials, such as reinforcing steel and dowels, on pallets or dunnage, and under cover, covered, or in containers to prevent contact with rain and runoff. |
| <input type="checkbox"/> | C26.13 | If drums must be stored in an uncovered area, store them at a slight angle to reduce ponding of rainwater on the lids and reduce corrosion. Additionally, place within secondary containment. |
| <input type="checkbox"/> | C26.14 | Keep chemicals in their original containers and well labeled. Labels shall be clearly and easily legible. Position container with label for easy access and viewing. Containers that are empty shall be labeled as “EMPTY.” Containers with non-potable water shall be labeled as “Non-Potable Water.” |
| <input type="checkbox"/> | C26.15 | Provide sufficient separation between stored materials to allow for spill monitoring, spill cleanup, and emergency response access. |
| <input type="checkbox"/> | C26.16 | Ensure that employees handling potential pollutants have received adequate training regarding the hazards and proper handling procedures for the materials. |
| <input type="checkbox"/> | C26.17 | Train employees in emergency spill cleanup procedures are to be present when dangerous materials or liquid chemicals are unloaded. |
| <input type="checkbox"/> | C26.18 | Ensure spill kits are to be readily available onsite at designated locations. |
| <input type="checkbox"/> | C26.19 | If significant residual materials remain on the ground after construction is complete, properly remove materials and any contaminated soil. If the area is to be paved, pave as soon as materials are removed to stabilize the soil. |
| <input type="checkbox"/> | C26.20 | Materials are to be covered, enclosed, or in their sealed containers while being transported to and from the site, and on the site. Loads are to be properly secured to prevent tipping, shifting, or movement of the material during transport. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M26.1 | Keep storage areas clean and well organized. Provide ample cleanup supplies for the various materials being stored. |
| <input type="checkbox"/> | M26.2 | Inspect perimeter controls at the end of each workday. Repair any damages immediately. |
| <input type="checkbox"/> | M26.3 | Inspect storage areas prior to an anticipated rainfall event and after the rainfall event. |

6.2 C.27 Material Use

Description

Prevent or reduce the discharge of pollutants to stormwater from material use by using alternative products, minimizing hazardous material use onsite, and training employees in the proper handling and use of construction materials.

Limitations

- Alternative materials may not be available, suitable, or effective in every case.

| Practice | | |
|--------------------------|-------|--|
| <input type="checkbox"/> | C27.1 | Use less hazardous, alternative materials as much as possible. |
| <input type="checkbox"/> | C27.2 | Minimize use of hazardous materials onsite. Buy recycled or less hazardous products to the maximum extent practicable. |
| <input type="checkbox"/> | C27.3 | Use materials only where and when needed to complete the work. |
| <input type="checkbox"/> | C27.4 | Follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals. Keep SDS at a designated location and ensure employees are knowledgeable of the location. |
| <input type="checkbox"/> | C27.5 | Train personnel applying pesticides on their usage. The State Department of Agriculture, Pesticides Branch, licenses pesticide dealers, certifies pesticide applicators, and conducts onsite inspections. |
| <input type="checkbox"/> | C27.6 | Do not over-apply fertilizers, herbicides, or pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmental harmful. Except on steep slopes, till fertilizer into the soil rather than surface spreading or spraying it. Apply surface dressings in several smaller applications, as opposed to one large application to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. |
| <input type="checkbox"/> | C27.7 | Maintain a log of amount, type, and locations where fertilizers, herbicides, or pesticides were applied as well as the BMPs utilized (refer to SWMPP Section E for more detailed chemical usage BMPs). These logs must be available onsite for review by DOTA inspectors. |
| <input type="checkbox"/> | C27.8 | Train employees in proper material use. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M27.1 | Spot check employees monthly to ensure proper practices are being performed. |
| <input type="checkbox"/> | M27.2 | Ensure that the SDS are maintained for all chemicals used. |

6.3 C.28 Protection of Stockpiles

Description

Stockpiles can be a significant source of erosion, sediment, and fugitive dust problems. Measures are to be taken to mitigate the potential for erosion of stockpiles.

Limitations

- Stockpiles are for temporary storage of material only. Provisions for permanent removal of stockpiled material must be in place.

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C28.1 | Locate stockpiles a minimum of 50 feet, or as far as practicable, from waterways, drainage facilities, concentrated runoff, and outside of any natural buffers identified on the SWPPP. |
| <input type="checkbox"/> | C28.2 | Avoid sloping ground for locating stockpiles. |
| <input type="checkbox"/> | C28.3 | Minimize stockpile height. |
| <input type="checkbox"/> | C28.4 | Provide earth dikes or other physical diversion to protect stockpiles from runoff and run-on. |
| <input type="checkbox"/> | C28.5 | Provide silt fences or other sediment control measures at the toe of the stock pile to mitigate runoff during rain events. |
| <input type="checkbox"/> | C28.6 | Cover stockpiles with plastic, mulch, or provide other stabilization measures to protect from wind and prevent erosion during rain events. |
| <input type="checkbox"/> | C28.7 | Provide adequate setback distance from lot lines. |
| <input type="checkbox"/> | C28.8 | Provide sediment basins where required. |
| <input type="checkbox"/> | C28.9 | Contain and securely protect stockpiles from the wind. |
| <input type="checkbox"/> | C28.10 | Do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or State waters. |
| <input type="checkbox"/> | C28.11 | Provide drain inlet protection devices and/or perimeter sediment controls, as applicable. |
| <input type="checkbox"/> | C28.12 | All measures (i.e., cover, sediment control measures) shall be in-place immediately upon creation of the stockpile and at all times that the stockpile is inactive. Inactive is defined as all times other than when addition to or removal of material to the stockpile is actively occurring. All measures shall be in-place by the end of each day or work shift. |
| <input type="checkbox"/> | C28.13 | Physically separate the stockpiles and their stormwater controls from other stormwater controls that are implemented on the site. |
| <input type="checkbox"/> | C28.14 | Ensure stockpiles, at any time and manner, shall not endanger traffic or shall not in any other way be detrimental to the completed work, health, or the operation of the airport. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M28.1 | Maintain and inspect BMP measures according to the type(s) being used. |

6.4 C.29 Solid Waste Management - Hazardous Waste

Description

Prevent or reduce the discharge of pollutants to stormwater and to the land from hazardous waste through proper material use, waste disposal, and training of employees.

Limitations

None.

| Practice | | |
|------------------------------------|--------|--|
| <input type="checkbox"/> | C29.1 | Determine if a material or item is a potentially hazardous waste: <ul style="list-style-type: none"> • Check label and shipping papers. • Look for words such as hazardous, danger, caustic, corrosive, flammable, carcinogenic, or toxic. • Check the SDS from the manufacturer of the product. The SDS shall kept be onsite at a designated location and readily available. |
| MATERIAL USE: | | |
| <input type="checkbox"/> | C29.2 | Use the entire product before disposing of the container. |
| <input type="checkbox"/> | C29.3 | Do not remove the original product label; it contains important safety and disposal information. |
| <input type="checkbox"/> | C29.4 | Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Do not apply these chemicals during or just before a rain event. Personnel applying controlled pesticides must be certified in accordance with the federal and state regulations. |
| <input type="checkbox"/> | C29.5 | Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Discharge rinse from water-based paints to the sanitary sewer. Filter and re-use thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste. |
| WASTE RECYCLING / DISPOSAL: | | |
| <input type="checkbox"/> | C29.6 | Separate contaminated clean up materials from construction and demolition (C&D) wastes. |
| <input type="checkbox"/> | C29.7 | Select designated hazardous waste collection areas onsite. |
| <input type="checkbox"/> | C29.8 | Store hazardous materials and wastes in covered containers and protected from vandalism. |
| <input type="checkbox"/> | C29.9 | Place hazardous waste containers in secondary containment. |
| <input type="checkbox"/> | C29.10 | Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal. |
| <input type="checkbox"/> | C29.11 | Recycle any useful material such as used oil or e-waste. |
| <input type="checkbox"/> | C29.12 | Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris. |
| <input type="checkbox"/> | C29.13 | Arrange for regular waste collection before containers overflow. |
| <input type="checkbox"/> | C29.14 | Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of as required by regulations. A licensed hazardous waste transporter must dispose of hazardous waste that cannot be reused or recycled. |

C.29 Solid Waste Management - Hazardous Waste
(continued)

| Practice | | |
|--------------------------|--------|---|
| TRAINING: | | |
| <input type="checkbox"/> | C29.15 | Train employees in proper hazardous waste management. |
| <input type="checkbox"/> | C29.16 | Place warning signs in areas recently treated with chemicals. |
| <input type="checkbox"/> | C29.17 | Keep spill cleanup materials where they are readily accessible. |
| <input type="checkbox"/> | C29.18 | Clean up any spilled material immediately. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M29.1 | Monitor onsite hazardous waste storage and disposal on a daily basis. |
| <input type="checkbox"/> | M29.2 | Keep storage areas clean and well organized. Provide ample cleanup supplies for the various materials being stored. |
| <input type="checkbox"/> | M29.3 | Inspect perimeter controls at the end of each workday. Repair any damages immediately. |
| <input type="checkbox"/> | M29.4 | Inspect storage areas prior to an anticipated rainfall event and after the rainfall event. |
| <input type="checkbox"/> | M29.5 | If a spill occurs, report the incident to the Construction Manager, clean it up immediately and properly dispose of the contaminated soil and cleanup materials according to the SDS and facility spill response plan. Report all spills to the Airport Manager. |
| <input type="checkbox"/> | M29.6 | Report spills of a certain size (volume of greater than 25 gallons of oil not contained within 72 hours) per HAR 11-451 to DOH HEER and the NRC. Refer to C.35 Spill Response Practices. |
| <input type="checkbox"/> | M29.7 | Procure a spill response contractor for any large spills that cannot be contained. |
| <input type="checkbox"/> | M29.8 | Provide two copies of the hazardous waste manifest to the Construction Manager. |

6.5 C.30 Solid Waste Management - Debris

Description

Prevent or reduce discharge of pollutants to the land, groundwater, and in stormwater from solid waste or C&D waste by providing designated waste collection areas, separate containers for recyclable waste materials, timing collection of waste and recyclable materials with each stage of the work, and properly training employees.

Limitations

- All waste debris and trash that can enter the AOA are Foreign Object Debris (FOD) and do not belong in or near aircrafts. FOD can result in injury to airport and airline personnel, and damage aircrafts. FOD-prevention is a major priority for safe airport operation.

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C30.1 | Clean up materials contaminated with hazardous substances, friable asbestos, waste paint, solvents, sealers, adhesives, or similar materials are not acceptable at C&D disposal sites. Separate contaminated clean up materials from C&D Wastes. |
| <input type="checkbox"/> | C30.2 | Place inert fill material such that it will not be subject to erosion from runoff. [Inert Fill Material is defined as earth, soil, rock, or rock-like material will not decompose or produce leachate]. Refer to C.28 Protection of Stockpiles for additional requirements. |
| <input type="checkbox"/> | C30.3 | Recycle or reuse C&D waste whenever practical. |
| <input type="checkbox"/> | C30.4 | Select designated waste collection areas onsite. |
| <input type="checkbox"/> | C30.5 | Provide only watertight dumpsters. Inspect dumpsters for leaks and repair any dumpster that is not watertight. |
| <input type="checkbox"/> | C30.6 | Locate containers in a covered area and/or in a secondary containment. Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out and to prevent scattering of wastes by wind. |
| <input type="checkbox"/> | C30.7 | Obtain additional containers and more frequent pickup during the demolition phase of a project. |
| <input type="checkbox"/> | C30.8 | Collect site trash daily, especially during rainy and windy conditions. |
| <input type="checkbox"/> | C30.9 | Dispose of trash into designated waste containers. |
| <input type="checkbox"/> | C30.10 | Ensure that toxic wastes (used oils, solvent, and paints) and chemicals (acids, pesticides, additives, curing compound) are not disposed of in dumpsters designed for refuse or construction debris. |
| <input type="checkbox"/> | C30.11 | Salvage or recycle any useful material. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Metal can be recycled. |
| <input type="checkbox"/> | C30.12 | Provide waste containers of sufficient size and number to contain C&D waste. Containers shall be of good integrity with no holes. |
| <input type="checkbox"/> | C30.13 | Schedule solid waste collection regularly. Empty waste containers weekly or when they are two-thirds full, whichever is sooner. |
| <input type="checkbox"/> | C30.14 | Do not allow containers to overflow. Clean up immediately if they do. |
| <input type="checkbox"/> | C30.15 | Do not hose out dumpsters on the construction site. Leave dumpster cleaning to trash hauling employees. |

C.30 Solid Waste Management – Debris
(continued)

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C30.16 | Require haulers to cover truck beds and waste containers for dust suppression. |
| <input type="checkbox"/> | C30.17 | Require truck beds to maintain at least two feet of freeboard for dust suppression. |
| <input type="checkbox"/> | C30.18 | Provide Storm Drain Inlet Protection and/or Perimeter Sediment Controls, as applicable. |
| <input type="checkbox"/> | C30.19 | For C&D waste, site clearing debris, or dredged soils, submit a Solid Waste Disclosure Form to the DOH Solid Waste Section. Provide a copy of this form to the DOTA Engineer. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M30.1 | Inspect entire site for litter and debris on a daily basis. |
| <input type="checkbox"/> | M30.2 | Inspect the construction waste and recycling areas regularly. |
| <input type="checkbox"/> | M30.3 | Remove solid waste collected at the Erosion and sediment control devices promptly. |
| <input type="checkbox"/> | M30.4 | If a container does spill, clean up immediately. |
| <input type="checkbox"/> | M30.5 | Train employees in proper solid waste management. |

6.6 C.31 Contaminated Soil Management

Description

Prevent or reduce the discharge of pollutants to stormwater and to the land from contaminated soil. Examine highly acidic or alkaline soils by conducting pre-construction surveys, inspect excavations regularly, and remediate contaminated soil promptly.

Limitations

- Contaminated soils must be disposed of at DOH-permitted facilities by DOH-approved transporter. Note: If transporting petroleum-contaminated soil (PCS) loads offsite to other than permitted remediation facilities, use transporters approved by the DOH Solid and Hazardous Waste Branch. DOH Solid and Hazardous Waste Branch must be notified 48 hours before any PCS loads are taken to DOH-permitted remediation facilities.
- The presence of contaminated soil may indicate contaminated groundwater as well. Refer to C.17 Dewatering Operations to address contaminated groundwater.
- Contamination may be identified through discoloration, odors, or sheen on the groundwater. Visual and/or olfactory observations should be verified through sampling of the potentially affected media.

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C31.1 | Conduct thorough site planning including pre-construction review of in-house records regarding previous work in the area. |
| <input type="checkbox"/> | C31.2 | Inspect soils for evidence of contamination, such as discoloration, odors, difference in soil properties, abandoned underground tanks or pipes, or buried debris etc. |
| <input type="checkbox"/> | C31.3 | Notify the DOH CWB at (808) 586-4309 at least 90 days prior to disturbing contaminated soil or dewatering from known areas of contamination. |
| <input type="checkbox"/> | C31.4 | Notify the DOTA Engineer and AIR-EE when contaminated media is encountered. |
| <input type="checkbox"/> | C31.5 | Make notifications in accordance with the State Contingency Plan, if it is a reportable quantity <ol style="list-style-type: none"> DOH, Hazard Evaluation and Emergency Response (HEER) Office (586-4249). Local Emergency Planning Committee (LEPC) (723-8958). National Response Center (800) 424-8802. Prepare and submit any associated written documentation as required by these agencies and provide a copy to AIR-EE. |
| <input type="checkbox"/> | C31.6 | Prevent leaks and spills to the maximum extent practicable. Contaminated soil can be expensive to treat and/or dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place. |
| <input type="checkbox"/> | C31.7 | Test suspect soils at certified laboratories. Consult with a Certified Industrial Hygienist (CIH) for the proper handling and disposal of the contaminated soil, if applicable. Specific protection requirement shall be determined by the CIH. |
| <input type="checkbox"/> | C31.8 | If the soil is contaminated, dispose per all applicable regulations. Contaminated soils must be disposed of at DOH-permitted facility by DOH-approved transporter. Ensure that the final disposal location for contaminated soils is approved by the DOTA Engineer and documented. |
| <input type="checkbox"/> | C31.9 | Secure required DOH permits. Submit any associated written documentation required by these agencies to DOTA Engineer and AIR-EE. |

C.31 Contaminated Soil Management
(continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C31.10 | <p>When temporarily storing contaminated soil onsite:</p> <ul style="list-style-type: none"> a. Ensure stockpiles, at any time and manner, shall not endanger traffic or shall not in any other way be detrimental to the completed work, health, or the operation of the airport. b. Place contaminated soil and material on impermeable liner or device. c. Contain contaminated soil and material by surrounding with impermeable lined berms and cover exposed contaminated soil with plastic sheets. d. Provide physical diversion to protect stockpiles from concentrated runoff. e. Locate stockpiles a minimum of 50 feet or as far as practicable from concentrated runoff, drainage structures/facilities, or outside of any natural buffers identified on the SWPPP. f. Avoid sloping ground for locating stockpile and minimize stockpile height. g. Manage contaminated soil or materials properly to minimize exposure by workers. h. Contain any dewatering effluent or wastewater generated during decontamination of equipment and dispose properly. i. Ensure all control measures shall be in-place or restored by the end of each day. j. Refer to C.28 Protection of Stockpiles for additional requirements, as applicable. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M31.1 | Monitor onsite contaminated soil storage and disposal on a daily basis. |
| <input type="checkbox"/> | M31.2 | Inspect contaminated soil storage areas on a daily basis. |

6.7 C.32 Concrete Operation and Waste Management

Description

Prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite, performing onsite washout in a designated area, and training employees. Concrete waste includes, but not limited to, concrete, mortar, plaster, stucco, and grout.

Concrete washout water is a slurry containing toxic metals. It is also caustic and corrosive, having a high pH.

Limitations

- Offsite washout of concrete wastes may not always be possible.

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C32.1 | Store dry and wet material under cover, away from drainage area. |
| <input type="checkbox"/> | C32.2 | Avoid mixing excess amounts of fresh concrete or cement onsite. |
| <input type="checkbox"/> | C32.3 | Perform washout of concrete trucks offsite or in designated areas only. The Airport Manager and AIR-EE shall approve the location of wash area, including a plan on how the area will be cleaned up and the waste materials disposed. |
| <input type="checkbox"/> | C32.4 | Do not wash concrete trucks into storm drains, open ditches, streets, or streams. |
| <input type="checkbox"/> | C32.5 | Do not allow excess concrete to be dumped onsite, except in designated areas. AIR-EE and the Airport Manager shall approve the location of dump area, including a plan on how the area will be cleaned up and the waste materials disposed. |
| <input type="checkbox"/> | C32.6 | For onsite washout: <ul style="list-style-type: none"> • Locate washout area at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste; • Line the washout with a minimum of 10 mil polyethylene sheeting that is free of holes, tears, or other defects that compromise the impermeability of the material. The seams of multiple sheets should be thoroughly adhered such that liquid wastes are contained. • Washout wastes into the temporary pit where the concrete can set, be broken up, and then disposed of properly. • Provide a minimum freeboard of 4 inches at the washout facilities to account for rain events. |
| <input type="checkbox"/> | C32.7 | When sandblasting, avoid creating runoff by draining the water to a bermed or level area. |
| <input type="checkbox"/> | C32.8 | Do not sweep excess exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile, or dispose in the trash. |
| <input type="checkbox"/> | C32.9 | Train employees in proper concrete waste management. |
| <input type="checkbox"/> | C32.10 | Collect wash water and all concrete waste/debris in a concrete washout system bin. Allow wash water to evaporate or properly disposed at an appropriate treatment facility. Allow concrete to harden, broken up, and, then, properly disposed. |
| <input type="checkbox"/> | C32.11 | Do not dump liquid wastes into storm drainage system or ground. |
| <input type="checkbox"/> | C32.12 | Follow requirements of C.28 Protection of Stockpiles when storing concrete solid waste onsite. |

C.32 Concrete Operation and Waste Management
(continued)

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C32.13 | When heavy rains are forecasted, monitor the washout's liquid level. Cover the washout or pump out the liquid from the washout to avoid an overflow during the storm. |
| <input type="checkbox"/> | C32.14 | Dispose of liquid and solid concrete wastes in compliance with the federal, state, and local standards. Refer to C.30 Solid Waste Management - Debris, for additional requirement for disposal and transportation, as applicable. |
| <input type="checkbox"/> | C32.15 | If concrete involves an onsite batch plant, follow the stormwater permitting requirements for industrial activities. The Airport Manager must approve the location of the batch plant. Locate the batch plant away from drainage facilities and drain paths. Comply with applicable federal, state and local regulations. |
| <input type="checkbox"/> | C32.16 | When saw-cutting concrete, collect the sawcut slurry and remove from the site by vacuuming. Avoid saw-cutting during wet weather. Cover or barricade storm drains during saw-cutting to contain slurry. Slurry may be placed in a temporary pit or container, as described in this section, to promote evaporation. |
| <input type="checkbox"/> | C32.17 | Wastewater from mortar, plaster, stucco, and grout shall not be allowed to flow into drainage structures or surface waters. Direct all waters to a leak-proof pit or container, as described in this section. |
| <input type="checkbox"/> | C32.18 | Remove and properly dispose any significant residual material from concrete, mortar, plaster, stucco, and grout remaining on the ground after the completion of construction. If the residual materials contaminate the soil, then, the contaminated soil shall also be removed and properly disposed. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M32.1 | Inspect concrete washout facilities after heavy rains and at the end of each workweek. Repair any damages before the next time it is used. |
| <input type="checkbox"/> | M32.2 | Cleanout the facility or construct a new one when it reaches 75 percent capacity or 4 inches of freeboard. |

6.8 C.33 Sanitary/Septic Waste Management

Description

Prevent or reduce the discharge of pollutants to stormwater from sanitary/septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Limitations

None.

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C33.1 | Locate sanitary facilities in a convenient location, away from drainage facilities, open ditches and water bodies. |
| <input type="checkbox"/> | C33.2 | Never discharge untreated wastewater to the ground. |
| <input type="checkbox"/> | C33.3 | If using an onsite disposal system, such as a septic system, comply with DOH requirements. |
| <input type="checkbox"/> | C33.4 | Temporary sanitary facilities that discharge to the sanitary sewer system are to be properly connected to avoid illicit discharges. |
| <input type="checkbox"/> | C33.5 | If discharging to the sanitary sewer, contact the local wastewater treatment plant for their requirements. |
| <input type="checkbox"/> | C33.6 | Provide sufficient number of sanitary facilities based upon size of labor work force and usage. |
| <input type="checkbox"/> | C33.7 | Arrange for regular waste collection by a licensed transporter before facilities overflow. |
| <input type="checkbox"/> | C33.8 | Ensure that the triturator training is completed prior to using DOTA triturator. Contact AIR-EE for information regarding the training. |
| <input type="checkbox"/> | C33.9 | Position sanitary facilities so they are secure and will not be tipped over or knocked down. |
| <input type="checkbox"/> | C33.10 | When servicing facility, prevent spill of cleaning solutions, cleaning wastewater, and sanitary waste. |
| <input type="checkbox"/> | C33.11 | Clean up spill immediately. For sanitary waste spill, disinfect area of spill after clean up. Do not over-apply disinfectant and prevent from discharging to drainage system, open ditches, and waters bodies. |

| Maintenance and Inspection | | |
|----------------------------|-------|--|
| <input type="checkbox"/> | M33.1 | Inspect sanitary/septic waste storage facility at the end of each workweek. |
| <input type="checkbox"/> | M33.2 | Monitor disposal operations for spills. |
| <input type="checkbox"/> | M33.3 | Maintain sanitary/septic facilities in good working order using a licensed service provider. |

6.9 C.34 Spill Prevention and Control

Description

Prevent or reduce the discharge of pollutants to stormwater from leaks and spills by reducing the chance of spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spilled materials, and training employees.

Report all spills to the Airport Duty Manager and AIR-EE. Small spills of oil (less than 25 gallons) which are capable of being cleaned up within 72 hours and which do not threaten ground or surface waters can be cleaned up using absorbent materials or other acceptable practices. Daily inspections of the facility will identify any small spills, which will be addressed immediately.

In the event of a large or uncontrolled release, the Construction Manager shall act as the Emergency Coordinator (EC) until the Airport Manager or his representative assumes the role of the EC.

Limitations

If necessary, use a private spill cleanup company.

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C34.1 | Store hazardous materials and wastes in covered containers or in a covered area, within secondary containment and protected from vandalism. |
| <input type="checkbox"/> | C34.2 | Place a stockpile of spill cleanup materials where it will be readily accessible. |
| <input type="checkbox"/> | C34.3 | Train employees in spill prevention and cleanup. |
| <input type="checkbox"/> | C34.4 | Designate responsible individuals. |
| <input type="checkbox"/> | C34.5 | Review spill response requirements at each work site. |
| <input type="checkbox"/> | C34.6 | Clean up leaks and spills immediately. |
| <input type="checkbox"/> | C34.7 | On paved surfaces, clean up the spill with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous. |
| <input type="checkbox"/> | C34.8 | Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. Refer to C.30 Solid Waste Management -Debris for BMPs. |
| <input type="checkbox"/> | C34.9 | Report significant spills to the United States (U.S.) Coast Guard, DOH HEER Office, and City and County of agencies, such as the Fire Department; they can assist in cleanup. |
| <input type="checkbox"/> | C34.10 | Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the NRC at (800) 424-8802 (24 hours). Notify DOH CWB at (808) 586-4309 and AIR-EE at (808) 838-8656 if the spill reached storm drains. |
| <input type="checkbox"/> | C34.11 | If repair or maintenance must occur onsite, refer to C.22 Vehicle and Equipment Operation and Maintenance BMPs. |
| <input type="checkbox"/> | C34.12 | Place drip pans or absorbent materials under all equipment when not in use. |
| <input type="checkbox"/> | C34.13 | Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly. |
| <input type="checkbox"/> | C34.14 | Transfer used fluids to the proper waste or recycling drums promptly. Don't leave full drip pans or other open containers lying around. |

C.34 Spill Prevention and Control (continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C34.15 | Oil filter disposed of in trash cans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Recycle oil filters if this service is available. |
| <input type="checkbox"/> | C34.16 | Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if all the acid appears to be drained out. If a battery is dropped, treat it as if it is cracked. Put it into the containment area until it is assured not to be leaking. |
| <input type="checkbox"/> | C34.17 | If fueling must occur onsite, refer to C.21 Vehicle and Equipment Refueling BMPs. |

| Maintenance and Inspection | | |
|----------------------------|-------|---|
| <input type="checkbox"/> | M34.1 | Ensure that the spill cleanup materials are fully stocked at the beginning of each workday. |
| <input type="checkbox"/> | M34.2 | Remove any products and fluid collected in drip pans or other secondary containment devices promptly. |
| <input type="checkbox"/> | M34.3 | Implement mandatory monthly Good Housekeeping/BMP refresher classes for employees. |

6.10 C.35 Spill Response Practices

Description

Proper control and cleanup of spilled hazardous materials reduces the discharge of hazardous materials to MS4. This BMP covers hazardous material spills in the DOTA right-of-way by DOTA and contract personnel. The Maintenance Baseyard and tenant facility stormwater pollution control plans will also contain information about spills in their respective areas.

Report all spills to the Airport Duty Manager and AIR-EE. Small spills of oil (less than 25 gallons) which are capable of being cleaned up within 72 hours and which do not threaten ground or surface waters can be cleaned up using absorbent materials or other acceptable practices. Daily inspections of the facility will identify any small spills, which will be addressed immediately.

In the event of a large or uncontrolled release, the Construction Manager shall act as the Emergency Coordinator (EC) until the Airport Manager or his representative assumes the role of the Emergency Coordinator.

Limitations

None.

| Practice | | |
|--------------------------|-------|---|
| <input type="checkbox"/> | C35.1 | Stop work. |
| <input type="checkbox"/> | C35.2 | Shut down pumps and equipment and secure valves and work operations. |
| <input type="checkbox"/> | C35.3 | Shut down any nearby propane tanks. |
| <input type="checkbox"/> | C35.4 | Move away from the affected area. |
| <input type="checkbox"/> | C35.5 | Notify and alert others of the incident via: (1) voice; (2) hand-held radios; and/or (3) other effective communication. |
| <input type="checkbox"/> | C35.6 | Keep non-essential employees away from the spill area. |
| <input type="checkbox"/> | C35.7 | Notify the EC. |
| <input type="checkbox"/> | C35.8 | <p>The Emergency Coordinator shall evaluate the situation and decide whether to implement a “fight or flight” response by gathering the following information, if it can be done safely:</p> <ul style="list-style-type: none"> • Your name, location, and how you may be reached. • Location of the release. • Type, quantity, and description of the release. • Hazards of the release. • Type of media affected (soil, asphalt, concrete, etc.). • Rate of the release. • Migratory direction of the release. • Potential for fire or explosion. • Potential for human exposure. • Potential for migration to surface water (ocean, storm drains, etc.). |
| <input type="checkbox"/> | C35.9 | Never subject yourself or other personnel to unreasonable risk of illness or injury. |

C.35 Spill Response Practices (continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C35.10 | Remove all injured persons from the immediate area of danger and render first aid. If injuries are severe, call 911 for emergency medical assistance. |
| <input type="checkbox"/> | C35.11 | If the decision is to “fight,” spill response personnel are to don the appropriate personal protective equipment (PPE). |
| <input type="checkbox"/> | C35.12 | Eliminate all possible sources of ignition/detonation such as vehicle engines, welding and grinding operations, and smoking. |
| <input type="checkbox"/> | C35.13 | Remove or isolate ignitable and incompatible materials from the area of the release. |
| <input type="checkbox"/> | C35.14 | Locate, stop, and contain the source of the release by: (1) closing, checking, repairing, plugging valves; and/or (2) plugging and patching holes. |
| <input type="checkbox"/> | C35.15 | Confine the release to prevent further migration by: <ol style="list-style-type: none"> 1) Diking and berming using sand, soil, or other inert material; 2) Sealing storm drains with plastic and sandbags; 3) Placing granular sorbent or absorbent pads and booms; 4) Diverting the chemicals from entering drains, manholes, streams, etc.; or 5) Implementing retention techniques. |
| <input type="checkbox"/> | C35.16 | Implement proper decontamination procedures on vehicles, affected media, PPE, and equipment. This may include placing absorbent material on oil stained pavement - later sweeping up, removing and disposing of affected media (soil or loose asphalt) that contains contaminant, and/or berming the spill area and scrubbing using detergents – disposing detergent and rinse in accordance with the procedures listed below. |
| <input type="checkbox"/> | C35.17 | All used decontamination solution, disposable PPE and affected media must be properly packaged in U.S. Department of Transportation (DOT) specified containers. |
| <input type="checkbox"/> | C35.18 | Labeling, transportation and subsequent disposal of hazardous materials/waste must be in accordance with applicable government regulations. |
| <input type="checkbox"/> | C35.19 | If needed, call the spill response contractor for cleanup and removal of accumulated product resulting from the release. The contractor will remove spilled product and properly dispose of the material in accordance with applicable state and federal regulations. |
| <input type="checkbox"/> | C35.20 | If the release is not readily and easily controlled, evacuation may be necessary. |
| <input type="checkbox"/> | C35.21 | If the EC decides on the “flight” option, the EC is to immediately alert and evacuate all personnel. |
| <input type="checkbox"/> | C35.22 | Call the necessary emergency service providers such as Code 22, 911 (medical facilities, County police, County fire), U.S. Coast Guard (842-2606), DOH HEER office (586-4249), NRC (800) 424-8802, Clean Islands Council (536-5814), and/or spill response contractors and vendors. Also notify the AIR-EE Supervisor (838-8656) in the event of large spills or spills that either enter the storm drain, canal, or ocean. |
| <input type="checkbox"/> | C35.23 | Report spills of a certain size (volume of greater than 25 gallons of oil not contained within 72 hours) per HAR 11-451 to DOH HEER and the NRC immediately. Comply with the DOH HEER requirements. A written report shall be provided to DOH HEER within 30 calendar days of a Reportable Quantity spill cleanup. Provide copies of the written report to DOTA Engineer and AIR-EE. |

C.35 Spill Response Practices
(continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C35.24 | Report any spills reaching the storm drains to DOH CWB at (808) 586-4309. Comply with the DOH CWB requirements. A written report shall be provided to DOH CWB within 5 calendar days of a spill cleanup. Provide copies of the written report to DOTA Engineer and AIR-EE. |
| <input type="checkbox"/> | C35.25 | Maintenance personnel are to proceed along an evacuation route to the nearest unaffected area. |

| Maintenance and Inspection | | |
|-----------------------------------|-------|---|
| <input type="checkbox"/> | M35.1 | Implement spill response drills on a monthly basis specific to each employee's type of work and materials and equipment used. |

6.11 C.36 Management of Materials Associated with Paint

Description

Prevent or reduce the discharge of pollutants to stormwater and to the land from materials associated with paint through proper material use, waste disposal, and training of employees.

Limitations

None.

| Practice | | |
|--------------------------|--------|---|
| <input type="checkbox"/> | C36.1 | Use proper storage and handling techniques for paint, solvents, and epoxy materials and supplies. Refer to C.26, Material Delivery and Storage BMPs. |
| <input type="checkbox"/> | C36.2 | Store paint, solvents, and epoxy compounds in original water-tight containers over secondary containment and well-labeled. Retain a complete set of SDS onsite. |
| <input type="checkbox"/> | C36.3 | Mix and clean paints and instruments in a covered and contained area, over secondary containment, when possible to minimize adverse impacts from spill. |
| <input type="checkbox"/> | C36.4 | Painting areas should be contained so that drips are easily cleaned. |
| <input type="checkbox"/> | C36.5 | When applying paint by spray, avoid over-spraying of paint. Apply paint per manufacturer's recommended application rate and coverage. Avoid or minimize applying paint in windy conditions. Maintain proper distance between sprayer tip and surface to minimize dissipation of the paint due to wind. Apply paint with brush or roller, if possible. |
| <input type="checkbox"/> | C36.6 | Do not apply traffic paint or thermoplastic if rain is forecasted. Minimize excessive spreading or over-application of beads when applied manually to the surface of the thermoplastic. |
| <input type="checkbox"/> | C36.7 | When painting operation is completed, clean brushes and other instruments by "painting out" brushes as much as possible or scraping off the excess paint. Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. |
| <input type="checkbox"/> | C36.8 | For water-based paints, wash brush and other instruments in a bucket and dispose of wash water into the sanitary sewer, where possible. If not, collect all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation. |
| <input type="checkbox"/> | C36.9 | Designate and locate onsite wash area a minimum of 50 feet or as far as practicable from storm drain inlets, open drainage facilities, or water bodies. |
| <input type="checkbox"/> | C36.10 | Do not dump liquid wastes into the storm drainage system. |
| <input type="checkbox"/> | C36.11 | Oil-based paints and residue are hazardous waste. Ensure collection, removal, disposal of hazardous waste complies with regulations. |
| <input type="checkbox"/> | C36.12 | Dispose containers only after all of the product has been used. Except for oil-based paints, all other paints can be disposed by drying, bagging, and placing with general rubbish. |
| <input type="checkbox"/> | C36.13 | Filter and re-use thinners and solvents. |
| <input type="checkbox"/> | C36.14 | Properly store and dispose waste materials generated from painting and structure repair and construction activities. |
| <input type="checkbox"/> | C36.15 | Immediately clean up spills and leaks. Keep an ample supply of spill cleanup materials where they are readily accessible. Do not clean surfaces or spills by hosing the area. Eliminate the source of the spill to prevent discharge or a furtherance of an ongoing discharge. |

C.36 Spill Management of Materials Associated with Paint
(continued)

| Practice | | |
|--------------------------|--------|--|
| <input type="checkbox"/> | C36.16 | Refer to C.34 Spill Prevention and Control BMPs. |
| <input type="checkbox"/> | C36.17 | Train employees in proper hazardous waste management and spill response. |

| Maintenance and Inspection | | |
|-----------------------------------|-------|--|
| <input type="checkbox"/> | M36.1 | Inspect containers, equipment, and containment facilities for leaks. |

SECTION 01562 – MANAGEMENT OF CONTAMINATED MEDIAS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

The General Provisions, Special Provisions, and General Requirements of the Specifications apply to the work specified in this section.

1.2 DESCRIPTION AND SCOPE OF WORK

- A. This Section describes procedures for the management of contaminated media (soil, groundwater, and soil vapor) that may be disturbed during excavation activities associated with this project.
- B. The Contractor shall supply all labor, materials, and equipment necessary for the removal, temporary storage, testing, handling, soil backfilling and management of contaminated media to carry out the work in accordance with these specifications, and all applicable Federal, State, and local regulations and latest amendments.
- C. The Contractor shall examine the State of Hawaii, Department of Transportation, Airports Division (DOTA) Programmatic Environmental Hazard Evaluation and Environmental Hazard Management Plan (DOTA EHE-EHMP) and, if included as part of these specifications, the Environmental Site Assessment (ESA) Phase II, to understand the conditions that may affect work and performance. Should the Contractor deviate from the DOTA EHE-EHMP or ESA, the Contractor shall be responsible to prepare a Site-Specific Environmental Hazard Management Plan (Site-Specific EHMP). Any deviation will require approval by the State of Hawaii, Department of Health (HDOH) and DOTA Environmental Section (DOTA AIR-EE) prior to implementation, using the forms provided in Appendix B of the DOTA EHE-EHMP. The forms should detail deviations from standard practices in the text and explain how those deviations will be protective of human health and the environment. The forms should be submitted to HDOH and DOTA AIR-EE for review and approval if deviations are requested or if notifying of a release.
- D. It should be noted that the DOTA EHE-EHMP is for Contaminants of Potential Concern (COPCs) which include, but not limited to, the following:
 - Petroleum Substances, e.g., TPH, TPH-g, TPH-d, TPH-o, BTEX, and PAHs.
 - Chlorinated Solvents, e.g., VOCs
 - Polychlorinated Biphenyls (PCBs)
 - Pesticides, e.g., chlordane
 - Heavy Metals, e.g., Arsenic, Barium, Cadmium, Total Chromium, Lead, Mercury, Selenium, and Silver.

In addition, free product (e.g., gasoline, diesel fuel, fuel oils, lubricating oils, benzene, toluene, xylenes) may be encountered in areas of previous petroleum releases.

Should the ESA Phase II identify contaminants other than those listed above, the Contractor shall be responsible to prepare a Site-Specific EHMP. The Contractor shall coordinate with, as well as have their Site-Specific EHMP approved by HDOH prior to the start of any ground disturbing activities.

1.3 REFERENCES

- A. Programmatic Environmental Hazard Evaluation and Environmental Hazard Management Plan dated July 2019, or its latest edition.
- B. DOTA's Storm Water Management Program Plan (SWMPP) for the Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG), including DOTA's Construction Activities BMP Field Manual dated August 2019, or its latest edition.
- C. All work under this contract shall be performed in strict accordance with all applicable Federal, State, and local regulations, standards, and codes governing contaminated media.
- D. The most recent editions of any relevant regulations, standards, documents, or codes shall be in effect, including, but not limited to, the following. Where conflicts among the requirements or with these specifications exists, the most stringent requirements shall apply.
 - 1. Title 29, Part 1910 of the Code of Federal Regulations (CFR), "Occupational Safety and Health Standards" (General Industry Standards).
 - 2. 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response".
 - 3. 29 CFR 1910.134, "Respiratory Protection".
 - 4. 29 CFR 1910.1000, "Air Contaminants".
 - 5. 29 CFR 1910.1020, "Access to Employee Exposure and Medical Records".
 - 6. 29 CFR 1910.1200, "Hazard Communication".
 - 7. 29 CFR 1926, "Safety and Health Regulations for Construction" (Construction Industry Standards).
 - 8. 40 CFR 50, "National Primary and Secondary Ambient Air Quality Standards A".
 - 9. 40 CFR 122, "EPA Administered Permit Program: The National Pollutant Discharge Elimination System".

10. 40 CFR 261, "Identification and Listing of Hazardous Waste".
11. 40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste".
12. 40 CFR 302, "Designation, Reportable Quantities, and Notification".
13. 49 CFR 172, Subpart E, "Labeling".
14. 49 CFR 172, Subpart F, "Placarding".
15. 12-8-3-148.1, "State of Hawaii, Safety and Health Regulation for Construction" (Construction Industry Standard).
16. 12-202-33, "A Hawaii Occupational Safety and Health Standards".
17. The Hawaii Environmental Response Law (Hawaii Revised Statutes [HRS] Chapter 128D) and the State Contingency Plan (Hawaii Administrative Rules [HAR] Title 11, Chapters 451-1–451-24).
18. The Hazard Evaluation and Emergency Response Office Technical Guidance Manual (TGM) for Implementation of the State Contingency Plan (Interim Final, June 21, 2009).
19. Hawaii Hazardous Waste Laws and Regulations (HRS Chapter 342J, HAR Title 11, Chapters 260.1–279.1).
20. Hawaii Solid Waste Laws and Regulations (HRS Chapters 342H and I, HAR Title 11, Chapter 58.1).
21. Hawaii Underground Storage Tank Laws and Regulations (HRS Chapter 342L; HAR Title 11, Chapter 280.1).
22. Hawaii Water Quality Standards (HAR Title 11, Chapter 54).
23. Hawaii Ambient Air Quality Standards (HAR Title 11, Chapter 59).
24. Hawaii Occupational Safety and Health Standards (HAR Title 12, Chapter 99).
25. Hawaii Department of Health, Office of Hazard Evaluation and Emergency Response. Screening for Environmental Hazards at Sites with Contaminated Soil and Groundwater. Website URL: <http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/EALs>. Fall 2011 (and updates).
26. Hawaii Department of Health, Office of Hazard Evaluation and Emergency Response. Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material. Website URL: <http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/technical-guidance-and-fact-sheets>. October 8, 2017 (and updates).

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

PART 2 – PRODUCTS

2.1 PERSONAL PROTECTIVE EQUIPMENT

- A. A minimum of Occupational Safety and Health Administration (OSHA) Level D Personal Protective Equipment (PPE) should be used for activities involving disturbance, movement, sampling, or management of hazardous materials, contaminated water, or contaminated soil. Additional PPE may be required in response to project-specific hazards or unusual conditions, such as possible close contact of workers with oil seeping from soils or floating on groundwater.
- B. Warning Signs and Labels: 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 appropriate labels to waste drums and other containers of contaminated materials.

2.2 POLYETHYLENE SHEETING

Sheet plastic shall be new, and clear or black with at least 20-mil thickness. A 6-mil plastic sheet can be used to cover the stockpiles.

PART 3 – EXECUTION

3.1 GENERAL WORK PROCEDURES

- A. Prior to beginning work, the Contractor, the Contractor's Qualified Environmental Professional, and DOTA Engineer or its representative shall discuss the approved Work Plan, as described in Paragraph 3.2 below, including work procedures and safety precautions.
- B. A daily on-site "tailgate" safety meeting shall occur. These meetings shall include a discussion of the day's work and an analysis of hazards that may be encountered. This includes hazardous materials, contaminated water, contaminated soil, and soil vapors. The workers shall be aware of the need for proper safety procedures and be familiar with the Contractor's Work Plan.
- C. Boundaries shall be established at each area where soil excavation is to be performed. The area shall be clearly identified to prevent unauthorized entry. Establish a control area by completely enclosing/roping-off the area where contaminated soil excavation, removal, stockpiling and disposal operations will be performed.

- D. Provide physical boundaries around the control area by roping-off the area to ensure that airborne concentrations of COPC will not exceed permissible exposure limits outside the control area.
- E. Caution signs shall be placed at the entrances to each work area, located such that approaching personnel may read the signs and take necessary precautions before entering the work area. 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 removal work.
- F. It should be noted that, in some cases, the contamination may not be identifiable through visual and/or olfactory observation (e.g., soil contaminated with metals, PCBs, pesticides, etc.) and contaminant-specific field screening techniques may need to be implemented.
- G. There shall be no eating, smoking, drinking, or storing of food or drink within work areas.
- H. Avoid skin contact with oil and other hazardous materials, contaminated water, or contaminated soil, and avoid inhalation of dust particles.
- I. Monitor workspace air conditions during work activities to verify that safe conditions are maintained. Use field monitoring devices to monitor workspace air conditions.
- J. Select and conduct the removal procedure to minimize the potential spread of contamination. Handle contaminated items such that no skin contact occurs. Contaminated materials shall not be exposed to open flames or other high temperatures.
- K. Before exiting the controlled area and before food breaks, each worker shall remove all PPE, place disposable items in a labeled, impermeable disposal bag, and then exit the area. Workers shall wash their hands thoroughly with a detergent soap to remove contamination. Boots shall be cleaned to minimize tracking of contaminated material from the work area.
- L. At the completion of work in an area, the work area shall be cleaned as necessary and all contaminated clothing, disposable PPE surface coverings, and waste material shall be disposed of as contaminated items.
- M. Soil excavation activities, grading, and any disturbance of impacted soil may cause a potential exposure to Contractor's employees and the general public due to fugitive dust. The routes of exposure of dusts are by inhalation, ingestion, and dermal contact. The Contractor shall use engineering controls such as water spraying and wind barriers to control fugitive dust.
- N. The Contractor shall test residual soils not used as backfill for COPC. Soils with concentrations above regulatory and/or unrestricted use environmental action levels shall be disposed of in accordance with regulatory requirements.

- O. Report construction activities in areas with contaminated soil or groundwater by completing the appropriate forms in the DOTA EHE-EHMP, Appendix B.3 Construction Activities Release Response Plan. Submit the forms to the HDOH Office of Hazard Evaluation and Emergency Response (HEER Office) and provide a copy of the forms to the DOTA Engineer and DOTA AIR-EE.

3.2 PRECONSTRUCTION REQUIREMENTS

- A. Submit the following a minimum of 30 calendar days prior to beginning any ground disturbing activities, for approval by DOTA AIR-EE.

- 1. Contractor's Work Plan for Known or Suspected Areas of Contaminated Media:

- a. The Contractor shall submit their work plan which shall include, but not limited to, a Site-Specific Health and Safety Plan (HASP) and if needed, a Site-Specific EHMP. The work plan shall describe the procedures, engineering controls, and methods the Contractor will use during the excavation, temporary storage, handling, treatment, backfilling, and disposal of soil and/or water at the project site. The plan shall also include soil stockpiling and segregation, testing, contaminated soil and water quality testing, contaminated soil and water disposal procedures, backfilling procedures, personal protection requirements, work area isolation, construction barriers, wetting methods, decontamination procedures, and emergency procedures. The work plan shall be in accordance to all applicable Federal, State, and local regulations and latest amendments.

For locations within the airport which DOTA has already established a Site-Specific EHMP from previous projects, the DOTA's Site-Specific EHMP, shall govern, where applicable.

- b. The plan shall include the names of the Contractor's and their subcontractor's qualified personnel who will be supervising or managing the management of contaminated materials at the site. Include the personnel's phone number and qualifications.
- c. The plan shall include the name(s) of the Contractor's Qualified Environmental Professional, including their qualifications.
- d. The plan shall also include copies of current training and certification of all workers by an EPA-approved Hazardous Waste Operations and Emergency Response course, respirator fit testing documentation, and medical clearances.
- e. Proposed schedule of work.

- f. A sketch identifying the location of temporary soil stockpiling and water storage devices, including pipes and appurtenances, if applicable.
- g. A map showing the location of the work and nearest medical facilities and hospitals.
- h. A copy of this Work Plan must be on the construction site and available at all times.
- i. The Work Plan shall be amended to reflect changes to the site or work conditions, as needed.

B. QUALIFIED ENVIRONMENTAL PROFESSIONAL

The Contractor shall employ a Qualified Environmental Professional who possesses five (5) years, minimum, experience providing environmental oversight for the management of contaminated media during construction activities. The Environmental Professional shall assist in the preparation of the Contractor's Work Plan by reviewing the work procedures, including the determination of the need for PPE, and to provide environmental oversight during construction. The Environmental Professional shall be identified in the Work Plan, including a list of their environmental qualifications, for approval by DOTA AIR-EE.

C. CONTRACTOR TRAINING

Each employee who may be exposed to hazardous materials, contaminated water, or contaminated soil shall be instructed for a minimum of 40 hours by a trained professional in hazardous materials operations and emergency response, awareness and work practices, safety and health precautions, and the use and requirements for PPE in accordance with 40 CFR 1910.120. A certificate of training, signed and dated by the trainer, shall be provided for each worker.

3.3 CONSTRUCTION REQUIREMENTS

A. SOIL EXCAVATION AND STOCKPILING

1. Notify the HDOH Clean Water Branch (CWB) at least 90 calendar days prior to disturbing contaminated soil from known areas of contamination. Notify the HDOH HEER Office at least seven (7) calendar days prior to construction activities that could disturb contaminated soil.
2. The HDOH HEER Office shall be immediately notified if contaminated soils are encountered. The disturbance of contaminated soil shall be performed in accordance with the Contractor's approved Work Plan, the DOTA EHE-EHMP, or a Site-Specific EHMP where applicable. HDOH HEER Office will determine whether additional sampling is required. Provide a location map with Global Positioning System (GPS) coordinates and approximate depth

(bgs) at which the contaminated soils were encountered to the DOTA Engineer and DOTA AIR-EE.

3. During excavation and disturbance of impacted soil, all workers, supervisory personnel, subcontractors, and consultants must take precautionary measures as necessary to prevent exposure of Contractor's employees and the general public to chemicals of concern (COCs) by contaminated soil dust and inhalation of associated vapors.
4. The Contractor's Qualified Environmental Professional shall direct the segregation of the soil into three (3) separate soil piles: Pile No. 1 will consist of clean soil; Pile No. 2 will consist of soil excavated from areas found to be contaminated or suspected to be contaminated; and Pile No. 3 will consist of soil that is grossly contaminated. Contaminated soil stockpiles, suspected contaminated soil stockpiles, and grossly contaminated soil stockpiles shall be placed onto 20-mil plastic sheeting. Underlay edges of the plastic sheeting with bermed soil. Ensure that the height of the bermed soil will be sufficient to prevent stormwater runoff from breaching it. Place the excavated soil inside the bermed area on top of the plastic sheeting. Cover the stockpiles with 6-mil plastic sheeting in the bermed area to mitigate dust concerns caused by wind and prevent contact with rainwater and stormwater runoff. Secure the plastic cover with sufficient ballast and place sediment control devices along the entire toe of each stockpile.
5. Each stockpile shall not exceed 100 cubic yards and shall be located away from drainage features, surface waters, and stormwater drainage paths. Or, the soils can be placed in watertight containers, such as 20-yard steel roll-off bins, drums, etc. These containers shall be covered.
6. The Contractor shall have representative soil samples taken from each stockpile (Pile No. 1, 2, and 3) and tested in accordance with HDOH guidelines, standards, and regulations, such that the soil sample report, prepared by the Contractor's Qualified Environmental Professional, can specifically state one of the following:
 - a. "The soil is not a regulated hazardous waste and is acceptable for disposal at a HDOH permitted facility."; or
 - b. "The soil is acceptable for unrestricted reuse."

Sampling and testing of the stockpiles shall be, at a minimum, in accordance to the latest edition of the HDOH's *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material*. The Contractor's Qualified Environmental Professional shall direct the soil sampling collection and testing methods in accordance with the most current guidelines. Stockpiles shall be tested using multi-increment (MI) sampling approaches. Appropriate decision unit (DU) volumes for larger stockpiles of soil should be discussed with the HDOH HEER Office on a case-by-case basis.

The Contractor shall also confirm, with the HDOH permitted facility, the facility's sampling requirements, as well as their standards for disposal.

7. Any liquid-phase oil or free product associated with the contaminated soil shall be drained prior to stockpiling. If feasible, the free product should be separated from the soil, properly stored, profiled, and disposed of at an approved recycling/disposal facility.
8. For any soils hauled off Airport property, the Contractor shall be responsible for the legal disposal of any soil. The Contractor shall implement and maintain the following:
 - a. A form, signed by the Contractor and haul truck driver. The form shall contain the following information:
 - i. The date the material is being taken off Airport property.
 - ii. The name of the haul trucking company.
 - iii. The haul truck number and license plate number.
 - iv. The quantity of material being loaded into the haul truck.
 - v. The disposal facility or location of where the material is to be taken.
 - vi. The time the truck left the project site.
 - b. The form and waste manifest from the HDOH permitted facility shall be provided to the Engineer or its representative by the close of the next working day. The Contractor shall verify that the quantity of material loaded into the truck, as indicated on the form, exactly matches the quantity of material disposed at the HDOH permitted facility, as indicated on the waste manifest.
 - c. The Contractor shall maintain a log that summarizes each form and waste manifest for ease of tracking and monitoring.
 - d. **All forms, waste manifest, and summary log shall be a condition of payment being made to the Contractor and shall be submitted with each progress payment. Failure to submit the above and/or should any quantity of material loaded into the truck, as indicated on the form, not exactly match the quantity of material disposed at the HDOH permitted facility, as indicated on the waste manifest, shall be reason for the State to withhold payment to the Contractor.**
9. Excavated soils can be reused onsite (within the construction site boundaries) with the prior approval of the DOTA AIR-EE, HDOH HEER Office, and subject to the following conditions:
 - a. Representative soil samples have been taken and tested in accordance with HDOH standards and regulations.

- b. The contaminated soil can only be reused within proximity of its original excavation.
 - c. The contaminated soil is placed within areas more than 150 meters from surface water and drainage features.
 - d. The contaminated soil cannot be placed beneath or within the footprint of a planned building structure.
 - e. The contaminated soil can only be placed at an elevation above the tidally influenced high water table and at least 1-foot below the finish surface grade. The more highly impacted soil should be placed at the bottom of the excavation and the cleanest soil at the top of the excavation. At least 1-foot of clean soil must be placed as the final backfill layer at the top. The excavation shall then be capped with an impervious layer, such as concrete and asphalt.
 - f. The contaminated soil cannot contain any free oil, oil sheens, oil stains, or total petroleum hydrocarbon (TPH) concentrations exceeding 5,000 parts per million (ppm).
 - g. The contaminated soil is not considered a hazardous waste pursuant to Federal and State laws.
 - h. Contaminated soil shall not be reused in areas that are uncontaminated.
10. Excavated soils can be reused offsite (off Airports property) with the prior approval of the DOTA AIR-EE, HDOH HEER Office, and subject to the following conditions:
- a. Representative soil samples have been taken and tested in accordance with HDOH standards and regulations.
 - b. The work shall be performed in accordance to the latest edition of the HDOH's *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material*.
 - c. A signed agreement with the receiving facility acknowledging the test results of the soil samples and acceptance of the soil is required to be submitted to the DOTA Engineer and DOTA AIR-EE ten (10) calendar days prior to hauling of the soil to the receiving facility.
 - d. The contaminated soil shall not contain any free oil, oil sheens, oil stains, or total petroleum hydrocarbon (TPH) concentrations exceeding 5,000 parts per million (ppm).
 - e. The contaminated soil is not considered a hazardous waste pursuant to Federal and State laws.

11. All soil that is reused onsite or offsite shall be included in the Closeout Report. The report shall include, at a minimum, a copy of the signed agreement from the receiving facility accepting the soil, a copy of the soil test results, the quantity of soil received by the facility, a location map of the reused soil including GPS coordinates of its limits, the depth and thickness of the soil's placement, a brief description of the purpose of the soil's re-use, and photos of the site conditions after placement has been completed.

B. GROUNDWATER MANAGEMENT

Soil and groundwater may be impacted by petroleum hydrocarbons, dissolved metals, and/or pesticides, and may be encountered during soil excavation.

1. The disturbance of contaminated groundwater shall be performed in accordance with the approved Work Plan, DOTA EHE-EHMP, or Site-Specific EHMP, where applicable. HDOH HEER Office will determine whether additional sampling is required.
2. If contaminated groundwater is uncovered at a previously unknown source or site on the project, the Contractor shall immediately notify the DOTA Engineer, Airport Duty Manager (CODE 22), DOTA AIR-EE, and HDOH HEER Office of its discovery. Provide a location map with GPS coordinates and approximate depth of the groundwater (bgs) at which the discovery was encountered.
3. During excavation and disturbance of impacted groundwater, all workers, supervisory personnel, subcontractors and consultants must take precautionary measures as necessary to prevent exposure of Contractor's employees and the general public to COCs and inhalation of associated vapors. Free product, sheen, and impacted groundwater must be managed properly.
4. Groundwater that exhibits evidence of possible contamination, i.e., odor, visual sheen, free product, coloration, and PID measurement, shall be properly stored when removed from the ground. Storage devices shall be watertight and leak-free to prevent discharge of the water into the surrounding ground, drainage system, and surface waters.

When disconnecting pipes and hoses from storage devices and equipment, residual waters contained in the pipes and hoses shall also be prevented from discharging into the surrounding ground, drainage system, and surface waters.

5. Representative water samples shall be taken and tested in accordance with Federal and State guidelines, standards, and regulations.
6. If free product is present in the extracted groundwater, it must be separated from the groundwater, profiled, and disposed of at an HDOH approved recycling/disposal facility. Free product shall not be moved from one excavation to another. Engineering measures shall be taken to prevent the

transfer of the free product during dewatering. Under no circumstances shall water contaminated with free product be discharged from a dewatering pit.

7. At least once daily, remove oil observed floating on the groundwater during excavation activities using a vacuum truck, absorbent pad, or other methods approved by HDOH HEER Office. Excavations shall not be backfilled until the floating oil is removed to the maximum extent practicable, which is when further use of vacuum trucks, absorbent pads, or other approved methods do not result in further floating oil removal. Backfilling of any excavation shall not occur without concurrence from DOTA AIR-EE and HDOH HEER Office.
8. Avoid any releases of contaminated groundwater to surface water bodies or areas beyond the work area.
9. Groundwater shall only be re-infiltrated in the ground with the prior approval of DOTA AIR-EE and HDOH HEER Office, and subject to the following conditions:
 - a. Within 200-feet of its original location or source and returned to the same aquifer which is not a current or potential drinking water source. Re-infiltration shall not contaminate uncontaminated areas.
 - b. More than 150 meters from surface waters, drainage features, and drainage structures.
 - c. Groundwater does not contain any gross contaminants.
 - d. If petroleum free product is present in the groundwater, the free product shall be removed prior to transfer of the groundwater to the re-infiltration site. Free product shall be removed at least once daily until no free product is observed after 24 hours. The free product shall be disposed at an HDOH-approved facility.
 - e. Groundwater is not considered a hazardous waste pursuant to Federal and State law.
 - f. Re-infiltration shall be conducted at a slow enough rate so that it does not flow past the designated infiltration area, enter storm drains, or impact surface water in the area.
 - g. If discharging to a re-infiltration trench, the trench must not be an underground injection control (UIC) well by HDOH's Safe Drinking Water Branch (SDWB) definitions. If some part of the trench system is deemed to be a UIC well, then the whole system shall be considered an injection well.
 - h. Advance clearance from HDOH SDWB is required if a re-infiltration trench is deeper than 10 feet.

- i. If a UIC well is used for re-infiltration, the Contractor is responsible to obtain the necessary permits, including, but not limited to, HDOH's UIC Permit. The Contractor shall meet and comply with all permit requirements, including, but not limited to, well construction, placement, use, and closure.
10. Under circumstances where contaminated groundwater cannot be re-infiltrated, proper disposal must be conducted with the prior approval of the DOTA AIR-EE, HDOH SDWB, HDOH Solid and Hazardous Waste Branch (SHWB), and HDOH HEER Office. This is also subject to the following conditions:
 - a. Discharge to the local or municipal sanitary sewer system after acquiring appropriate permit(s) from City and County (if applicable and if allowable by the receiving governmental agency) prior to discharge. If discharge water was generated within contaminated areas, additional coordination with HDOH HEER Office is required, and Aquatic Habitat Criteria (Chronic Toxicity) shall apply to discharge within these areas, in addition to any criteria applicable to the National Pollutant Discharge Elimination System (NPDES) permit or pretreatment facility. Water discharged to a sanitary sewer may be required to meet Water Quality Standards.
 - b. Notification to the appropriate agencies and other pertinent information related to the discharge must be provided upon request.
 - c. The Contractor is responsible for the legal disposal or discharge of any groundwater that is not re-infiltrated, and shall provide the DOTA AIR-EE with copies of waste manifests.
 - d. For any groundwater hauled off Airport property, the Contractor shall have representative samples taken and tested in accordance with HDOH guidelines, standards, and regulations. A copy of the groundwater test result shall be submitted to DOTA AIR-EE. The groundwater shall not be disposed offsite without the approval of DOTA AIR-EE and the HDOH permitted facility that is receiving the groundwater. Furnish documentation from the receiving facility indicating that they acknowledge the groundwater test results, including their approval to dispose the groundwater at their facility.

C. RELEASE REPORTING

Encountering previously unknown, suspected, or confirmed contaminated soil or groundwater during subsurface construction activities is considered a release and shall be reported to HDOH HEER Office (phone: 808-586-4249, or after hours at 808-247-2191). Copies of the HDOH Release Report, HDOH issued Release Number, and email correspondence (if applicable), shall be furnished to the DOTA Engineer and DOTA AIR-EE.

1. Upon the discovery of contaminated soil and/or groundwater, the Contractor shall immediately notify the DOTA Engineer, DOTA AIR-EE, and the Airport Duty Manager (CODE 22). The Contractor shall also immediately notify the Hawaii State Emergency Response Commission (HSERC/HEER) and the Local Emergency Planning Committee (LEPC) of the discovery.
2. A reportable release of hazardous substances or contaminated soil or groundwater may be indicated by, but not limited to, any of the following:
 - A petroleum sheen on the groundwater in an excavation.
 - Any free product that appears on groundwater.
 - Visual or olfactory evidence of contamination (e.g., unusual discoloration, buried containers, fumes, unknown liquids).
3. Comply with DOTA and HDOH HEER Office requirements. A written report shall be provided to the HDOH HEER Office. The *Hawaii Hazardous Substance Written Follow-up Notification Form* is provided in the DOTA EHE-EHMP, Appendix B.1. Photos shall be included to document the incident. The Contractor shall keep a copy of the completed Form B.1 and provide copies of the written report to the DOTA Engineer and DOTA AIR-EE.
4. If free product is encountered, report the release in accordance with HAR § 11-451.

Releases that occur during construction activities or releases due to unforeseen events (spill) shall also be reported.

1. Report all spills to the Airport Duty Manager (CODE 22) and DOTA AIR-EE immediately.
2. In the event of a release of a hazardous substance that causes an imminent threat to human health or the environment, the first call shall be to 911.
3. Small spills of petroleum or hazardous substances (less than 25 gallons) which are capable of being cleaned up within 72 hours and do not threaten ground or surface waters shall be cleaned up immediately.
4. Report spills of a certain size (e.g., volume of greater than 25 gallons or not contained within 72 hours), per HAR § 11-451, to HDOH HEER Office and the National Response Center immediately. Comply with the HDOH HEER Office requirements. A written report shall be provided to the HDOH HEER Office within 30 calendar days of a Reportable Quantity spill cleanup. The *Hawaii Hazardous Substance Written Follow-up Notification Form* is provided in the DOTA EHE-EHMP, Appendix B.1. Photos shall be included to document the incident. The Contractor shall keep a copy of the completed Form B.1, and provide copies of the written report, the HDOH issued Release Number, and email correspondence (if applicable) to the DOTA Engineer and DOTA AIR-EE.

5. Any spill that enters a body of water, onto an adjoining shoreline, or discharges into the storm drain system, HDOH CWB must also be immediately notified and the National Response Center notified within 24 hours. Report significant spills to the U.S. Coast Guard.

D. FINAL CLEANUP

1. When work which disturbs contaminated soil has been completed, the State will visually inspect the work area for evidence of contaminated materials and direct the Contractor to clean and remove remaining contaminated materials. The Contractor shall not dismantle the work area boundaries prior to authorization by the State.
2. Any equipment which contacts contaminated materials shall be cleaned with a water spray immediately upon completion of work. The wash location shall be located immediately adjacent to the contaminated area. All wash water and solid waste shall be disposed of in accordance with the Work Plan. The wash water shall not be allowed to discharge into the drainage system and surface waters.

E. AIR MONITORING

1. Air monitoring shall be conducted when petroleum-contaminated soil (PCS), contaminated groundwater, free product, or chlorinated solvents (e.g., PCE, TCE, etc.) is present in an excavated area. The monitoring shall include both work area and perimeter measurements of volatile organic compound (VOC) vapors. Appropriate response actions shall be taken in conformance to Federal and State regulatory requirements and guidelines. The response actions shall include ensuring that on-site workers have the appropriate level of PPE and the general public is not affected adversely.
2. Air monitoring shall be conducted with a conventional photoionization detector (PID) to measure total VOC vapor concentrations. If high levels of benzene are anticipated, an Ultra-Rae PID, which is benzene-specific, shall also be used.
3. If toxic gases are a potential concern, air monitoring of the lower explosive limit (LEL) shall be conducted using a multi-gas meter to determine if a hazardous atmosphere exists.
4. Air monitoring shall be conducted for at least three (3) full 8-hour shifts to establish a negative exposure assessment for worker's exposure to airborne contaminants. After the establishment of the negative worker's exposure, periodic monitoring shall be conducted once every seven (7) calendar days to document worker exposure for the duration of the contaminated soil work.
5. Work area and perimeter air monitoring shall be conducted throughout the entire duration of the contaminated soil work to ensure unprotected personnel are not exposed above permissible exposure limits at all times.

If the outside boundary levels are at or exceed permissible exposure limits, work shall be stopped, and the Contractor's Qualified Environmental Professional and DOTA Engineer shall be immediately contacted to address the situation causing the increased levels.

6. Submit air sampling results to the DOTA Engineer within five (5) calendar days after the samples are collected, signed by the testing laboratory employee performing the air monitoring.

F. UNDERGROUND STORAGE TANKS (UST) AND UTILITY PIPES

1. For any UST or pipeline discovered or planned removal, the nature of the UST or pipeline, and whether they are inactive, shall be determined prior to removal. Immediately notify the DOTA Engineer and DOTA AIR-EE of the discovery.

If unanticipated petroleum pipelines are discovered, contact HDOH HEER Office within 24 hours after encountering them.

2. The Contractor shall record field observations of the UST and pipelines. These observations shall include, but are not limited to, the following:
 - a. Location relative to fixed landmarks, including GPS coordinates. Provide a location map that shows the UST and pipelines that were encountered. The map must include a North arrow and a scale.
 - b. Depth, diameter, length, and type of pipe, if applicable. Describe the condition of the pipe.
 - c. Type of fuel or product, including analytical laboratory reports for the product that is recovered.
 - d. Beginning and ending fluid levels, if applicable.
 - e. Volume of each type of product removed.
 - f. Flow rates, if applicable.
 - g. Direction of flow.
 - h. Detailed photographs.
 - i. Detailed description of actions taken following the discovery, such as, cutting, product removal, and disposal.

Provide records of the field observations to the DOTA Engineer, DOTA AIR-EE, and HDOH HEER Office.

3. Prior to removal of a UST, the Contractor shall prepare and submit to the DOTA Engineer, for review by DOTA AIR-EE, a Site-Specific plan. All work

associated with USTs shall be in compliance with HAR § 11-280.1 requirements, and HDOH HEER Office and HDOH SHWB requirements.

The contractor shall also complete the HDOH *Notice of Intent to Close Underground Storage Tanks* form and submit it to the DOTA Engineer for submission to HDOH SHWB (UST Section) by DOTA AIR-EE.

Prior to the removal of the UST, the Contractor shall receive approval from DOTA AIR-EE and HDOH HEER Office.

4. The UST or pipeline segment must be drained of its content or determined that it is empty of liquids or flammable vapors prior to the removal. Any petroleum fluids recovered must be representatively sampled and tested to determine how they can be recycled or disposed in full accordance with HAR § 11-58.1 and § 11-260–279, and any other Federal and State regulations.
5. Only personnel knowledgeable and trained in pipeline and UST removal shall cut, drain, and remove USTs and pipelines. Prior to cutting, plastic sheeting and absorbent material shall be placed below and adjacent to the cutting location. Any residual fluid in the UST or pipeline must be properly contained on the sheeting and prevented from discharging into the surrounding soil or entering any drainage system and surface waters.
6. The cut-off ends of the pipeline segments, that remain in-place, must be filled with concrete and appropriately sealed to prevent any potential leakage and contact with groundwater.
7. If the waste pipe or UST are to be stored onsite prior to disposal, the area shall be lined with polyethylene plastic sheeting, 10 mil or thicker, and bermed to contain any free product. Some viscous products may appear to be immobile, however, after exposed to atmosphere heating, can liquefy. The waste pipe segment shall be stored on appropriate dunnage with the ends of the pipe sealed or covered to protect the interior of the pipe from contact with rainwater and wind.
8. All removed pipelines and USTs shall be properly disposed or recycled.
9. For USTs, a UST Removal Report including all sampling activities required under HAR § 11-280.1 shall be prepared and submitted to the DOTA Engineer, DOTA AIR-EE, and HDOH SHWB (UST Section).

3.4 POST-CONSTRUCTION REQUIREMENTS

A. Submit the following within 30 calendar days after work is completed.

1. Close-out Report

- a. A signed certificate stating that the removal and disposal of all contaminated materials were completed in accordance with the Contractor's approved Work Plan or Site-Specific Plan, and all

- applicable Federal, State, and local rules and regulations.
- b. All approved DOTA EHE-EHMP deviation request forms. (Reference Appendix B of the DOTA EHE-EHMP.)
 - c. All Site-Specific EHMP, if applicable.
 - d. All testing, laboratory results, and reports for any soil, groundwater, soil vapor, UST, pipeline, and other samplings taken.
 - e. All disposal forms, waste manifests, and summary logs.
 - f. Any results from project air monitoring.
 - g. Record of Field Observations, including location map with GPS coordinates, limits, and depths of any contaminated media (soil, groundwater, etc.) that were encountered at previously unknown source or sites on the project. Include a copy of the completed *Hawaii Hazardous Substance Written Follow-up Notification* form that was submitted to HDOH and all other associated documents.
 - h. If any contaminated soil was removed offsite (off of Airport Property), at a minimum, include the following:
 - A copy of the signed agreement from the receiving facility acknowledging the test result of the soil samples and indicating acceptance of the soil for reuse.
 - Copies of the test results of the soil sampling.
 - i. If any contaminated soil was re-used onsite (within the construction site boundaries), at a minimum, include the following:
 - Copies of the test results of the soil sampling.
 - The quantity of soil that is re-used on-site.
 - Location map of the re-used soil. Include GPS coordinates of its limits, if the area is accessible.
 - A brief description of the purpose of the re-used soil (e.g., general fill, utility trench backfill material, etc.). Include the depth and thickness of its placement.
 - Photos of the site after placement of the re-use soil has been completed.
 - j. Record of Field Observation of any unanticipated UST or pipeline discovered during construction activities, including a copy of the completed HDOH *Notice of Intent to Close Underground Storage Tanks* form and all other associated documents.

The Close-out Report shall be by each individual contaminated media and shall include all appropriate documentations. The Close-out Reports for each

contaminated media can be submitted separately or combined in a 3-ring binder with divider tabs.

PART 4 – MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will be paid for under the various contract items as shown below.

For ALLOWANCE items in the Proposal Schedule, the allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the DOTA Engineer. The Contractor shall be allowed to include overhead, profit, insurance and/or other mark-ups, as stipulated in Section 9.5 of the 2016 General Provisions for Construction Projects, Air and Water Transportation Facilities Divisions.

| <u>Item No.</u> | <u>Item</u> | <u>Unit</u> |
|-----------------|-----------------------------------|-------------|
| 01562.1 | Management of Contaminated Medias | Allowance |

Should the DOTA receive reports of any illegal dumping of material, and if illegal dumping is confirmed to have occurred, the DOTA will assess a Liquidated Damage amount of \$5,000 per truck per day, until the illegal dumped material has been cleaned up or the incident has been remedied to the HDOH's concurrence. The Contractor shall not be entitled to recover any Liquidated Damages assessed, even after the non-compliance has been corrected.

The Contractor shall also be responsible for all citations, fines, and penalties levied by HDOH or EPA against the State due to the Contractor's failure to properly manage contaminated medias, including non-compliance with the DOTA EHE-EHMP or Site-Specific EHMP. The Contractor shall reimburse the State within 30 calendar days for the full amount of outstanding cost that the State has incurred, or the State shall deduct all incurred costs from the Contractor's monthly progress payments.

If the Contractor fails to satisfactorily address the non-compliance item, DOTA reserves the right to employ outside assistance or use the State's own labor forces to provide necessary corrective measures. The Contractor shall be fully responsible for all cost and time. The State shall charge the Contractor such incurred costs plus any associated project engineering costs and shall make appropriate deductions from the Contractor's monthly progress payment.

END OF SECTION

SECTION 01565 - SECURITY MEASURES

PART I – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

- A. The Contractor shall incorporate the State's airport security measures as part of his work. The Contractor shall adhere to established and enhanced security procedures, as mandated by the State and FAA, throughout the course of this Contract.

1.03 SUBMITTALS

- A. Submit a security plan that addresses the conditions set forth in this Contract. Said plan shall contain, at a minimum, a plan of the project scope with locations of construction barricades with secured entry/exits, identification of locations requiring guards, Contractor measures to ensure security of worksite and personnel and procedures to ensure the containment of the worksite from unauthorized personnel. This package shall be submitted within fourteen (14) calendar days after award of the Contract.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 SECURITY

- A. Obtain airport security identification badges for all employees working on this project and Air Operations Area (AOA) decals for all vehicles entering the AOA area in accordance to the requirements stated in the Special Provisions. All requests for badges and AOA decals shall be submitted in writing to the Airport District Manager through the Engineer within fourteen (14) calendar days after award of the Contract. Only authorized personnel working on this project shall be allowed to obtain badges. The Contractor shall be responsible to pay for all costs associated with complying with airport security requirements, including obtaining airport security identification badges.

As of the writing of this specification, the fees to obtain a new airport identification badge are \$10.00 for processing and \$60.00 for fingerprinting. However, due to the changing fee structure of these services, the Contractor shall inquire with the Daniel K. Inouye International Airport AOA badge and ramp license office at (808) 836-6427. For other Airport Districts cost inquiries should be made the relevant Air District Office:

| | |
|---|----------------|
| Kona International Airport | (808) 327-9517 |
| Hilo International Airport | (808) 961-9350 |
| Kahului, Kapalua, Hana, Molokai, Kalaupapa, & Lanai Airports | (808) 872-3874 |
| Lihue & Port Allen Airports | (808) 271-3902 |

If access is required to the Daniel K. Inouye International Airport - International Arrivals Building, inquiries shall be made to the Bureau of Customs and Border Patrol at (808) 861-8642 for additional bonding requirements.

- B. The Contractor shall comply with all existing and proposed airport security initiative requirements. Contractor may be subject to civil penalties up to \$35,000.00 for each security violation.
- C. The Contractor shall protect work areas from theft, vandalism and unauthorized entry. Ensure that proper methods are undertaken to secure tools, materials and equipment from the public.
- D. All vehicles entering the AOA through any of the Airport Access Check Points may be subject to search. The Contractor shall allow extra time for these inspections and be able to provide personnel, as required, to assist Airport security personnel during the inspections.
- E. If required by the State, the Contractor will be responsible for the posting of guards at access points where the construction traffic may compromise the integrity of the airport security. Payment for posting of security guards required by the State shall be paid for as an allowance item in the Proposal Schedule. The Contractor shall submit the name and qualifications of the security company to the Engineer for review prior to hiring the security company. The security company shall have extensive experience in working on airports and knowledgeable in airport security procedures within the State of Hawaii.

PART 4 - MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

- A. No measurement shall be made for the items in this Section.

4.02 BASIS OF PAYMENT

- A. Work under this Section, except for posting of security guards and the provision of security measures required by the State, shall be considered incidental to and included in the bid prices for the various items of work in this project. AOA badges, decals, and fines are not eligible for reimbursement.
- B. Posting of security guards or other security measures required by the State shall be paid for under an allowance item in the Proposal Schedule. The allowance is an estimate and the amount shall not exceed the maximum amount shown in the proposal schedule. Additional charges by the Contractor for overhead, coordination, profit, insurances and other incidental expenses shall not be allowed. These shall be included in the Contractor's lump sum bid price.
- C. Payment will be made under:

| <u>Item No.</u> | <u>Item</u> | <u>Unit</u> |
|-----------------|-------------------|-------------------|
| 01565.1 | Security Measures | Allowance (ALLOW) |

END OF SECTION

SECTION 01580 - TEMPORARY FACILITIES AND UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

- A. This item shall consist of arranging and maintaining all utilities including, but not limited to, water, electricity, sewage disposal and telephone communications in the work area which the Contractor and Engineer deems necessary to meet the requirements of the work under the contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES DURING CONSTRUCTION

- A. Water and Sanitation: The Contractor shall provide temporary drinking water and sanitary facilities for the field personnel. The facilities shall be in accordance with the applicable health regulations and shall be maintained clean and operable until the conclusion of the construction work.
- B. Telephone: The Contractor shall have a telephone available for the State's use for communications with field personnel. Cellular telephones are acceptable. The Contractor shall install the telephone immediately upon starting work and maintain service until the project is completed. All costs associated with obtaining and maintaining telephone service shall be borne by the Contractor.
- C. Electricity: Contractor shall obtain or provide temporary electric power and shall pay for all connections and energy charges incurred during construction.
- D. Metering: Water and electrical services shall be metered and payment for meters and services shall be borne by the Contractor. Temporary connections for water shall include installation of a meter and backflow preventer at the point of connection according to State standards at the Contractor's cost. The Contractor shall submit requests for temporary connections in writing to the Engineer fourteen (14) calendar days prior to the connection and shall include a description of work and a sketch of the proposed installation.

PART 4 - PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 01700 – MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 GENERAL REQUIREMENTS

- A. Section 699 of "Hawaii Standard Specifications for Road, Bridge, and Public Works Construction, 1994," are hereby incorporated into and made a part of these specifications by reference unless otherwise modified hereinafter.

1.03 MOBILIZATION

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

1.04 DEMOBILIZATION

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

1.05 PERFORMANCE BOND

- A. The Contractor shall file and pay for the performance and payment bonds according to Section 2.24 of the General Provisions, except that the value of the bonds shall equal one hundred percent (100%) of the amount of the contract basic bid amount plus one hundred percent (100%) of the amount of the extra work.
- B. Payment for the Contractor's bond premium will be made as part of mobilization in accordance to the terms stated in Part 4 below.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 - MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

- A. Mobilization shall not be measured for payment. The maximum bid allowed for "Mobilization" is an amount not to exceed six (6) percent of the sum of all items (excluding this item and all Allowances). If the proposal submitted by the bidder indicates an amount in excess of the allowable maximum, the indicated amount or amounts shall be reduced to the allowable maximum; the "Sum of All Items," in the proposal schedule shall be adjusted to reflect any such reduction. For the purposes of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the "Sum of All Items" adjusted in accordance with the foregoing shall be used and the bidder's proposal shall be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith."
- B. Demobilization will not be measured for payment.

4.02 BASIS OF PAYMENT

- A. Mobilization will be paid for at the contract lump sum price under Mobilization. Partial payment will be made as follows:
 - 1. When 2 1/2 percent of the original contract amount is earned, 50 percent of the bid amount will be paid.
 - 2. When 5 percent of the original contract amount is earned, 75 percent of the bid amount will be paid.
 - 3. When 10 percent of the original contract amount is earned, 100 percent of the bid amount will be paid.
 - 4. Nothing herein shall be construed to limit or preclude partial payments otherwise provided by the contract.
- B. Payment will be made under:

| <u>Item No.</u> | <u>Item</u> | <u>Unit</u> |
|-----------------|-------------------------------|---------------|
| 01700 | Mobilization & Demobilization | Lump Sum (LS) |

END OF SECTION

SECTION 01715 - EXISTING CONDITIONS - ASBESTOS / LEAD / HAZARDOUS
MATERIAL SURVEY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes hazardous material survey for asbestos-containing material (ACM), lead-containing paint (LCP), arsenic materials, for the HNL Airport Administration Tower 5th Floor Replace Project at the Daniel K. International Airport, Island of Oahu, and is provided for the Contractor's information.
- B. B. Related Sections include the following:
 - 1. SECTION 13282 – LEAD PAINT CONTROL MEASURES 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.
 - 2. SECTION 13289 – LEAD TESTING AND MONITORING for requirements for lead monitoring and clearance for compliance.

1.03 ASBESTOS

- A. The structure or structures to be renovated or modified under this contract were surveyed for the presence of ACM. A copy of the survey report is included in this Section.
 - 1. No ACM was confirmed within the project area during the survey. Therefore, no special requirement apply.
 - 2. Contractor must comply with applicable regulations to protect workers, occupants, students, and the environmental when disturbing materials containing trace amounts of asbestos.

1.04 LEAD CONTAINING PAINT

- A. Inform employees, subcontractors, and other persons engaged in the project that LCP are present in the project site. Follow the requirements of Federal, State, and local regulations.

- B. 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.
- C. Contractor may conduct additional lead testing of existing painted surface at his/her own expense.
- D. Contractor shall follow applicable rules and regulations pertaining to the handling, removal, and disposal of LCP.

1.05 ARSENIC

- A. No arsenic-containing materials were confirmed in the project areas during the survey. Therefore, no special requirements apply.

1.06 POLYCHLORINATED BIPHENYLS (PCBs) AND MERCURY

- A. No PCB or mercury containing electrical components will be disturbed during the project. Therefore, no special requirements apply.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.01 SURVEY REPORT

- A. Targeted Hazardous Material Survey Report for Air Conditioning Replacement, Hawaii Department of Transportation Airports Division, Administration Tower 5th Floor, Daniel K. Inouye International Airport, 300 Rodgers Boulevard, Honolulu, Island of Oahu 96819, 58 pages, dated January 5, 2022, 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.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

ATTACHED: HAZARDOUS MATERIAL

**TARGETED HAZARDOUS MATERIAL SURVEY REPORT
FOR
AIR CONDITIONING REPLACEMENT
HAWAII DEPARTMENT OF TRANSPORTATION AIRPORTS DIVISION
ADMINISTRATION TOWER 5TH FLOOR
DANIEL K. INOUE INTERNATIONAL AIRPORT
300 RODGERS BOULEVARD
HONOLULU, ISLAND OF OAHU 96819**

MNA PROJECT 3175_2

JANUARY 05, 2022



Myounghee Noh & Associates

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This report is prepared for:

Coffman Engineers, Inc.
745 Fort Street, Suite 400
Honolulu, Hawaii 96813

TARGETED HAZARDOUS MATERIAL SURVEY REPORT
FOR
AIR CONDITIONING REPLACEMENT
HAWAII DEPARTMENT OF TRANSPORTATION AIRPORTS DIVISION
ADMINISTRATION TOWER, 5TH FLOOR
DANIEL K. INOUE INTERNATIONAL AIRPORT
300 RODGERS BOULEVARD
HONOLULU, ISLAND OF OAHU 96819

MNA Project 3175_2

January 05, 2022



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CONTRIBUTORS

| | |
|-----------------------|-----------------------------------|
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| Certified Inspectors | Danny Falanug, Kealohilani Serrao |
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EXECUTIVE SUMMARY

In October 2021, Myounghee Noh & Associates, L.L.C. dba MNA Environmental (MNA), was retained by Coffman Engineers, Inc., to conduct a targeted hazardous material survey at the Hawaii Department of Transportation Airports Division Administration Tower 5th Floor, at the Daniel K. Inouye International Airport, located at 300 Rodgers Boulevard, Honolulu, Oahu. Targeted were those areas anticipated to be disturbed during the planned air conditioning replacement.

The objective of the survey was to identify the presence, extent, and conditions of hazardous materials on the 5th floor of the building in the areas anticipated to be disturbed, so that the information can be incorporated in the design.

During 06 and 08 December 2021, MNA conducted this hazardous material survey and identified 19 suspect building materials. Based on sampling and analysis of 39 asbestos/bulk, 10 heavy metal/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 | Cd | Cr | Hg | Arsenic | PCB | Mercury |
|---|-----|-----|-----|----|----|----|---------|-----|---------|
| HDOT Airports Administration Tower, 5th Floor | | | | | | | | | |
| Break Room | | | | | | | | | ☐ |
| Conference Room | | | | | | | | | ☐ |
| Hallway | | ☐ | | | ☐ | ☐ | | | ☐ |
| Library | | | | | | | | | ☐ |
| Mechanical Room | | ☐ | | | | ☐ | | | |
| Men's Restrooms | | | | | | | | | ☐ |
| Women's Restrooms | | | | | | | | | ☐ |
| Plenum | | ☐ | | | ☐ | ☐ | | | |
| Work Area | | | | | | | | | ☐ |

☐ indicates presence of hazardous material

ACM – Asbestos-Containing Material

Cd – Cadmium

Cr – Chromium

Hg – Mercury

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 lead-, chromium-, and/or mercury-containing paint, and mercury-containing light tubes. These control measures are briefly described in Section 10 Recommendations for Renovation and Construction Work. General dust, silica, and runoff controls and environmental protection are also warranted.

Paint samples were analyzed for lead, cadmium, chromium, and mercury content only. There is a potential for the presence of other hazardous chemicals in the lead-free or low-lead paint coatings, such as arsenic, zinc, and other metals and chemical substances. Suspect asbestos materials may contain other hazardous substances, such as silica and/or polychlorinated biphenyls (PCB).

Contractor must anticipate hazards and take all appropriate measures to prevent exposure of site workers and the environment.

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 landfills for waste characterization requirements.

Worker protection from silica exposures is also enforced by the Occupational Safety and Health Administration. All appropriate engineering controls must be implemented, and personal protective equipment may be considered as added protection.

1.0 INTRODUCTION

Myounghee Noh & Associates, L.L.C. (MNA), under an agreement with Coffman Engineers, Inc., conducted a targeted hazardous material survey for the Hawaii Department of Transportation (HDOT) Airports Division Administration Tower, 5th Floor air conditioning replacement, at the Daniel K. Inouye International Airport, located at 300 Rodgers Boulevard, Honolulu, Oahu.

MNA's survey was conducted in support of the planned air conditioning replacement project. Targeted were those areas anticipated to be disturbed by the air conditioning replacement work, as follows (Table 1):

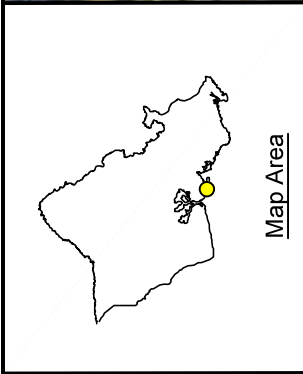
- Hazardous building materials due to the suspected presence of asbestos or arsenic.
- Paints/coatings suspected of containing lead, cadmium, chromium, and/or mercury.
- Polychlorinated biphenyls (PCB)-containing light ballasts.
- Mercury-containing electrical equipment, such as fluorescent light tubes,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



HDOT Administration Tower
December 2021

2.0 SAMPLING AND SURVEY METHODS

During 06 and 08 December 2021, State of Hawaii-certified building inspectors, Danny Falanug and Kealohilani Serrao, conducted the building material survey. The inspectors performed a visual assessment of the project site, identified materials suspected of containing asbestos, heavy metals, or arsenic, and collected samples of these materials. The inspectors also surveyed light ballasts and inventoried light components and switches. Inspector certifications are presented in Appendix A.



Map Area

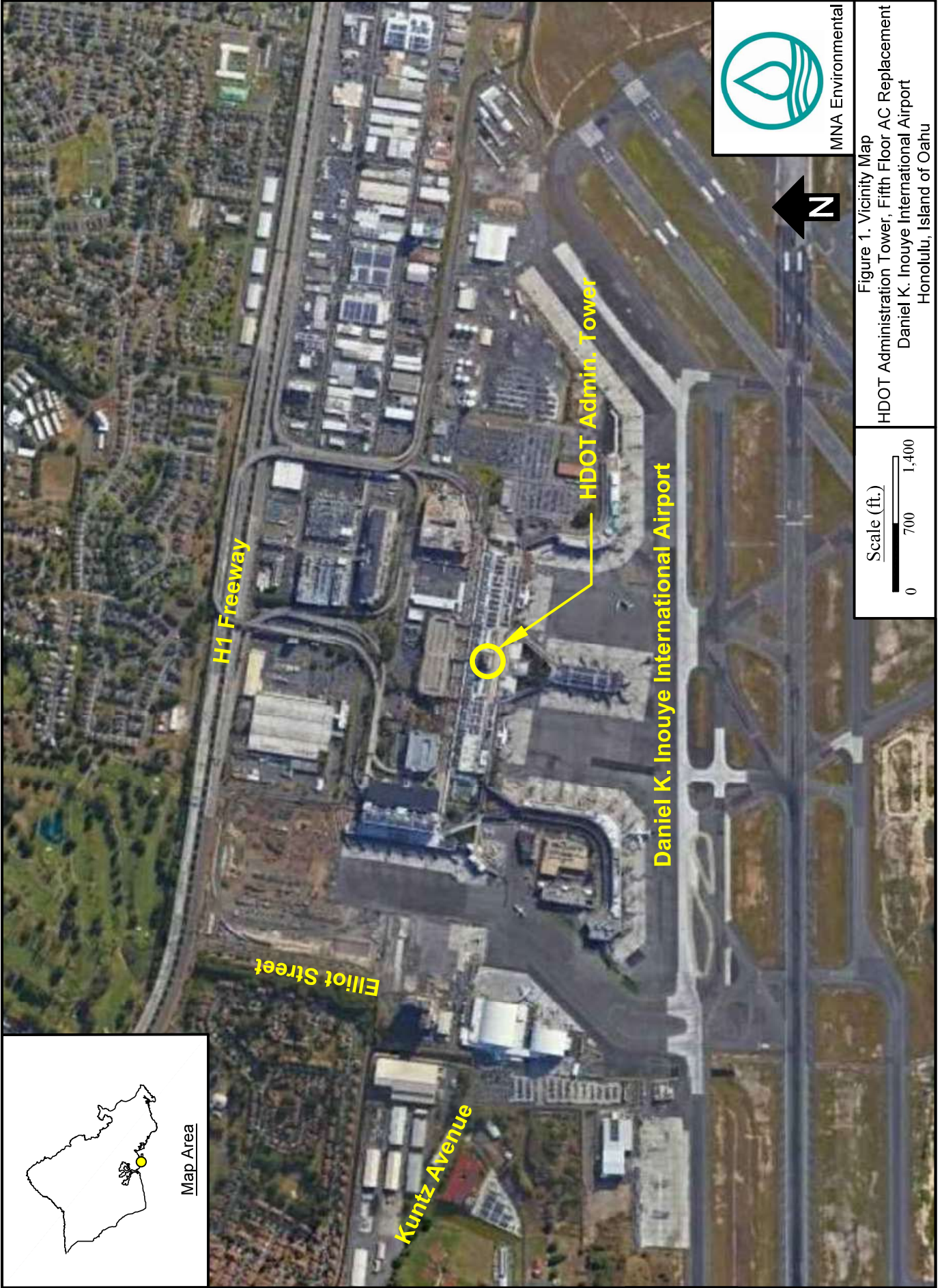


Figure 1. Vicinity Map
HDOT Administration Tower, Fifth Floor AC Replacement
Daniel K. Inouye International Airport
Honolulu, Island of Oahu

Scale (ft.)
0 700 1,400

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. 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 white paint on textured cement material (wall) is found to be lead-containing paint (LCP), then all identical white paint on textured cement material (wall) in the survey area should be treated as LCP. Table 1 provides an overview of sampling and a summary of hazardous materials identified.

Table 1. Summary of Sampling and Results

| Materials Sampled | Samples Submitted/ Inspected | Suspect Material Locations | Identified Hazardous Materials |
|---|------------------------------|--|--|
| HDOT Airports Administration Tower, 5th Floor | | | |
| Asbestos in bulk material or paint | 39 | Air handling unit and ducting, ceilings, flexible ducting, walls, 2-inch pipes and elbows, 6-inch pipes and elbows | None |
| Lead in paint | 10 | Ceilings, walls | 3 LCP (73 mg/kg – 1,200 mg/kg) |
| Cadmium in paint | 5 | | None |
| Chromium in paint | | | 1 LCP also contained chromium (220 mg/kg) |
| Mercury in paint | | | 3 LCP also contained mercury (4 mg/kg – 27 mg/kg) |
| Arsenic in bulk | 2 | Ceiling (acoustic tile) | None |
| PCB light ballasts | 9 | Fluorescent light fixtures (60 fixtures) | None |
| Mercury light tubes | 116 | Fluorescent light tubes (116 tubes) | All low mercury vapor light tubes |
| Mercury light switches | 11 | Wall switches (11 switches) | None |
| HID bulbs | 0 | --- | None |

ACM – Asbestos-Containing Material

HID – High-Intensity Discharge

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 arsenic. Duplicate paint chip samples were collected for lead analysis, and the primary samples were also analyzed for cadmium, chromium, and mercury. 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. Paint chip samples for heavy metal analyses were delivered under chain-of-custody to Hawaii Analytical Laboratory in Honolulu, Hawaii.

2.3 PCB-Containing Ballast Inspection

Fluorescent light ballasts in the project area 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; nine of 60 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 the project area 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 in the project area. If a switch does not make a clicking sound when turned on and off, it is 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 and the arsenic samples by 3050B/6010B. 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 NIOSH Method 7082m. The cadmium and chromium samples were analyzed using the EPA Method 3051m/7000Bm. The mercury samples were analyzed using the EPA Method 3051m/7471Bm. 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.

Thirteen homogeneous materials suspected of containing asbestos were identified and sampled, generating 39 samples for analysis. None of the samples contained measurable levels of asbestos. Therefore, it is concluded that no ACM is present in the area anticipated to be disturbed.

The suspected ACM descriptions and identifiers are provided in Appendix B. Sample 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 HEAVY METAL PAINT 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 lead-based paint (LBP). Paint containing any measurable concentration of lead is considered to be 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. The disturbance of cadmium is regulated by 29 CFR 1926.1127, the OSHA Cadmium Construction Standard. The disturbance of chromium is regulated by 29 CFR 1926.1126, the OSHA Chromium Construction Standard. The OSHA General Industry and Construction Standards also regulate mercury under 29 CFR 1910 Subpart H, I, and Z; and 29 CFR 1926 Subpart D and E. Paints are determined to be hazardous when any measurable amount of lead, cadmium, chromium, or mercury is determined by laboratory analysis.

Five suspected lead paints were identified and sampled, generating 10 paint chip samples. Three lead paints were identified in the survey area, with results ranging from 73 mg/kg to 1,200 mg/kg. None of the three lead paints were identified as LBP, exceeding 5,000 mg/kg, the threshold for LBP. The three LCP also contained mercury, ranging from 4 mg/kg to 27 mg/kg, and one LCP also contained chromium, 220 mg/kg. None of the paints contained cadmium above laboratory reporting limits (Table 2).

Table 2. Lead-Containing Paint Determination

| Rooms | Locations | HM ID | Material Color | Material | Substrate | Results (mg/kg) | | | | Condition | Estimated Quantity (sq. ft.) |
|---|-----------------|-------|----------------|----------|--------------------------|--------------------|-----|------------|-----------|-----------|------------------------------|
| | | | | | | Pb | Cd | Cr | Hg | | |
| Mechanical Room, Plenum | Ceilings, walls | 5 | White | Paint | Concrete | LCP 73 - 89 | <10 | <80 | 11 | Good | 160 |
| Mechanical Room | Wall | 7 | Lt. brown | Paint | Drywall | <40 | <10 | <80 | <4 | Good | 80 |
| Mechanical Room | Walls | 8 | Lt. brown | Paint | Textured cement material | 340 - 360 | <10 | <80 | 27 | Fair | 180 |
| Break Room, Conference Room, Hallway, Library, Men's and Women's Restrooms, Plenum, Work Area | Ceilings, walls | 9 | White | Paint | Drywall | <40 | <10 | <80 | <4 | Good | 600 |
| Hallway, Plenum | Walls | 19 | White | Paint | Textured cement material | 850 - 1,200 | <10 | 220 | 4 | Good | 100 |

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.

Abbreviations and Acronyms

HM ID – Hazardous Material Identifier

Cd – Cadmium

Cr – Chromium

Hg – Mercury

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

mg/kg – milligrams per kilogram or parts per million

sq. ft. – Square Feet

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

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.

One building material suspected of containing arsenic, white and brown 2’ x 1’ acoustic ceiling tile with pinholes, was identified and sampled, generating two samples for analysis. Neither of the samples contained a measurable level of arsenic. Therefore, no arsenic-containing materials were identified in the project area.

Suspected arsenic-containing material description and identifier are provided in Appendix B. Sample location drawing is provided in Appendix C. Photograph of suspected arsenic-containing material is 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

Handling, storage, transportation, and disposal of suspect PCB-containing waste are regulated by the Toxic Substance Control Act (TSCA; 40 CFR 761).

MNA inventoried 60 fluorescent light fixtures, containing a total of 60 ballasts throughout the project area. Nine light ballasts were inspected, and each identified as non-PCB ballast because the “No PCBs” label was observed. Contractor must be required to inspect and document each ballast before removal and replacement, if required.

8.0 MERCURY RESULTS

Handling, storage, transportation, and disposal of Universal Waste are regulated by the EPA Standards for Universal Waste Management (40 CFR 273).

MNA inventoried and visually inspected 116 fluorescent light tubes in the project area; all fluorescent light tubes had a green band, indicating that they were low-mercury vapor tubes. No high-intensity discharge light bulbs were observed in the project areas. Eleven light switches were also inspected, and none of them contained mercury.

9.0 SUMMARY OF SURVEY RESULTS

MNA conducted a targeted hazardous material survey at the HDOT Airports Administration Tower, 5th Floor, Daniel K. Inouye International Airport, at 300 Rodgers Boulevard, Honolulu, Island of Oahu. MNA’s survey was conducted in support of the planned air conditioning replacement project.

Based on the analysis of 13 asbestos-suspected materials, five lead-suspected paint coatings, one arsenic-suspected material, 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 | Cd | Cr | Hg | Arsenic | PCB | Mercury |
|---|-----|-----|-----|----|----|----|---------|-----|---------|
| HDOT Airports Administration Tower, 5th Floor | | | | | | | | | |
| Break Room | | | | | | | | | ☐ |
| Conference Room | | | | | | | | | ☐ |
| Hallway | | ☐ | | | ☐ | ☐ | | | ☐ |
| Library | | | | | | | | | ☐ |
| Mechanical Room | | ☐ | | | | ☐ | | | |
| Men’s Restrooms | | | | | | | | | ☐ |

| | ACM | LCP | LBP | Cd | Cr | Hg | Arsenic | PCB | Mercury |
|-------------------|-----|-----|-----|----|----|----|---------|-----|---------|
| Women's Restrooms | | | | | | | | | ☐ |
| Plenum | | ☐ | | | ☐ | ☐ | | | |
| Work Area | | | | | | | | | ☐ |

☐ indicates presence of hazardous material

ACM – Asbestos-Containing Material

Cd – Cadmium

Cr – Chromium

Hg – Mercury

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 demolition and construction work 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.

10.1 Asbestos-Containing Materials

Based on sampling and analysis of 13 homogeneous materials on the 5th Floor of the building, no ACM were identified in the project areas during this survey. Therefore, no special asbestos control measures are provided.

10.2 Heavy Metal-Containing Paints

Employees involved in renovation or demolition activities that disturb heavy metal-containing paints must conduct work in general accordance with 29 CFR 1926.62 OSHA Lead in Construction Standard, 29 CFR 1926.1126 OSHA Chromium in Construction Standard. The OSHA General Industry and Construction Standards also regulate mercury under 29 CFR 1910 Subpart H, I, and Z and 29 CFR 1926 Subpart D and E. Work practices that would trigger these requirements include, but are not limited to, sanding, blasting, welding, cutting, scraping, and spot/whole paint removals. For each project, the contractor must determine the appropriate safety measures based on the area to be disturbed, the lead and or other metals concentration, and the paint condition. Applicable work practice guidelines involving the disturbance of lead paints are summarized, but are not limited to:

- Contractors must anticipate hazards and utilize appropriate engineering controls and personal protective equipment (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]),

airborne chromium (29 CFR 1926.1126[d][1] and [d][2]), and airborne mercury (29 CFR 1926.95).

- An exposure assessment should be carried out when employees are disturbing lead-, chromium-, or mercury-containing paints to ensure that they are not exposed to airborne lead concentrations greater than the OSHA Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$ or 0.05 milligram per cubic meter (mg/m^3)] for lead, 0.5 mg/m^3 for chromium, and 100 mg/m^3 for mercury, averaged over an 8-hour period. Additional periodic exposure monitoring may be required if the OSHA Action Levels are exceeded.
- Employees must implement stringent dust control procedures to prevent airborne dust containing heavy metals.
- Employees must clean the work area thoroughly using wet methods and a high-efficiency particulate air (HEPA) vacuum. Dry sweeping or air blowing of heavy-metal containing debris and dust must be avoided.
- Lead-, chromium-, or mercury-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-, chromium-, or mercury-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, chromium, or mercury 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 the project area, no materials containing arsenic were identified in the project areas during this survey. Therefore, no special asbestos control measures are provided.

10.4 PCB-Containing Ballasts

No PCB-containing ballasts were observed during the survey. In an event any ballasts are observed with missing or illegible “No PCBs” labels, or manufactured prior to 1979, they are considered suspect PCB-containing in accordance with EPA guidance for PCB. 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 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 must determine the appropriate safety measures based on the number and condition of suspect PCB-containing ballasts.

10.5 Mercury-Containing Light Tubes

Low mercury vapor light tubes were observed during the survey. Trained employees are required to perform disturbance, removal, or cleanup of mercury-containing light tubes, and the work must be performed in accordance with EPA and OSHA regulations. Safeguards, precautions, and protective measures should be utilized to prevent mercury exposure. For each project, the contractor should determine the appropriate safety measures based on the quantity and condition of affected light tubes.

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/concrete slab, partitions, other building components, or existing equipment or furniture. If any previously unforeseen suspected materials become known, such as any hazardous chemicals in the lead-, chromium-, or mercury-free paint coatings, additional assessment may be required prior to the planned air conditioning replacement project.

Paint samples were analyzed for lead, cadmium, chromium, and mercury content only. There is a potential for the presence of other hazardous chemicals in the lead-free or low-lead paint coatings, such as arsenic, zinc, and other metals and chemical substances. Suspect asbestos materials may contain other hazardous substances, such as silica and/or PCB. Contractor must anticipate hazards and take all appropriate measures to prevent exposure of workers and environment.

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 waste characterization requirements.

Worker protection from silica exposures is also enforced by the OSHA. All appropriate engineering controls must be implemented and PPE may be considered as added protection.

APPENDIX A: INSPECTOR CERTIFICATIONS

Danny Falanug

Kealohilani Serrao



State of Hawai'i Asbestos Certification

Training Course Exp. Dates

| | | | |
|-----|----------|----|----------|
| W | n/a | MP | n/a |
| CS | n/a | PD | n/a |
| INS | 05/11/22 | PM | 05/21/22 |

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

**Falanug
Danny**

Myounghee Noh & Associates, L.L.C.

HIASB-3526

State Exp. Date 05/25/2022

State of Hawai'i Lead Based Paint Activities Certification

Expiration Dates:

| | |
|-------------------|------------|
| Inspector- | 08/12/2022 |
| Supervisor- | 06/12/2023 |
| Risk Assessor- | n/a |
| Project Designer- | 08/06/2023 |
| Worker- | n/a |



**Falanug
Danny**

Certification # PB-0661





State of Hawai'i Asbestos Certification

Training Course Exp. Dates

| | | | |
|-----|----------|----|-----|
| W | n/a | MP | n/a |
| CS | 05/23/22 | PD | n/a |
| INS | 05/04/22 | PM | n/a |

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

Serrao
 Kealohilani T.E.
 Myounghee Noh & Associates, L.L.C.
HIASB-4729
 State Exp. Date **06/06/2022**

State of Hawai'i Lead Based Paint Activities Certification

Expiration Dates:

| | |
|-------------------|------------|
| Inspector- | 09/30/2022 |
| Supervisor- | n/a |
| Risk Assessor- | n/a |
| Project Designer- | n/a |
| Worker- | n/a |



Serrao
 Kealohilani T.E.
 Certification # PB-1128



**APPENDIX B: HOMOGENEOUS MATERIALS IDENTIFIED AND
SAMPLE TYPES COLLECTED**

Homogeneous Materials Identified and Sample Types Collected

| HM ID | Rooms | Locations | Material Color | Material | Substrate | Asb | Pb | Cd | Cr | Hg | Ars | Result |
|-------|-------------------------|-----------------|--------------------------|---|--------------------------------|-----|----|----|----|----|-----|---|
| 1 | Mechanical Room, Plenum | 6" Pipes | White Yellow Beige | Wrap Insulation Coating | Metal | X | | | | | | ND |
| 2 | Mechanical Room, Plenum | 6" Pipe elbows | White Silver Beige | Coating Wrap Insulation Adhesive | Metal | X | | | | | | ND |
| 3 | Mechanical Room, Plenum | 2" Pipes | White Yellow | Wrap Insulation | Metal | X | | | | | | ND |
| 4 | Mechanical Room, Plenum | 2" Pipe elbows | White Yellow | Wrap Insulation | Metal | X | | | | | | ND |
| 5 | Mechanical Room, Plenum | Ceilings, walls | White | Paint | Concrete | | X | X | X | X | | LCP 73 - 89 mg/kg <10 mg/kg <80 mg/kg Hg 11 mg/kg |
| 6 | Mechanical Room, Plenum | Ceiling | White | Textured paint Skim coat | Concrete | X | | | | | | ND |
| 7 | Mechanical Room | Wall | Lt. brown | Paint | Drywall | | X | X | X | X | | <40 mg/kg <10 mg/kg <80 mg/kg <4 mg/kg |
| 8 | Mechanical Room | Walls | Lt. brown | Paint | Textured cement material | | X | X | X | X | | LCP 340 - 360 mg/kg <10 mg/kg <80 mg/kg Hg 27 mg/kg |

Homogeneous Materials Identified and Sample Types Collected

| | | | | | | | | | | |
|----|--|-----------------------------|-------------------------------------|--------------------------------|--------------------------------|---|---|---|---|---|
| 9 | Break Room, Conference Room, Hallway, Library, Men's and Women's Restrooms, Plenum, Work Area | Ceilings, walls | White | Paint | Drywall | X | X | X | X | <40 mg/kg <10 mg/kg <80 mg/kg <4 mg/kg |
| 10 | Break Room, Conference Room, Hallway, Library, Men's and Women's Restrooms, Plenum, Work Area | Walls | Lt. brown with white | Drywall | None | X | | | | ND |
| 11 | Hallway, Mechanical Room, Plenum | Walls | Lt. brown | Textured paint Skim Coat | textured cement material | X | | | | ND |
| 12 | Mechanical Room, Plenum | AHU, ducting | Green | Caulking | Metal | X | | | | ND |
| 13 | Break Room, Conference Room, Hallway, Library, Work Area | Ceiling | White with gouges | 2' x 2' Acoustic tile | None | X | | | | ND |
| 14 | Mechanical Room, Plenum | AHU and ducting interior | Green | TSI | Metal | X | | | | ND |
| 15 | Plenum | Flexible ducting | Silver Yellow | Wrap Insulation | None | X | | | | ND |
| 16 | Plenum | Ceiling | White and brown with pinholes | 2' x 1' Acoustic tile | Concrete | X | | | | ND |

Homogeneous Materials Identified and Sample Types Collected

| | | | | | | | | | | | |
|----|-----------------|---------|-------------------------------|-----------------------|--------------------------|---|---|---|---|---|--|
| 17 | Plenum | Ceiling | White and brown with pinholes | 2' x 1' Acoustic tile | Concrete | | | | | X | <40 - <41 mg/kg |
| 18 | Plenum | Ceiling | Dk. brown | Glue | Concrete | X | | | | | ND |
| 19 | Hallway, Plenum | Walls | White | Paint | textured cement material | | X | X | X | X | LCP 850 - 1,200 mg/kg <10 mg/kg Cr 220 mg/kg Hg 4 mg/kg |

All materials were identified on the 5th floor of the HDOT Administration Tower.

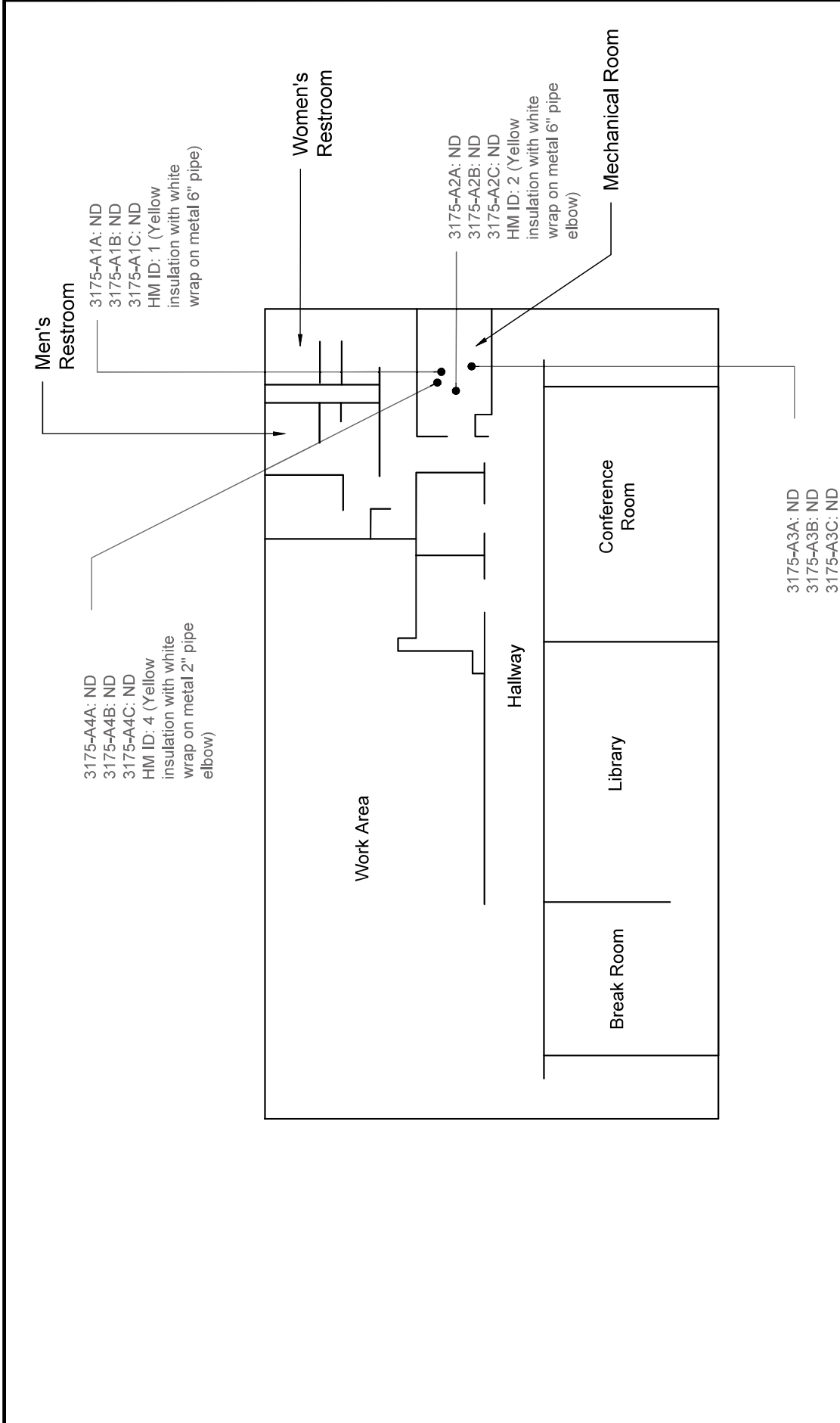
Bold values indicate results above the reporting limit.

Abbreviations and Acronyms

- Asb - Asbestos
- AHU - Air Handling Unit
- Ars - Arsenic
- Cd - Cadmium
- Cr - Chromium
- Hg - Mercury
- HIM ID - Homogeneous Material Identifier
- LCP - Lead-Containing Paint <5,000 mg/kg mg/kg - milligrams per kilogram, equivalent to parts per million
- ND - Not Detected
- Pb - Lead
- TSI - Thermal System Insulation

**APPENDIX C: SAMPLE AND HAZARDOUS MATERIAL LOCATION
DRAWINGS**

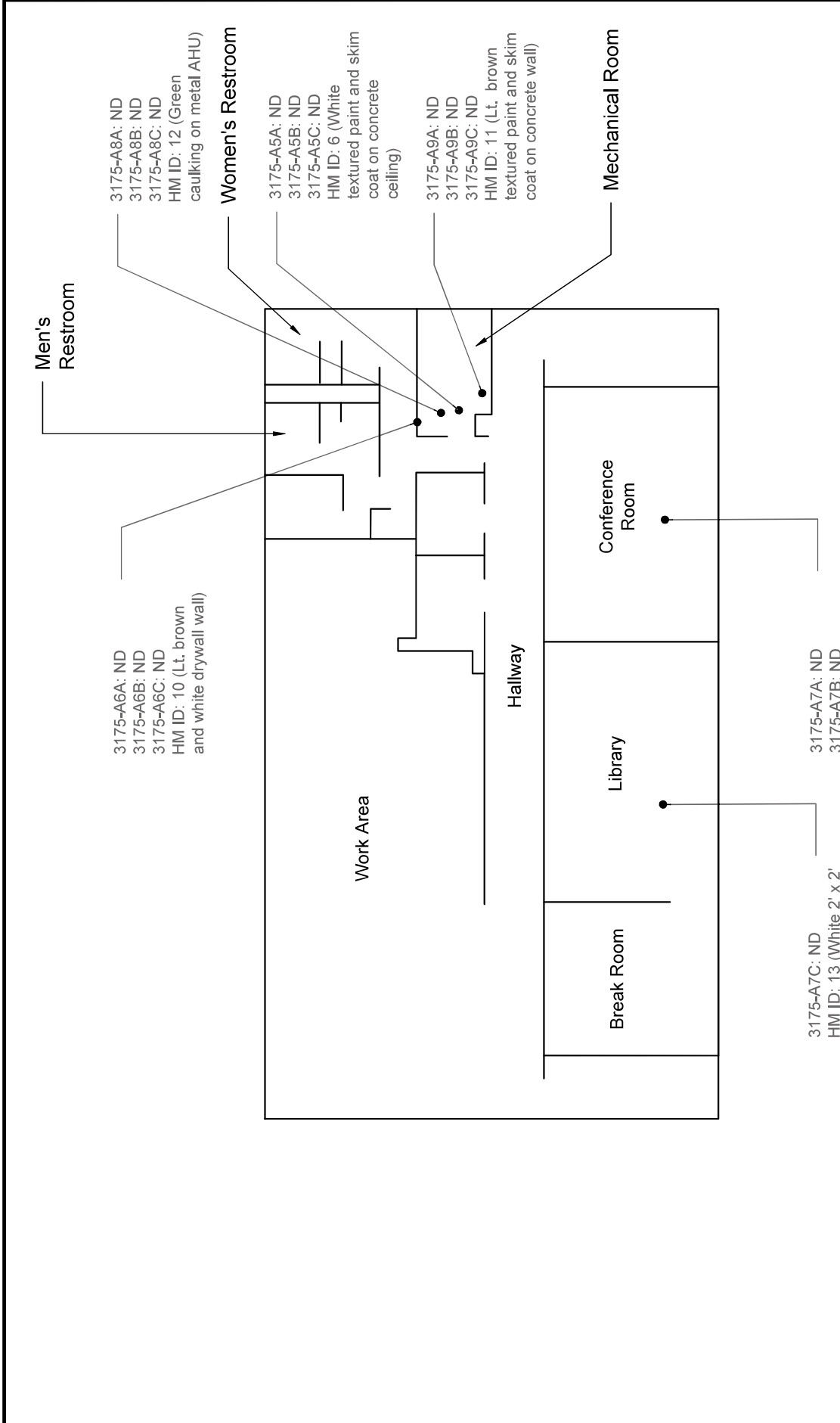
| List of Drawings | |
|---|-----------|
| Asbestos Sample and Hazardous Material Locations | C-1 – C-3 |
| Heavy Metal Paint and Arsenic Sample and Hazardous Material Locations | C-4 |



Sheet Number
C - 1

Asbestos Sample Locations
Daniel K. Inouye International Airport
Administration Tower, Fifth Floor
1 of 3

Legend and Notes
HM ID - Homogeneous Material Identifier
ND - None Detected (Reporting Limit 1%)

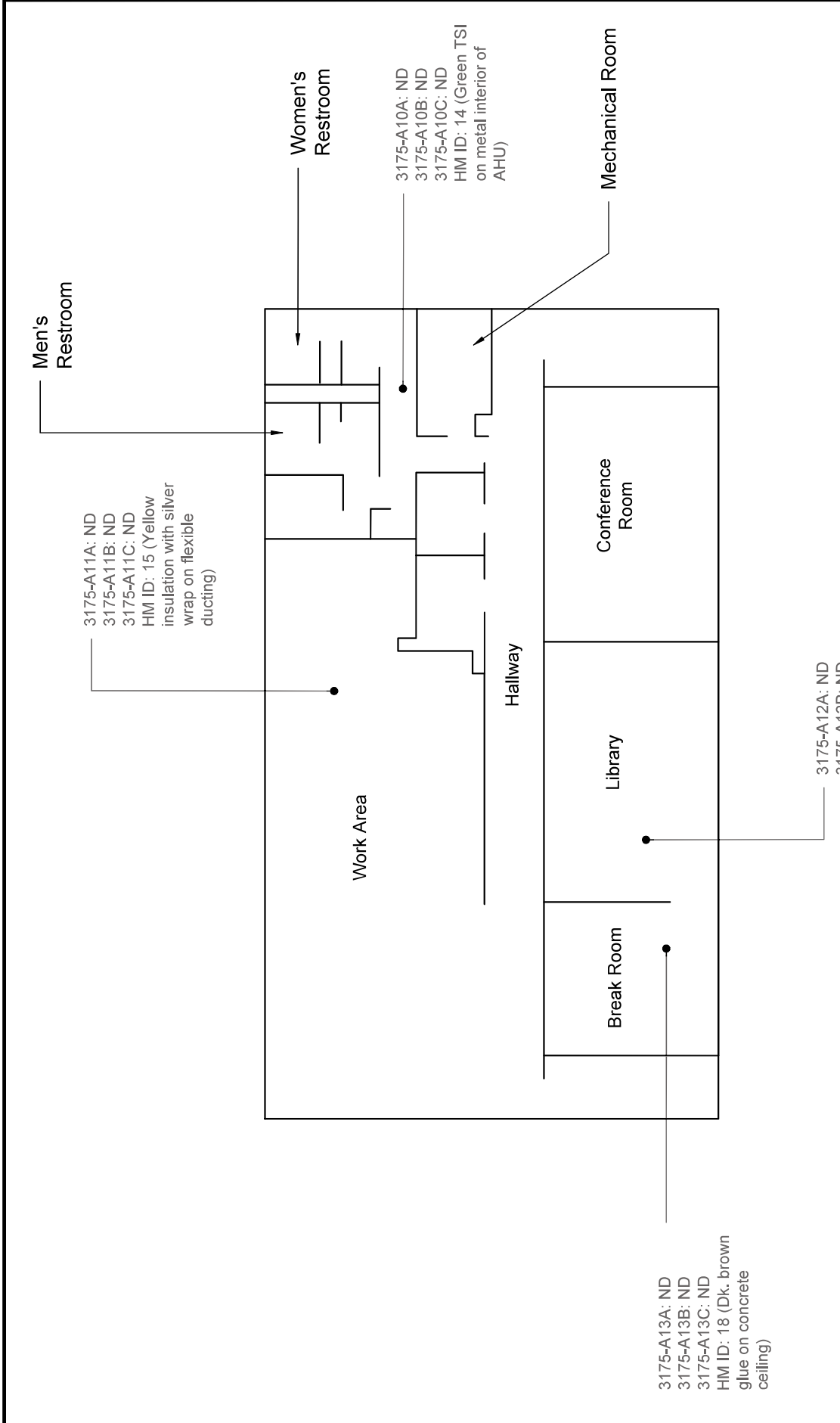


MNA Environmental
Sheet Number
C - 2



Asbestos Sample Locations
Daniel K. Inouye International Airport
Administration Tower, Fifth Floor
2 of 3

Legend and Notes
AHU - Air Handling Unit
HM ID - Homogeneous Material Identifier
ND - None Detected (Reporting Limit 1%)

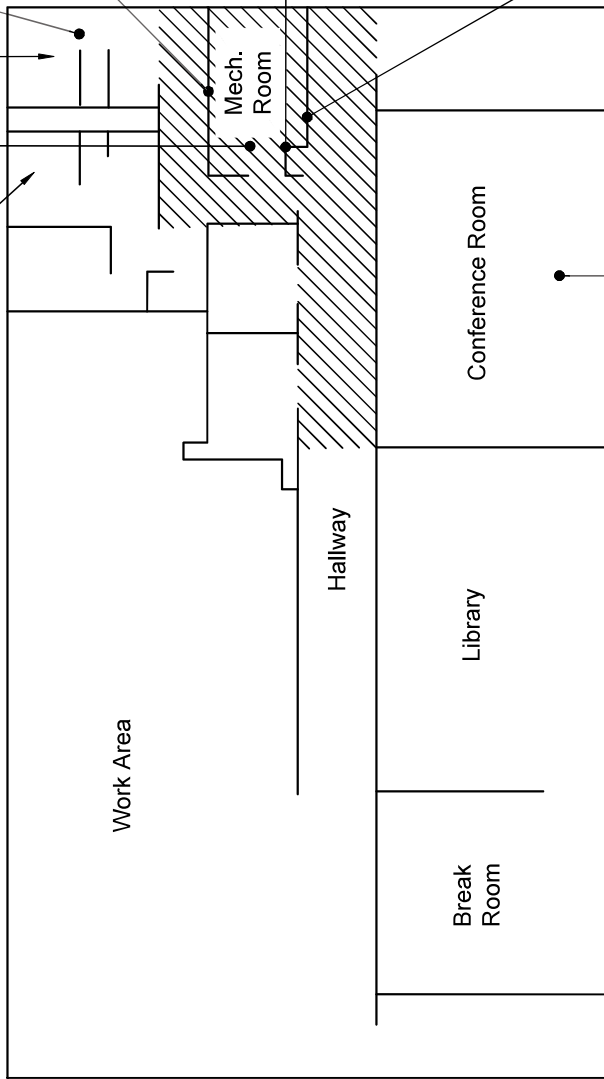


Sheet Number
C - 3

Asbestos Sample Locations
Daniel K. Inouye International Airport
Administration Tower, Fifth Floor
3 of 3

Legend and Notes
HM ID - Homogeneous Material Identifier
ND - None Detected (Reporting Limit 1%)
TSI - Thermal System Insulation

| HM ID | Locations | Color | Substrate | Results (mg/kg) |
|-------|-----------------|-----------|-----------------|-----------------------------------|
| 5 | Ceilings, walls | White | Concrete | LCP 73 - 89 Hg 11 |
| 8 | Walls | Lt. brown | Cement material | LCP 340 - 360 Hg 27 |
| 19 | Walls | White | Cement material | LCP 850 - 1,200 Cr 220 Hg 4 |



3175-P1A: LCP 73 mg/kg
3175-P1B: LCP 89 mg/kg
Cd: <10 mg/kg
Cr: <80 mg/kg
Hg: 11 mg/kg
HM ID: 5 (White paint on concrete ceiling)

Women's Restroom

3175-P4A: <40 mg/kg
3175-P4B: <40 mg/kg
Cd: <10 mg/kg
Cr: <80 mg/kg
Hg: <4 mg/kg
HM ID: 9 (White paint on drywall ceiling)

Men's Restroom

3175-P2A: <40 mg/kg
3175-P2B: <40 mg/kg
Cd: <10 mg/kg
Cr: <80 mg/kg
Hg: <4 mg/kg
HM ID: 7 (Lt. brown paint on drywall wall)

Mech. Room

3175-P3A: LCP 340 mg/kg
3175-P3B: LCP 360 mg/kg
Cd: <10 mg/kg
Cr: <80 mg/kg
Hg: 27 mg/kg
HM ID: 8 (Lt. brown paint on cement material wall)

Hallway

Break Room

Library

Conference Room

3175-P5A: LCP 1,200 mg/kg
3175-P5B: LCP 850 mg/kg
Cd: <10 mg/kg
Cr: 220 mg/kg
Hg: 4 mg/kg
HM ID: 19 (White paint on cement material wall)


3175-ARS1A: <40 mg/kg
3175-ARS1B: <41 mg/kg
HM ID: 17 (White and brown 2' x 1' acoustic tile with pinholes on concrete ceiling)

Legend and Notes

/// Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

Cd - Cadmium
Cr - Chromium
Hg - Mercury
HM ID - Hazardous Material Identifier
LCP - Lead-Containing Paint < 5,000 mg/kg
mg/kg - milligrams per kilogram (equivalent to ppm)



MNA Environmental

Sheet Number
C - 4

Heavy Metal Paint and Arsenic Sample and Hazardous Material Locations
Daniel K. Inouye International Airport
Administration Tower, Fifth Floor

APPENDIX D: PHOTOGRAPHS



HM ID: 1

Mechanical Room
White wrap with yellow insulation and beige coating on metal 6" pipe.

Non ACM



HM ID: 2

Mechanical Room
White coating and silver wrap with beige insulation and adhesive on metal 6" pipe elbow.

Non ACM



HM ID: 3

Mechanical Room
White wrap with yellow insulation on metal 2" pipe.

Non ACM



HM ID: 4

Mechanical Room
White wrap with yellow insulation on metal 2”
pipe connection.

Non ACM



HM ID: 5

Mechanical Room
White paint on concrete ceiling.

LCP 73 – 89 mg/kg
Mercury: 11 mg/kg



HM ID: 6

Mechanical Room
White textured paint and skim coat on concrete
ceiling.

Non ACM



HM ID: 7

Mechanical Room
Light brown paint on drywall wall.

Non LCP



HM ID: 8

Mechanical Room
Light brown paint on textured cement material walls.

LCP 340 – 360 mg/kg
Mercury: 27 mg/kg



HM ID: 9

Women's Restroom
White paint on drywall ceiling.

Non LCP

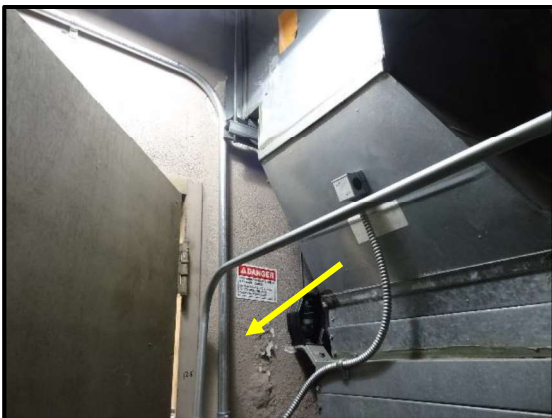


HM ID: 10

Mechanical Room

Light brown paint with white drywall on drywall wall.

Non ACM



HM ID: 11

Mechanical Room

Light brown textured paint and skim coat on cement material wall.

Non ACM



HM ID: 12

Mechanical Room

Green caulking on metal ducting.

Non ACM



HM ID: 13

Hallway
White with gouges 2' x 4' acoustic tiles on ceiling.

Non ACM



HM ID: 14

Plenum
Green thermal system insulation inside the ducting.

Non ACM



HM ID: 15

Plenum
Silver wrap with yellow insulation on flexible ducting.

Non ACM



HM ID: 16

Plenum
White and brown with pinholes 2' x 4' tiles on
concrete ceiling.

Non ACM



HM ID: 17

Plenum
White and brown with pinholes 2' x 4' tiles on
concrete ceiling.

Non Arsenic



HM ID: 18

Plenum
Dark brown glue on concrete ceiling.

Non ACM



HM ID: 19

Hallway

White paint on textured cement material wall.

LCP 850 – 1,200 mg/kg

Chromium: 220 mg/kg

Mercury: 4 mg/kg

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@lateesting.com

LA Testing Order: 322122554

Customer ID: 32MYOU50

Customer PO:

Project ID:

Attention: Kealohilani Serrao
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214

Fax:

Received Date: 12/10/2021 11:30 AM

Analysis Date: 12/13/2021 - 12/14/2021

Collected Date: 12/08/2021

Project: 3175_2 HNL Airport Admin Tower

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

| Sample | Description | Appearance | Non-Asbestos | | Asbestos |
|--|-------------|--|---|--------------------------|---------------|
| | | | % Fibrous | % Non-Fibrous | % Type |
| 3175-A1A-Wrap 322122554-0001 | 1 | White/Silver Fibrous Homogeneous | 50% Cellulose | 50% Non-fibrous (Other) | None Detected |
| 3175-A1A-Insulation 322122554-0001A | 1 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A1B-Wrap 322122554-0002 | 1 | White/Silver Fibrous Homogeneous | 50% Cellulose | 50% Non-fibrous (Other) | None Detected |
| 3175-A1B-Insulation 322122554-0002A | 1 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A1C-Coating 322122554-0003 | 1 | Beige Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A1C-Wrap 322122554-0003A | 1 | White/Silver Fibrous Homogeneous | 40% Cellulose 10% Synthetic 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A1C-Insulation 322122554-0003B | 1 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A2A-Coating 322122554-0004 | 2 | White Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A2A-Wrap 322122554-0004A | 2 | Silver/Beige Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A2A-Insulation 322122554-0004B | 2 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A2B-Adhesive 322122554-0005 | 2 | Yellow/Clear Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A2B-Wrap 322122554-0005A | 2 | White/Silver Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A2B-Insulation 322122554-0005B | 2 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A2C-Wrap 322122554-0006 | 2 | Silver/Beige Non-Fibrous Homogeneous | 40% Cellulose 10% Glass | 50% Non-fibrous (Other) | None Detected |
| 3175-A2C-Insulation 322122554-0006A | 2 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A3A-Wrap 322122554-0007 | 3 | White/Silver Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |

Initial report from: 12/14/2021 10:56:17



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: 322122554

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 | | Asbestos |
|--|-------------|--|----------------------------|--------------------------|---------------|
| | | | % Fibrous | % Non-Fibrous | % Type |
| 3175-A3A-Insulation 322122554-0007A | 3 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A3B-Wrap 322122554-0008 | 3 | White/Silver Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A3B-Insulation 322122554-0008A | 3 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A3C-Wrap 322122554-0009 | 3 | White/Silver Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A3C-Insulation 322122554-0009A | 3 | Yellow Non-Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A4A-Wrap 322122554-0010 | 4 | White/Silver Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A4A-Insulation 322122554-0010A | 4 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A4B-Wrap 322122554-0011 | 4 | White/Silver Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A4B-Insulation 322122554-0011A | 4 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A4C-Wrap 322122554-0012 | 4 | White/Silver Fibrous Homogeneous | 50% Cellulose 10% Glass | 40% Non-fibrous (Other) | None Detected |
| 3175-A4C-Insulation 322122554-0012A | 4 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A5A-Texture Paint 322122554-0013 | 6 | White Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A5A-Skim Coat 1 322122554-0013A | 6 | Beige Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A5A-Skim Coat 2 322122554-0013B | 6 | Gray Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A5B-Texture Paint 322122554-0014 | 6 | White Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A5B-Skim Coat 1 322122554-0014A | 6 | White Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A5B-Skim Coat 2 322122554-0014B | 6 | Gray Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A5C-Texture Paint 322122554-0015 | 6 | Beige Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A5C-Skim Coat 322122554-0015A | 6 | Gray Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |

Initial report from: 12/14/2021 10:56:17



LA Testing

520 Mission Street South Pasadena, CA 91030

Tel/Fax: (323) 254-9960 / (323) 254-9982

<http://www.LATesting.com> / pasadenalab@lateesting.com

LA Testing Order: 322122554

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 | | Asbestos |
|--|-------------|---|--------------------------------|--|---------------|
| | | | % Fibrous | % Non-Fibrous | % Type |
| 3175-A6A 322122554-0016 | 10 | Brown/White Fibrous Heterogeneous | 20% Cellulose | 80% Non-fibrous (Other) | None Detected |
| 3175-A6B 322122554-0017 | 10 | Brown/White Fibrous Heterogeneous | 20% Cellulose | 80% Non-fibrous (Other) | None Detected |
| 3175-A6C 322122554-0018 | 10 | Brown/White Fibrous Heterogeneous | 20% Cellulose | 80% Non-fibrous (Other) | None Detected |
| 3175-A9A-Texture Paint 322122554-0019 | 11 | Brown Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9A-Skim Coat 1 322122554-0019A | 11 | White Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9A-Skim Coat 2 322122554-0019B | 11 | Beige Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9B-Texture Paint 322122554-0020 | 11 | Brown Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9B-Skim Coat 1 322122554-0020A | 11 | White Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9B-Skim Coat 2 322122554-0020B | 11 | Beige Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9C-Texture Paint 322122554-0021 | 11 | Brown Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9C-Skim Coat 1 322122554-0021A | 11 | White Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A9C-Skim Coat 2 322122554-0021B | 11 | Beige Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A8A 322122554-0022 | 12 | Green Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A8B 322122554-0023 | 12 | Green Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A8C 322122554-0024 | 12 | Green Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A7A 322122554-0025 | 13 | White/Beige Fibrous Heterogeneous | 40% Cellulose 20% Min. Wool | 20% Perlite 20% Non-fibrous (Other) | None Detected |
| 3175-A7B 322122554-0026 | 13 | White/Beige Fibrous Heterogeneous | 40% Cellulose 20% Min. Wool | 20% Perlite 20% Non-fibrous (Other) | None Detected |
| 3175-A7C 322122554-0027 | 13 | Beige Fibrous Homogeneous | 45% Cellulose 15% Glass | 25% Perlite 15% Non-fibrous (Other) | None Detected |
| 3175-A10A 322122554-0028 | 14 | White/Black Fibrous Heterogeneous | 80% Glass | 20% Non-fibrous (Other) | None Detected |

Initial report from: 12/14/2021 10:56:17



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: 322122554

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 | | Asbestos |
|---|-------------|---|---------------|--------------------------|---------------|
| | | | % Fibrous | % Non-Fibrous | % Type |
| 3175-A10B <small>322122554-0029</small> | 14 | White/Black Fibrous Heterogeneous | 80% Glass | 20% Non-fibrous (Other) | None Detected |
| 3175-A10C <small>322122554-0030</small> | 14 | Green Non-Fibrous Homogeneous | 80% Glass | 20% Non-fibrous (Other) | None Detected |
| 3175-A11A-Wrap <small>322122554-0031</small> | 15 | Silver Fibrous Homogeneous | 10% Glass | 90% Non-fibrous (Other) | None Detected |
| 3175-A11A-Insulation <small>322122554-0031A</small> | 15 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A11B-Wrap <small>322122554-0032</small> | 15 | Silver Fibrous Homogeneous | 10% Glass | 90% Non-fibrous (Other) | None Detected |
| 3175-A11B-Insulation <small>322122554-0032A</small> | 15 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A11C-Wrap <small>322122554-0033</small> | 15 | Silver Fibrous Homogeneous | 10% Glass | 90% Non-fibrous (Other) | None Detected |
| 3175-A11C-Insulation <small>322122554-0033A</small> | 15 | Yellow Fibrous Homogeneous | 98% Glass | 2% Non-fibrous (Other) | None Detected |
| 3175-A12A <small>322122554-0034</small> | 16 | Brown/White Fibrous Heterogeneous | 90% Cellulose | 10% Non-fibrous (Other) | None Detected |
| 3175-A12B <small>322122554-0035</small> | 16 | Brown/White Fibrous Heterogeneous | 90% Cellulose | 10% Non-fibrous (Other) | None Detected |
| 3175-A12C <small>322122554-0036</small> | 16 | Brown/White Fibrous Homogeneous | 90% Cellulose | 10% Non-fibrous (Other) | None Detected |
| 3175-A13A-Ceiling Tile <small>322122554-0037</small> | 18 | Brown Fibrous Homogeneous | 98% Cellulose | 2% Non-fibrous (Other) | None Detected |
| 3175-A13A-Glue <small>322122554-0037A</small> | 18 | Brown Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A13B-Ceiling Tile <small>322122554-0038</small> | 18 | Brown Fibrous Homogeneous | 98% Cellulose | 2% Non-fibrous (Other) | None Detected |
| 3175-A13B-Glue <small>322122554-0038A</small> | 18 | Brown Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |
| 3175-A13C-Ceiling Tile <small>322122554-0039</small> | 18 | Brown Fibrous Homogeneous | 98% Cellulose | 2% Non-fibrous (Other) | None Detected |
| 3175-A13C-Glue <small>322122554-0039A</small> | 18 | Brown Non-Fibrous Homogeneous | | 100% Non-fibrous (Other) | None Detected |

Initial report from: 12/14/2021 10:56:17



LA Testing

520 Mission Street South Pasadena, CA 91030

Tel/Fax: (323) 254-9960 / (323) 254-9982

<http://www.LATesting.com> / pasadenalab@lateesting.com

LA Testing Order: 322122554

Customer ID: 32MYOU50

Customer PO:

Project ID:

Analyst(s)

Kieu-anh Pham Duong (48)

Yisely Sanchez (23)

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

LA Testing maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by LA Testing. LA Testing bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. 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 must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore LA Testing recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. 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: 12/14/2021 10:56:17



Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

322122554 #

LATesting
520 Mission Street

South Pasadena, CA 91030

PHONE: 1-800-303-0047

FAX: (323) 254-9982

| | | | |
|--|--------------------|--|---------------------------|
| Company Name : Myounghee Noh & Associates, LLC | | EMSL Customer ID: | |
| Street: 99-1046 Iwaena Street Suite 210A | | City: Aiea | State/Province: HI |
| Zip/Postal Code: 96701 | Country: US | Telephone #: 808-484-9214 | Fax #: |
| Report To (Name): Kealohilani Serrao | | Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email | |
| Email Address: kealohi@noh-associates.com | | Purchase Order: | |
| Project Name/Number: 3175_2 HNL Airport Admin Tower | | EMSL Project ID (Internal Use Only): | |
| U.S. State Samples Taken: HI | | CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt | |

EMSL-Bill to: Same Different - If Bill to is Different note instructions in Comments**
Third Party Billing requires written authorization from third party

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.

| | | |
|---|--|--|
| <p>PCM - Air <input type="checkbox"/> Check if samples are from NY</p> <p><input type="checkbox"/> NIOSH 7400</p> <p><input type="checkbox"/> w/ OSHA 8hr. TWA</p> <p>PLM - Bulk (reporting limit)</p> <p><input checked="" type="checkbox"/> PLM EPA 600/R-93/116 (<1%)</p> <p><input type="checkbox"/> PLM EPA NOB (<1%)</p> <p>Point Count</p> <p><input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%)</p> <p>Point Count w/Gravimetric</p> <p><input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%)</p> <p><input type="checkbox"/> NYS 198.1 (friable in NY)</p> <p><input type="checkbox"/> NYS 198.6 NOB (non-friable-NY)</p> <p><input type="checkbox"/> NYS 198.8 SOF-V</p> <p><input type="checkbox"/> NIOSH 9002 (<1%)</p> | <p>TEM - Air <input type="checkbox"/> 4-4.5hr TAT (AHERA only)</p> <p><input type="checkbox"/> AHERA 40 CFR, Part</p> <p><input type="checkbox"/> 763 NIOSH 7402</p> <p><input type="checkbox"/> EPA Level II</p> <p><input type="checkbox"/> ISO 10312</p> <p>TEM - Bulk</p> <p><input type="checkbox"/> TEM EPA NOB</p> <p><input type="checkbox"/> NYS NOB 198.4 (non-friable-NY)</p> <p><input type="checkbox"/> Chatfield SOP</p> <p><input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5</p> <p>TEM - Water: EPA 100.2</p> <p>Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking</p> <p>All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking</p> | <p>TEM- Dust</p> <p><input type="checkbox"/> Microvac - ASTM D 5755</p> <p><input type="checkbox"/> Wipe - ASTM D6480</p> <p><input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167)</p> <p>Soil/Rock/Vermiculite</p> <p><input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<1%)</p> <p><input type="checkbox"/> PLM EPA 600/R-93/116 with milling prep (<0.25%)</p> <p><input type="checkbox"/> TEM EPA 600/R-93/116 with milling prep (<0.1%)</p> <p><input type="checkbox"/> TEM Qualitative via Filtration Prep</p> <p><input type="checkbox"/> TEM Qualitative via Drop Mount Prep</p> <p><input type="checkbox"/> Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)</p> <p>Other:</p> <p><input type="checkbox"/></p> |
|---|--|--|

Check For Positive Stop - Clearly Identify Homogenous Group Filter Pore Size (Air Samples): 0.8µm 0.45µm

Samplers Name: Danny Falanug **Samplers Signature:**

| Sample # | Sample Description | Volume/Area (Air) HA # (Bulk) | Date/Time Sampled |
|-----------|------------------------|-------------------------------|-------------------|
| 3175-A1A | Please see field forms | Bulk | 12/08/21 10:00 |
| ↓ | ↓ | ↓ | ↓ |
| 3175-A13C | | | |

| | |
|---|--|
| Client Sample # (s): 3175-A1A - 3175-A13C | Total # of Samples: 39 |
| Relinquished (Client): Kealohi Serrao (Ch) | Date: 12/09/21 Time: 13:00 |
| Received (Lab): | Date: 12/09/21 Time: 11:30 |

Comments/Special Instructions:
Please see field forms

322122554 #

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project Number: 3175 2 **Location:** HNL Airport Administration Tower 5th Floor **Inspector Initials:** DF, KS **Survey Dates and Times:** 12-6-21 10:00

| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Friable ACM Type | Area Sq. ft or L. ft | Hatch Color | | | | | | | | | | | | | | | | | | | | |
|---|--------------|-----------------|--------------|----------------|----------------------|----------|-----------|-----------|--------------------|----------------------|-------------|-----------|--------------|-----------------|--------|-------|------------|------|---------------|-----|--|------------|--------|---|--|--|------------|--------|--|--|--|
| 1 | HNL-AT | 5 | Mech, Plenum | 6" pipes | white wrap w/ yellow | TSI | Metal | G F P | (Y) N (TSI) S M | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A A</td> <td>Mech</td> <td>6" pipe</td> <td>510</td> <td></td> </tr> <tr> <td>3175-A B</td> <td></td> <td>↓</td> <td></td> <td></td> </tr> <tr> <td>3175-A C</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-A A | Mech | 6" pipe | 510 | | 3175-A B | | ↓ | | | 3175-A C | | | | |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A A | Mech | 6" pipe | 510 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A B | | ↓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | HNL-AT | 5 | Mech, Plenum | 6" pipe elbows | white wrap w/ yellow | TSI | Metal | G F P | (Y) N (TSI) S M | | X | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 2 A</td> <td>Mech</td> <td>6" pipe elbow</td> <td>511</td> <td></td> </tr> <tr> <td>3175-A 2 B</td> <td></td> <td>↓</td> <td></td> <td></td> </tr> <tr> <td>3175-A 2 C</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-A 2 A | Mech | 6" pipe elbow | 511 | | 3175-A 2 B | | ↓ | | | 3175-A 2 C | | | | |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 2 A | Mech | 6" pipe elbow | 511 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 2 B | | ↓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 2 C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | HNL-AT | 5 | Mech, Plenum | 2" pipes | white wrap w/ yellow | TSI | Metal | G F P | (Y) N (TSI) S M | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 3 A</td> <td>Mech</td> <td>2" pipe</td> <td>518</td> <td></td> </tr> <tr> <td>3175-A 3 B</td> <td>Plenum</td> <td>↓</td> <td></td> <td></td> </tr> <tr> <td>3175-A 3 C</td> <td>Plenum</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-A 3 A | Mech | 2" pipe | 518 | | 3175-A 3 B | Plenum | ↓ | | | 3175-A 3 C | Plenum | | | |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 3 A | Mech | 2" pipe | 518 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 3 B | Plenum | ↓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 3 C | Plenum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

322122554 #

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project Number: 3175 2 **Location:** HNL Airport Administration Tower 5th Floor **Inspector Initials:** DF, KS **Survey Dates and Times:**

| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Friable ACM Type | Area Sq. Ft. or L. ft | Hatch Color | | | | | | | | | | | | | | | | |
|---|--------------|--------|--------------------------|---------------------------|----------------------|-------------------|-----------|-----------|--------------------|-----------------------|-------------|-----------|--------------|--------|-------|------------|------|-----|--------------------------|------------|--------|--|---|------------|--------|--|--|
| 4 | HNL-AT | 5 | Mech, plenum | 2" pipe elbows connection | white wrap w/ yellow | TSI | Metal | G(F)P | (Y) N (TSI) S M | 30 | X | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 4 A</td> <td>Mech</td> <td>518</td> <td>2" pipe elbow connection</td> </tr> <tr> <td>3175-A 4 B</td> <td>Plenum</td> <td></td> <td>↓</td> </tr> <tr> <td>3175-A 4 C</td> <td>Plenum</td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | PIC ID | Notes | 3175-A 4 A | Mech | 518 | 2" pipe elbow connection | 3175-A 4 B | Plenum | | ↓ | 3175-A 4 C | Plenum | | |
| Sample ID | Room Sampled | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 4 A | Mech | 518 | 2" pipe elbow connection | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 4 B | Plenum | | ↓ | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 4 C | Plenum | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | HNL-AT | 5 | Mech, Plenum | ceiling, wall | white | paint w/skim coat | CC | G(F)P | (Y) N (TSI) S M | 160 | /// | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 5 A</td> <td>Mech</td> <td>512</td> <td>ceiling</td> </tr> <tr> <td>3175-A 5 B</td> <td></td> <td></td> <td>↓</td> </tr> <tr> <td>3175-A 5 C</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | PIC ID | Notes | 3175-A 5 A | Mech | 512 | ceiling | 3175-A 5 B | | | ↓ | 3175-A 5 C | | | |
| Sample ID | Room Sampled | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 5 A | Mech | 512 | ceiling | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 5 B | | | ↓ | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 5 C | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | HNL-AT | 5 | Mech, | wall | Lt. Brown w/ white | DW | None | G(F)P | (Y) N (TSI) S M | 680 | /// | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 6 A</td> <td>Mech</td> <td>513</td> <td>wall</td> </tr> <tr> <td>3175-A 6 B</td> <td></td> <td></td> <td>↓</td> </tr> <tr> <td>3175-A 6 C</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | PIC ID | Notes | 3175-A 6 A | Mech | 513 | wall | 3175-A 6 B | | | ↓ | 3175-A 6 C | | | |
| Sample ID | Room Sampled | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 6 A | Mech | 513 | wall | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 6 B | | | ↓ | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 6 C | | | | | | | | | | | | | | | | | | | | | | | | | | | |

322122554 #

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project Number: 3175 2 Location: HNL Airport Administration Tower 5th Floor Inspector Initials: DF, KS Survey Dates and Times:

| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Friable ACM Type | Area Sq. ft or L. ft | Hatch Color | | | | | | | | | | | | | | | | | | | | |
|--|--------------|-----------------|--|--------------|----------------|-------------------|-----------|-----------|------------------|----------------------|-------------|-----------|--------------|-----------------|--------|-------|------------|---------|---------|-----|--|------------|------------|---------|--|--|------------|---------|---------|--|--|
| 11 | HNL-AT | 5 | Mech | walls | Lt. Brown | Paint w/skim coat | Cement | GFP | Y N TSI S M | 180 | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 9 A</td> <td>Mech</td> <td>wall</td> <td>514</td> <td></td> </tr> <tr> <td>3175-A 9 B</td> <td>↓</td> <td>↓</td> <td></td> <td></td> </tr> <tr> <td>3175-A 9 C</td> <td>↓</td> <td>↓</td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-A 9 A | Mech | wall | 514 | | 3175-A 9 B | ↓ | ↓ | | | 3175-A 9 C | ↓ | ↓ | | |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 9 A | Mech | wall | 514 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 9 B | ↓ | ↓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 9 C | ↓ | ↓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | HNL-AT | 5 | Mech, plenum | AHU, Ducting | of Gray Green | caulking | Metal | GFP | Y N TSI S M | 500 | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 8 A</td> <td>Mech</td> <td>AHU</td> <td>515</td> <td></td> </tr> <tr> <td>3175-A 8 B</td> <td>↓</td> <td>Ducting</td> <td></td> <td></td> </tr> <tr> <td>3175-A 8 C</td> <td>↓</td> <td>Ducting</td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-A 8 A | Mech | AHU | 515 | | 3175-A 8 B | ↓ | Ducting | | | 3175-A 8 C | ↓ | Ducting | | |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 8 A | Mech | AHU | 515 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 8 B | ↓ | Ducting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 8 C | ↓ | Ducting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | HNL-AT | 5 | Hallway, work area, break, library, conference | ceiling | white w/gauges | 2' x 2' ACT | NMC | GFP | Y N TSI S M | 4,300 | /// | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-A 7 A</td> <td>Hallway</td> <td>ceiling</td> <td>517</td> <td></td> </tr> <tr> <td>3175-A 7 B</td> <td>conference</td> <td>↓</td> <td></td> <td></td> </tr> <tr> <td>3175-A 7 C</td> <td>Library</td> <td>↓</td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-A 7 A | Hallway | ceiling | 517 | | 3175-A 7 B | conference | ↓ | | | 3175-A 7 C | Library | ↓ | | |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 7 A | Hallway | ceiling | 517 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 7 B | conference | ↓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-A 7 C | Library | ↓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

322122554 #

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project Number: 3175 2 Location: HNL Airport Administration Tower 5th Floor Inspector Initials: DF, KS Survey Dates and Times:

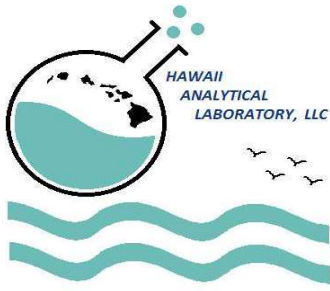
| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Friable ACM Type | Area Sq. Ft or L. ft | Hatch Color |
|---|-------------------------|------|--------------|------------------|---------------------------|--------------------|-----------|---|--|---|-------------|
| 14 | HNL-AT | 5 | Plenum, Mech | Ducting, AHU | Green | TSI | Metal | GFP | (Y) N (TSI) S M | 3,000 | |
| Notes: Interior of the Ducting and AHU. | | | | | | | | | | | |
| Sample ID | | | | | | | | | | | |
| Room Sampled | | | | | | | | | | | |
| 3175-A 10 A | Plenum Ducting | | | | | | | | | | |
| 3175-A 10 B | Plenum Ducting | | | | | | | | | | |
| 3175-A 10 C | Mech AHU | | | | | | | | | | |
| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition <td>Friable ACM Type <td>Area Sq. Ft or L. ft <td>Hatch Color</td> </td></td> | Friable ACM Type <td>Area Sq. Ft or L. ft <td>Hatch Color</td> </td> | Area Sq. Ft or L. ft <td>Hatch Color</td> | Hatch Color |
| 15 | HNL-AT | 5 | Plenum | Flexible Ducting | Silver wrap w/ yellow | TSI | None | GFP | (Y) N (TSI) S M | 300 | |
| Notes: | | | | | | | | | | | |
| Sample ID | | | | | | | | | | | |
| Room Sampled | | | | | | | | | | | |
| 3175-A 11 A | Plenum Flexible Ducting | | | | | | | | | | |
| 3175-A 11 B | ↓ | | | | | | | | | | |
| 3175-A 11 C | ↓ | | | | | | | | | | |
| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition <td>Friable ACM Type <td>Area Sq. Ft or L. ft <td>Hatch Color</td> </td></td> | Friable ACM Type <td>Area Sq. Ft or L. ft <td>Hatch Color</td> </td> | Area Sq. Ft or L. ft <td>Hatch Color</td> | Hatch Color |
| 16 | HNL-AT | 5 | Plenum | ceiling | White and brown w/pinkles | 2' x 1' AGES FILES | CC | GFP | (Y) N (TSI) S M | 2,000 | |
| Notes: | | | | | | | | | | | |
| Sample ID | | | | | | | | | | | |
| Room Sampled | | | | | | | | | | | |
| 3175-A 12 A | Plenum ceiling | | | | | | | | | | |
| 3175-A 12 B | ↓ | | | | | | | | | | |
| 3175-A 12 C | ↓ | | | | | | | | | | |

322122554 #

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project Number: 3175 2 Location: HNL Airport Administration Tower 5th Floor Inspector Initials: DF, KS Survey Dates and Times: 12/6/12 12/8

| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Friable ACM Type | Area Sq. ft or L. ft | Hatch Color |
|-------------|----------|------|--------------|-----------------|----------------|----------|-----------|-----------|-------------------------|----------------------|-------------|
| 18 | HNL-AT | 5 | plenum | ceiling | Dark Brown | Glue | CC | GFP | Y (N) TSI S (M) | 3,000 | /// |
| | | | Room Sampled | Sample Location | | PIC ID | | | Notes | | |
| 3175-A 17 A | | | plenum | ceiling | | 526 | | | 2'x1' ceiling tile glue | | |
| 3175-A 17 B | | | | | | | | | | | |
| 3175-A 17 C | | | | | | | | | | | |
| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Friable ACM Type | Area Sq. ft or L. ft | Hatch Color |
| | | | Room Sampled | Sample Location | | PIC ID | | | Notes | | |
| 3175-A A | | | | | | | | | | | |
| 3175-A B | | | | | | | | | | | |
| 3175-A C | | | | | | | | | | | |
| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Friable ACM Type | Area Sq. ft or L. ft | Hatch Color |
| | | | Room Sampled | Sample Location | | PIC ID | | | Notes | | |
| 3175-A A | | | | | | | | | | | |
| 3175-A B | | | | | | | | | | | |
| 3175-A C | | | | | | | | | | | |



Hawaii Analytical Laboratory ANALYTICAL REPORT

Wednesday, December 15, 2021

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

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

Lab Job No: 202111450
Date Submitted: 12/10/2021
Your Project: 3175_2, HNL Airport Admin Tower, 12/8/21

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

| Sample No. | Your Sample ID / Description | Results | Units | Date Analyzed |
|------------|------------------------------|---------|-------|---------------|
| 202174486 | 3175-P1A | 73 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174487 | 3175-P1B | 89 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174488 | 3175-P2A | < 40 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174489 | 3175-P2B | < 40 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174490 | 3175-P3A | 340 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174491 | 3175-P3B | 360 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174492 | 3175-P4A | < 40 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174493 | 3175-P4B | < 40 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174494 | 3175-P5A | 1200 | mg/kg | 12/14/2021 |
| Comments | | | | |

Hawaii Analytical Laboratory (101812) is accredited by the AIHA LAP, LLC in the EMLAP, IHLAP, and ELLAP programs for the scope of work listed on www.aihaaccreditedlabs.org, in accordance with the recognized ISO/ IEC 17025:2005. AIHA is a NLLAP recognized accrediting body. Controlled doc.: Lead Report, rev. 3 - 20181015

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

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

Lab Job No: 202111450
Date Submitted: 12/10/2021
Your Project: 3175_2, HNL Airport Admin Tower, 12/8/21

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

| Sample No. | Your Sample ID / Description | Results | Units | Date Analyzed |
|------------|------------------------------|---------|-------|---------------|
| 202174495 | 3175-P5B | 850 | mg/kg | 12/14/2021 |
| Comments | | | | |

Total Recoverable Cadmium

EPA Method: 3051m / 7000Bm

| Sample No. | Your Sample ID / Description | Results | Units | Date Analyzed |
|------------|------------------------------|---------|-------|---------------|
| 202174486 | 3175-P1A | < 10 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174488 | 3175-P2A | < 10 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174490 | 3175-P3A | < 10 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174492 | 3175-P4A | < 10 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174494 | 3175-P5A | < 10 | mg/kg | 12/14/2021 |
| Comments | | | | |

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

Lab Job No: 202111450
Date Submitted: 12/10/2021
Your Project: 3175_2, HNL Airport Admin Tower, 12/8/21

Total Recoverable Chromium

EPA Method: 3051m / 7000Bm

| Sample No. | Your Sample ID / Description | Results | Units | Date Analyzed |
|------------|------------------------------|---------|-------|---------------|
| 202174486 | 3175-P1A | < 80 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174488 | 3175-P2A | < 80 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174490 | 3175-P3A | < 80 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174492 | 3175-P4A | < 80 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174494 | 3175-P5A | 220 | mg/kg | 12/14/2021 |
| Comments | | | | |

Total Recoverable Mercury (Manual Cold-Vapor Technique)

EPA Method: 3051m / 7471Bm

| Sample No. | Your Sample ID / Description | Results | Units | Date Analyzed |
|------------|------------------------------|---------|-------|---------------|
| 202174486 | 3175-P1A | 11 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174488 | 3175-P2A | < 4 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174490 | 3175-P3A | 27 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174492 | 3175-P4A | < 4 | mg/kg | 12/14/2021 |
| Comments | | | | |
| 202174494 | 3175-P5A | 4 | mg/kg | 12/14/2021 |
| Comments | | | | |

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

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

Lab Job No: 202111450
Date Submitted: 12/10/2021
Your Project: 3175_2, HNL Airport Admin Tower, 12/8/21

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 proficiency. 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.



Anne Antin
Quality Control Manager

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Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

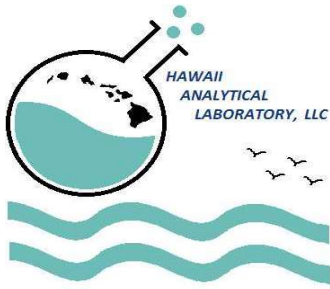
Project Number: 3175 2 **Location:** HNL Airport Administration Tower 5th Floor **Inspector Initials:** DF, KS **Survey Dates and Times:** 12-6-21 10:00

| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Area (Sq. Ft. or L. ft) | Hatch Color | | | | | | | | | | | | | | | |
|---|-----------------------------------|-----------------|--------------|---------------|----------------|----------|-----------|-----------|-------------------------|-------------|-----------|--------------|-----------------|--------|-------|------------|------|---------|-----|-----------|------------|---|---|--|-----------|
| 5 | HNL Administration Tower (HNL-AT) | 5 | Mech, Plenum | ceiling, wall | white | paint | cc | GFP | 160 | /// | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-P 1 A</td> <td>Mech</td> <td>ceiling</td> <td>512</td> <td>202174486</td> </tr> <tr> <td>3175-P 1 B</td> <td>↓</td> <td>↓</td> <td></td> <td>202174487</td> </tr> </tbody> </table> | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-P 1 A | Mech | ceiling | 512 | 202174486 | 3175-P 1 B | ↓ | ↓ | | 202174487 |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 1 A | Mech | ceiling | 512 | 202174486 | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 1 B | ↓ | ↓ | | 202174487 | | | | | | | | | | | | | | | | | | | | | |
| 7 | HNL-AT | 5 | Mech | wall | lt. brown | paint | DW | GFP | 80 | --- | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-P 2 A</td> <td>Mech</td> <td>wall</td> <td>513</td> <td>202174488</td> </tr> <tr> <td>3175-P 2 B</td> <td>↓</td> <td>↓</td> <td></td> <td>202174489</td> </tr> </tbody> </table> | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-P 2 A | Mech | wall | 513 | 202174488 | 3175-P 2 B | ↓ | ↓ | | 202174489 |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 2 A | Mech | wall | 513 | 202174488 | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 2 B | ↓ | ↓ | | 202174489 | | | | | | | | | | | | | | | | | | | | | |
| 8 | HNL-AT | 5 | Mech | walls | lt. brown | paint | cement | GFP | 180 | --- | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-P 3 A</td> <td>Mech</td> <td>wall</td> <td>514</td> <td>202174490</td> </tr> <tr> <td>3175-P 3 B</td> <td>↓</td> <td>↓</td> <td></td> <td>202174491</td> </tr> </tbody> </table> | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-P 3 A | Mech | wall | 514 | 202174490 | 3175-P 3 B | ↓ | ↓ | | 202174491 |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 3 A | Mech | wall | 514 | 202174490 | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 3 B | ↓ | ↓ | | 202174491 | | | | | | | | | | | | | | | | | | | | | |

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project Number: 3175 2 **Location:** HNL Airport Administration Tower 5th Floor **Inspector Initials:** DF, KS **Survey Dates and Times:** 12/6, 12/8

| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Area Sq. ft or L. ft | Hatch Color | | | | | | | | | | | | | | | |
|--|--------------|-----------------|--|----------------|----------------|----------|-----------|-----------|----------------------|-------------|-----------|--------------|-----------------|--------|-------|------------|---------|------|-----|-----------|------------|----|---------|--|-----------|
| 9 | HNL-AT | 5 | WR, Hallway, MRR, Break Library, work area, Plenum, conference | walls, ceiling | white | DW | NONE | GFP | 600 | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-P 4 A</td> <td>Hallway</td> <td>wall</td> <td>516</td> <td>202174492</td> </tr> <tr> <td>3175-P 4 B</td> <td>WR</td> <td>ceiling</td> <td></td> <td>202174493</td> </tr> </tbody> </table> | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-P 4 A | Hallway | wall | 516 | 202174492 | 3175-P 4 B | WR | ceiling | | 202174493 |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 4 A | Hallway | wall | 516 | 202174492 | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 4 B | WR | ceiling | | 202174493 | | | | | | | | | | | | | | | | | | | | | |
| 19 | HNL-AT | 5 | Hallway, plenum | walls | white | paint | cement | GFP | 100 | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Sample ID</th> <th>Room Sampled</th> <th>Sample Location</th> <th>PIC ID</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>3175-P 5 A</td> <td>Hallway</td> <td>wall</td> <td>530</td> <td>202174494</td> </tr> <tr> <td>3175-P 5 B</td> <td></td> <td>↓</td> <td></td> <td>202174495</td> </tr> </tbody> </table> | | | | | | | | | | | Sample ID | Room Sampled | Sample Location | PIC ID | Notes | 3175-P 5 A | Hallway | wall | 530 | 202174494 | 3175-P 5 B | | ↓ | | 202174495 |
| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 5 A | Hallway | wall | 530 | 202174494 | | | | | | | | | | | | | | | | | | | | | |
| 3175-P 5 B | | ↓ | | 202174495 | | | | | | | | | | | | | | | | | | | | | |
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| Sample ID | Room Sampled | Sample Location | PIC ID | Notes | | | | | | | | | | | | | | | | | | | | | |
| 3175-P A | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3175-P B | | | | | | | | | | | | | | | | | | | | | | | | | |



Hawaii Analytical Laboratory ANALYTICAL REPORT

Wednesday, December 15, 2021

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

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

Lab Job No: 202111451
Date Submitted: 12/10/2021
Project Name: 3175_2, HNL Airport Admin Tower, 12/8/21

Total Recoverable Arsenic (FAAS)

EPA Method: 3051m / 7000Bm

| Sample No. | Sample ID / Description | Results | Units | Date Analyzed |
|------------|-------------------------|---------|-------|---------------|
| 202174496 | 3175-Ars1 | < 40 | mg/kg | 12/14/2021 |
| Comments: | | | | |
| 202174497 | 3175-Ars2 | < 41 | mg/kg | 12/14/2021 |
| 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 proficiency. 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.

Anne Antin
Quality Control Manager

Hawaii Analytical Laboratory (101812) is accredited by the AIHA LAP, LLC in the EMLAP, IHLAP, and ELLAP programs for the scope of work listed on www.aihaaccreditedlabs.org, in accordance with the recognized ISO/ IEC 17025:2005 and participates in the CAPT proficiency testing program. Controlled doc.: Analytical Report, rev. 2 - 20160829

Hazardous Homogeneous Materials and Sampling Survey Field Form: Arsenic Bulk

Project Number: 3175 2 **Location:** HNL Airport Administration Tower 5th Floor **Inspector Initials:** DF, KS **Survey Dates and Times:** 12-6-21 10:00

| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition | Area Sq. ft or L. ft | Hatch Color |
|--------------|-----------|------|--------------|-----------------|-------------------------|---------------|-----------|--|----------------------|-------------|
| 17 | HNL-AT 5 | | PleNUM | ceiling | white & Brown w/pinhole | 2' x 1' Tiles | CC | GFP | 2,000 | |
| | Sample ID | | Room Sampled | Sample Location | | PIC ID | | | | Notes |
| 3175-Ars A | | | PleNUM | ceiling | | | | | | |
| 3175-Ars B | | | | | | | | | | |
| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition <td>Area Sq. ft or L. ft</td> <td>Hatch Color</td> | Area Sq. ft or L. ft | Hatch Color |
| | | | | | | | | GFP | | |
| | Sample ID | | Room Sampled | Sample Location | | PIC ID | | | | Notes |
| 3175-Ars A | | | | | | | | | | |
| 3175-Ars B | | | | | | | | | | |
| HM ID | Building | Flr. | Rooms | Locations | Material Color | Material | Substrate | Condition <td>Area Sq. ft or L. ft</td> <td>Hatch Color</td> | Area Sq. ft or L. ft | Hatch Color |
| | | | | | | | | GFP | | |
| | Sample ID | | Room Sampled | Sample Location | | PIC ID | | | | Notes |
| 3175-Ars A | | | | | | | | | | |
| 3175-Ars B | | | | | | | | | | |

DIVISION 2 – SITEWORK

SECTION 02410 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.

1.03 DESCRIPTION OF WORK

- A. Extent of selective demolition work is indicated on the drawings. Selective demolition work includes, but is not limited to, selective demolition, removal, and subsequent disposal of all materials indicated or required to be removed.
- B. It shall be the responsibility of the Contractor to examine the project site and determine for himself the existing conditions.
- C. Execute all work in an orderly and careful manner with due consideration for all items of work to remain.
- D. Obvious conditions which exist on the site shall be accepted as part of the work, even though they may not be clearly indicated on the Drawings and/or described herein, or may vary therefrom.
- E. All debris of any kind accumulated from the work of this section shall be disposed off the site.
- F. Protect all existing conditions surrounding the work area, including, but not limited to, walkways, parking, landscaping, etc. at all times from damage.
- G. Any damage as a result of demolition work and any neglect to provide protection shall be fixed new at Contractor's own expense.
- H. Demolish and remove materials as indicated on the drawings and as required to perform work under this project.

- I. Carefully remove, salvage, and label existing items and store at project site at location as approved by the Engineer for re-installation in new work as indicated.
- J. Permits, Notice, Etc.:
 - 1. The Contractor shall procure and pay for all necessary permits or certificates that may be required in connection with this work.
 - 2. The Contractor shall serve proper notice and consult with the Engineer regarding any temporary disconnections of electrical or other utility lines in the area which may interfere with the removal work, and all such lines where necessary shall be properly disconnected or relocated before commencing with the work.
 - 3. Submit, where required, a State Department of Health Clean Air Branch, "Asbestos Notification of Demolition & Renovation" form.

1.04 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to State ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.05 SUBMITTALS

- A. Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work for review prior to commencement of work. Include coordination for temporary shut-off and continuation of utility services as required, together with details for dust and noise control protection.

1.06 FIELD CONDITIONS

- A. State will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so the State's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by the State as far as practical.

- C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Presence of hazardous materials (lead containing paint) have been found and/or are anticipated to be within the building, in materials that are part of, and adjacent to the subject work in this construction contract. A report on the presence of asbestos containing materials is included in SECTION 01715 EXISTING CONDITIONS – ASBESTOS / LEAD / HAZARDOUS MATERIAL SURVEY. Examine the report to become aware of locations where hazardous materials are present.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify the Engineer.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- F. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor, may be removed from structure as work progresses. Transport salvaged items from site as they are removed. Storage or sale of removed items on site will not be permitted.
- G. Explosives: Use of explosives will not be permitted.
- H. Noise and Dust shall be kept within acceptable levels at all times including non-working hours, weekends and holidays, in conformance with requirements of other sections of this specification.
- I. Other Conditions:
 - 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. Wastewater shall not be discharged into existing streams, waterways, or drainage systems such as gutter and catch basins unless treated to comply with Department of Health pollution regulations.
 - 2. Trucks hauling materials shall be covered as required by PUC regulation. Trucks hauling fine materials shall be covered.
- J. Existing Conditions: The Contractor shall be responsible for protection of existing conditions for the entire duration of the project. Damage to the existing conditions as a result of the work of this section shall be corrected at Contractor's own expense.

1.07 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.
- C. Survey of Existing Conditions: Prior to commencement of selective demolition work, inspect areas in which work will be performed. Inventory existing conditions of structure surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; photograph, video or otherwise document and file with the Engineer prior to starting work.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. The existence of exposed and concealed utility lines other than those shown on the drawings is not definitely known. Should any other utility lines be encountered, the Contractor shall immediately notify the Engineer and follow their direction as to procedure. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations. Do not interrupt existing utilities serving occupied building or facilities, except when authorized in writing by the Engineer. Outages and interruptions must be

accepted in advance by the Engineer. Submit written notice of outages and interruptions not less than fourteen days in advance of intended outage. Report damage, however slight, immediately. Do not repair or reconstruct any pipe, conduit, or installation without authorization, except perform emergency repairs immediately.

- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. The State will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - c. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - d. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.03 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Erect temporary barricades as required, to prevent people from entering into project area to the extent as accepted by the Engineer. The extent of barricade

may be adjusted as necessary with the acceptance of the Engineer. This work shall be accomplished at Contractor's own expense.

2. When necessary, the Contractor shall provide, erect and maintain lights, barriers, etc., as required by traffic and safety regulations with special attention to protection of life.
 3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or elements to be removed, and adjacent facilities or work to remain.
 4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 5. Life safety procedures and provisions shall be in conformance with all applicable Federal, State, and City and County regulations, including OSHA.
 6. Remove protections at completion of work.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- D. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.

3.04 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
1. Arrange with utility companies to shut off indicated utilities if required.

3.05 SELECTIVE DEMOLITION, GENERAL

- A. A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 4. Dispose of demolished items and materials promptly.
 5. If suspected hazardous materials are encountered, do not disturb; immediately notify the Engineer.
- B. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- D. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to the Engineer in written, accurate detail. Pending receipt of directive from the Engineer rearrange selective demolition schedule as necessary to continue overall job progress without delay.
- E. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from the Engineer. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations, as directed by the Engineer.
- F. Temporary buildings and facilities which are not of permanent construction but are extensively used or are essential for public use for a period of time shall be provided with safe pedestrian passageways around the construction site as per 2010 ADA Standards, Section 201.3.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain the State's property, remove demolished materials from Project site.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off State's property and legally dispose of them.

3.07 CLEANING

- A. Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.
- C. Where exposed existing surfaces and/or materials are damaged or left unfinished by the removal work, the resultant exposed unfinished surfaces shall be repaired, patched, filled or finished to match the adjoining existing surfaces. Where the method of repair work is not indicated or specified, the Contractor shall perform the repair work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The General Provisions of the contract, including the General Provisions for Construction Projects (2016) and Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section. Special attention is directed to the Proposal Schedule.

1.02 SUMMARY

- A. Section Includes:

1. Urethane joint sealants.
2. Mildew-resistant joint sealants.
3. Latex joint sealants.
4. Acoustical sealants.

- B. Provide all sealants to completely close all joints indicated on the drawings or specified to be sealed to a watertight condition, including the following:

1. Interior joints.
2. Silicone sealant.
3. Acoustical sealant.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.04 SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
 1. Joint-sealant application, joint location, and designation.

2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

D. Sample warranties.

1.05 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. **Source Limitations:** Obtain each type of joint sealant through one source from a single manufacturer.

1.06 PRECONSTRUCTION TESTING

- A. **Preconstruction Laboratory Testing:** Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 1. **Adhesion Testing:** Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 2. **Compatibility Testing:** Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 3. **Stain Testing:** Use ASTM C 1248 to determine stain potential of sealant when in contact with concrete and masonry substrates.
- B. **Preconstruction Field-Adhesion Testing:** Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.07 WARRANTY

- A. **Special Installer's Warranty:** Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period. The warranty shall provide for the repair of all leaks as well as repair and replacement of sealant and damage to the building and/or its finishes at no cost to the State.
 1. **Warranty Period:** Two years from date of Final Acceptance.

- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

- 1. Warranty Period: Five years from date of Final Acceptance.

1.08 PRODUCT 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: Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high temperatures, contaminants, or other causes.

1.09 PROJECT CONDITIONS

- A. Inspection: Examine joint surfaces and backing, and their anchorage to the structure, and conditions under which joint sealer work is to be performed, and notify Contractor in writing of conditions detrimental to proper completion of the work and performance of sealers. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.

PART 2 - PRODUCTS

2.01 JOINT SEALANTS, GENERAL

- A. Colors of Exposed Joint Sealants: As selected by Engineer from manufacturer's full range.

2.02 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
- B. Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 25, Uses T and NT.

2.03 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

2.04 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.05 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant for Exposed and Concealed Joints: ASTM C 834, nonsag, paintable, nonstaining latex sealant. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.06 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.07 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.02 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.03 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.04 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of unit masonry and concrete walls, and partitions.
 - d. Joints on underside of plant-precast structural concrete planks.

- e. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Engineer from manufacturer's full range of colors.
 - B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
 1. Joint Locations:
 - a. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - b. Other joints as indicated on Drawings.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As selected by Engineer from manufacturer's full range of colors.
 - C. D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Engineer from manufacturer's full range of colors.
 - D. Provide Acoustical Joint Sealants where indicated in the Drawings.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 09290 - GYPSUM BOARD

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes gypsum board assemblies.

1.03 SYSTEM DESCRIPTION

- A. L/240 maximum deflection where supporting light weight finishes similar to paint and wallpaper, with 5 psf lateral load.
- B. L/360 maximum deflection where supporting heavy finishes similar to tile and stone, with 5 psf lateral load.

1.04 QUALITY ASSURANCE

- A. Install solid framing at all panel edges, ensure supporting framing is adequate to prevent telegraphing of imperfections, sagging and is adequate to support suspended items.

PART 2 - PRODUCTS

2.01 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C1396/C1396M
 - 1. Thickness: 5/8 inch
 - 2. Width: 48 inches
 - 3. Length: Use longest length available to avoid joints
 - 4. Edges: Tapered

2.02 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.

1. Material: Plastic.
2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.03 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Interior Gypsum Wallboard: Paper.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.04 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.03 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.04 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Engineer for visual effect.
- C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where indicated.
4. U-Bead: Use at exposed panel edges.

3.05 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

3.06 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the price bid for the various items of work in this project.

END OF SECTION

SECTION 09513 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including the General Provisions for Construction Projects (2016) and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.03 SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim and perimeter molding: Set of 6-inch- long Samples of each type, finish, and color.
 - 3. Clips: Full-size hold-down and seismic clips.
- D. Delegated-Design Submittal: For seismic restraints for ceiling systems.
 - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.

2. Structural members to which suspension systems will be attached.
 3. Method of attaching hangers to building structure.
 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 5. Size and location of initial access modules for acoustical panels.
 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Cameras.
 - e. Sprinklers.
 - f. Perimeter moldings.
 7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
 8. Minimum Drawing Scale: 1/8 inch = 1 foot.
- F. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
- G. Maintenance Data: For finishes to include in maintenance manuals.

1.04 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Airport Baseyard or location determined by Engineer.
1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 2. Suspension-System Components and perimeter molding: Quantity of each exposed component equal to 2 percent of quantity installed.
 3. Hold-Down Clips: Equal to 2 percent of quantity installed.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, perimeter molding and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.06 QUALITY ASSURANCE

- A. Provide acoustical panel units and grid components by a single manufacturer.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system and perimeter molding from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design seismic restraints for ceiling systems.
- B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- C. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E1264.
 - 2. Smoke-Developed Index: 450 or less.

2.03 ACOUSTICAL PANELS

- A. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- B. Classification: Provide panels as follows:
 - 1. Type and Form: Stone wool (Mineral wool) panels with factory applied latex paint on glass scrim surface.
 - 2. Pattern: E (lightly textured).
- C. Color: White.
- D. Light Reflectance (LR): Not less than 0.85.
- E. Articulation Class (AC): 170
- F. Ceiling Attenuation Class (CAC): Not less than 20.
- G. Noise Reduction Coefficient (NRC): Not less than 0.75.
- H. Edge/Joint Detail: Square.
- I. Modular Size: 24" x 24" x 5/8".

2.04 METAL SUSPENSION SYSTEM

- A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
- B. Wide-Face, Capped, Double-Web, Hot-Dip Galvanized, G30, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; hot-dip galvanized, G30 coating designation; with prefinished, 15/16-inch-wide aluminum caps on flanges.
 - 1. Structural Classification: Heavy-duty system.
 - 2. Face Design: Flat, flush.
 - 3. Cap Finish: Painted to match color of acoustical unit.

2.05 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Stainless-Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- F. Hold-Down Clips: Manufacturer's standard hold-down.
- G. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.
- H. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- I. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

2.06 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.07 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 07920 " Joint Sealants."

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.03 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 7. Do not attach hangers to steel deck tabs.
 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
 - 1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 - 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 - 3. Install hold-down and seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
 - a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.

3.04 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.05 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 13282 - LEAD PAINT CONTROL MEASURES

PART 1 - GENERAL

1.01 SUMMARY

A. 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 lead paints.

B. Lead-containing paints were identified in the HNL Airport Administration Tower 5th Floor Project, at the Daniel K International Airport, Island of Oahu, as follows:

White paint on concrete ceilings and walls, in the Mechanical Room and Plenum, 73-89 milligrams per kilogram (mg/kg)

Light brown paint on textured cement material in the Mechanical Room, 340-360 mg/kg.

White paint on textured cement material in the Hallway and Plenum, 850-1,200 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 LCP 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.

C. Implement appropriate engineering controls and safety measures to prevent site workers, other trades, public, and environmental exposures to lead hazards.

D. Inform employees, subcontractors, and other persons conducting work for this project, that electrical components in the project area 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.

E. 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 (HIOSHA) 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.

- F. Initiate and maintain safety precautions and programs necessary to keep the work place safe for employees and subcontractors.
- G. 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 Contracting Officer.
- H. 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.

1.02 COORDINATION WITH OTHER SECTIONS

Contractor shall refer to SECTION 13289 – LEAD TESTING AND MONITORING for requirements of work when disturbing hazardous materials.

1.03 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).

- A. Testing shall be conducted by an industrial hygienist, at the Contractor's expense.
- B. Test results shall be presented to the Contracting Officer for evaluation. Contractor's work practices, air monitoring and clearance requirements may be modified in accordance with paint test results.

1.04 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTAL PROCEDURES.
- B. 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. Site Supervisor and/or Competent Person's name, contact number, and certifications
 4. Written Emergency Procedures Plan
 5. Hazardous waste disposal plan
- C. Within 10 days of waste disposal, Contractor shall submit the following, as applicable:
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

2.01 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.

2.02 TOOLS AND EQUIPMENT

HEPA Vacuuming Equipment: Vacuuming equipment utilizing High Efficiency Particulate Air (HEPA) filters.

PART 3 - EXECUTION

3.01 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 the Contracting Officer 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 State.

- 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, as applicable.
 - 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.

3.02 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.
- 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 debris generated by the Contractor must conform to the requirements 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.

3.03 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 the Contracting Officer, conduct clean-up, and implement enhanced engineering controls immediately at no additional cost to the State.
- 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.

3.04 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 ($\mu\text{g}/\text{m}^3$) 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. 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. Respiratory protection may be used whenever there is any possibility of LCP disturbance, intentional or accidental.
 - 4. Respirators may be worn by anyone in a lead control area any time 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 or When Personnel Has Lost or Gained 20 or More Pounds: 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.

3.05 STOP ACTION LEVELS

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.

- A. If the lead dust levels rise above this figure for any sample taken, enhance work procedures to lower ambient dust levels.
- B. 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 the Contracting Officer. 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.

3.06 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 µg/m ³ |
| Powered-air purifying respirator (PAPR): Negative pressure respirator HEPA filter Full facepiece | Up to 2,500 µg/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 µg/m ³ |

3.07 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.

3.08 TOOLS

Filters on vacuums and exhaust equipment shall be absolute HEPA filters and UL 586 labeled.

3.09 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 State will conduct area air sampling daily, on each shift, as applicable.
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 ($\mu\text{g}/\text{m}^3$) | 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. Respiratory protection may be worn in affected area until the area is visually cleared.
- D. If the high reading was the result of other causes, initiate corrective action as determined by the IH or Competent Person.
- E. Effect on Contract Sum. Complete corrective work with no change in the Contract Sum if lead-containing dust levels exceeding $30 \mu\text{g}/\text{m}^3$ 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. Contracting Officer 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. The project area shall be visually inspected 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 Contracting Officer'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 State.

3.14 CLEARANCE

Visual Clearance

- A. Pre-demolition inspection shall be conducted after painted surface treatment. Visual clearance inspection shall ensure that the subsequent work will generate no visible emissions.
- B. Final visual inspection shall be conducted 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 Contracting Officer for EPA ID number.
- B. Contracting Officer 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 Contracting Officer 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 the Contracting Officer. 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 Contracting Officer. 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:

DAGS 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 13289 – LEAD TESTING AND MONITORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section describes Contractor's responsibility for compliance while conducting work which disturbs lead-containing paint (LCP) for the HNL Airport Administration Tower 5th Floor Project at the Daniel K International Airport, Island of Oahu. Related sections are:
 - 1. SECTION 01715 – EXISTING CONDITIONS – ASBESTOS/LEAD/HAZARDOUS MATERIAL SURVEY for general requirements and the hazardous material survey.
 - 2. SECTION 13282 – LEAD PAINT CONTROL MEASURES for requirements of work which disturbs lead-containing paint.
- B. Implement appropriate engineering controls and safety measures to prevent site workers, 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 State, will conduct the monitoring during the Contractor's work which disturbs LCP, as applicable. IH firm shall have no affiliation with Abatement Contractor.

1.03 GENERAL REQUIREMENTS

- A. Testing and workers' breathing zone monitoring shall be conducted by the Contractor for the purpose of:
- B. Verifying compliance with the applicable codes, regulations and laws regarding LCP abatement.
- C. Ensuring that the legally-required documentation is collected in a timely manner.
- D. Providing engineering controls during project.

1.04 TESTING/ AIR MONITORING/ INDUSTRIAL HYGIENE SUPERVISION AND AIR MONITORING

- A. If required, industrial hygiene supervision and boundary air monitoring shall be performed by an independent IH firm retained by the State. The laboratory used for sample analysis shall be proficient in:
 - 1. The National Lead Laboratory Accreditation Program (NLLAP) for lead analysis.
 - 2. The Environmental Lead Laboratory Accreditation Program (ELLAP), for lead analysis.
- B. Air monitoring and project supervision may 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 asbestos abatement and/or the relevant 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.

1.05 COORDINATION

- A. Coordinate with the Consultant/Project Monitor for the testing and monitoring requirements included in Section 13282 – LEAD PAINT CONTROL MEASURES for testing/air monitoring Project Monitor and all applicable Federal, State, and local regulations.

1.06 PRE-CONSTRUCTION CONFERENCE

- A. Hold conference prior to construction and shall be conducted by the Contracting Officer assisted by the Project Designer.
 - 1. Attendance: Present also shall be the Contractor, Project Designer and or the Project Monitor and Building Representative(s). When the abatement Contractor is a sub-contractor to a General Contractor, a representative of the General Contractor shall also attend.
 - 2. Agenda:
 - a. Review final schedule for project.
 - b. Verify legal requirements and special conditions.
 - c. Verify compliance with pre-construction requirements.

- d. Obtain copies of all mandatory notifications.
- e. Inspect sample respiratory equipment and other abatement equipment.
- f. Review procedures and responsibilities.
- g. Clarify the scope of work and its best impact on the users of the building.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 COMPETENT PERSON RESPONSIBILITIES

- A. Contractor's Competent Person shall prepare a Lead Hazard Control Plan per Section 13282 Paragraph 1.06 A. 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 the Contracting Officer, obtain EPA ID number, and request equitable adjustment to the contract.
- C. Refer to Sections 13282 and part 3.03, below, for additional responsibilities.

3.02 CONTRACTOR RESPONSIBILITIES

- A. Submit complete work plans for review and concurrence by the Contracting Officer. Refer to Section 13282 for requirements of the work plan.
- B. Contractor shall be responsible for providing the daily personal air monitoring and necessary records for all of the Contractor's employees for the duration of the project as required by OSHA (29 CFR 1926.62) and all other applicable laws.
- C. Contractor shall obtain the OSHA required reports for personnel air monitoring as part of the contract.
- D. Contractor shall be responsible for daily personal air samples that shall be collected on at least 25% of the Contractor's personnel performing removal work on similar tasks and for the duration of the project. Submit within 5 working days to the Contracting Officer.
- E. Contractor is solely responsible for protecting their workers, other personnel, and the public from any work activities at the work site and property regardless of potential testing and monitoring conducted by the IH.

- F. 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.
- G. Accommodate additional testing performed by the IH; however, this shall not remove Contractor's responsibility of monitoring required by law and contract specifications.
- H. 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., and as applicable, until successful clearance is obtained.
- I. Lead Clearance by Visual Inspection
 - 1. The project area shall be visually inspected to ensure no LCP debris or waste remain.
 - 2. No visible emissions of lead paint debris or dust.

3.03 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 the Contracting Officer within 10 days of completion. 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 Contracting Officer
5. Ensure workers are trained, engineering controls in place, and proper respiratory protection is utilized by personnel within control areas
6. Relay to the Contracting Officer any discrepancies in Contractor's action with provisions of project specifications

3.04 TESTING/AIR MONITORING

- A. IH retained by the State 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 the Contracting Officer with test results, interpretations, follow-up actions, and final resolutions.

3.05 SAMPLE DESIGN

- A. The following is a typical sampling design per control area during the construction, when LCP is disturbed. Number of sample quantities and volume may vary.
- B. 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 $\mu\text{g}/\text{m}^3$ 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.
- C. Barrier Samples: As applicable, two samples may be taken per barrier.
- D. Environmental Samples: Each removal area shall be controlled so that airborne dust cannot escape into trade, staff, and public access areas. Per the IH's discretion, high volume or low volume samples per controlled area will be taken.

3.06 MEASUREMENT AND PAYMENT

- A. 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.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15010 - GENERAL MECHANICAL PROVISIONS

PART 1 - GENERAL

1.01. GENERAL CONDITIONS

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

1.02. DESCRIPTION OF WORK

- A. This section applies to all sections of DIVISION 15, MECHANICAL.
- B. Scope of work shall be as described in the technical sections of DIVISION 15, MECHANICAL.

- 1.03. SUBMITTALS: Submittals required in this and other sections of DIVISION 15, MECHANICAL, shall conform to the General Provision and Special Provisions and the following additional requirements. Submittals shall include the manufacturer's name, trade name, place of manufacture, catalog model or number, nameplate data, size, layout dimension, capacity, project specification and paragraph reference, applicable industry, and technical society reference standards, years of satisfactory service, and other information necessary to establish contract compliance of each item the Contractor proposes to provide. Photographs of existing installations are unacceptable and will be returned without approval. Submittals for each section of DIVISION 15, MECHANICAL, shall be complete. Incomplete submittals will be returned without review.

- A. Manufacturer's Catalog Data: Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves, and catalog cuts. Each submittal shall clearly identify equipment to be provided. Information not pertaining to equipment shall be deleted or crossed out.
- B. Shop Drawings: Provide at least six sets of shop drawings for each Section of DIVISION 15, MECHANICAL. Shop Drawings shall use a minimum scale of 1/4 inch per foot on drawing sheets the same size as contract drawings. Include floor plans, sectional views, wiring diagrams, and installation details of equipment, and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams

shall identify circuit terminals, and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. If equipment is disapproved, drawings shall be revised to show accepted equipment and resubmitted.

- C. Manufacturer's Instructions: Where installation procedures or part of installation procedures are required to be in accordance with the manufacturer's instructions, submit printed copies of those instructions with product submittals. All products or items that carry manufacturer's warranty shall be installed in accordance with manufacturer's instructions. Installation of the item shall not proceed until the manufacturer's instructions are received. Failure to submit shall be cause for rejection of the equipment or material. When manufacturer's instructions and these specifications have different requirements, the more stringent requirement shall prevail. However, if the requirements are conflicting, it is the Contractor's responsibility to notify the Engineer in writing prior to procurement and installation.

All but not limited to, the following items shall be installed in accordance with the manufacturer's instructions and these bid documents.

| | |
|----------------------------|--------------------------------|
| Air Conditioning Equipment | Air Devices |
| Duct Insulation | Fans |
| Flexible Duct | Manufactured Duct Joints |
| Pipe Insulation | Temperature Maintenance System |
| Vibration Isolators | Volume Dampers |

- D. Certificates of Compliance: Submit a certificate of compliance from the manufacturer for approval for products, finishes, and equipment as specified in the technical sections whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance. The certificates shall identify the manufacturer, the products, equipment, or materials, and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to the requirements specified.
- E. Reference Standards Compliance: Where equipment for materials are specified to conform to industry and technical society reference standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), American Society of Mechanical Engineers (ASME), American Gas Association (AGA), American Refrigeration Institute (ARI), and Underwriters Laboratories (UL), submit proof of such conformance. If an organization uses a label or listing to indicate compliance with a particular reference standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections.

- F. Independent Testing Organization Certificate: In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing and approved by the Engineer.
- G. Operation and Maintenance Manuals: When specified in subsequent Section of DIVISION 15, MECHANICAL, the Contractor shall submit complete bound sets with table of contents and indexed sections of operating and maintenance instructions. Indexed sections shall be provided for each type of equipment in each specification section of DIVISION 15, MECHANICAL. Submit six (6) copies to the Engineer for approval. Provide complete brochures of all approved shop drawings for the project to the State of Hawaii. All items in product brochures not pertaining to equipment supplied for DIVISION 15, MECHANICAL, shall be deleted by lining out such paragraphs, diagrams, or pages. These manuals shall include the following:
1. Approved equipment submittals.
 2. Recommended maintenance procedure and frequency.
 3. Parts list with manufacturers numbers.
- H. Operating Instructions: Submit text of posted operating instructions for each system and principal item of equipment as specified in the technical sections.
- I. As-Built Drawings
1. The Contractor shall maintain at the job site one (1) set of full size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction.
 2. Where a choice of material or method is permitted herein or where variations in scope or character of work from that of the original contract is authorized, the drawings shall be marked to define the construction actually provided.
 3. Where equipment installation is involved, the size, manufacturer's name, model number, power input or characteristic as applicable shall be shown on the as-built drawings.
 4. The representation of such changes shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction.

5. The drawings shall be maintained and updated on a daily basis. The Contractor shall sign, and date each sheet to certify that the dimensions and details shown on the drawings reflect the dimensions and details, and specifications as constructed in the field.

J. Welders Qualifications: All welders shall be certified, by an independent testing laboratory and certificates shall be submitted to the Engineer for approval. Testing of welders shall be in accordance with the welding section of ANSI B-31.09 "Building Services Piping".

1.04. QUALITY ASSURANCE

- A. Material and Equipment Qualifications: Provide materials and equipment that are standard products of manufacturers regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. Standard products shall have been in satisfactory commercial or industrial use for two-years prior to bid opening. The two-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the two-year period.
- B. Alternative Qualifications: Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.
- C. Manufacturer's Nameplate: Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.
- D. Modification of References: In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears, Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Design Engineer, or City, County, State Building Officials.

1.05. SUBSTITUTION OF EQUIPMENT

- A. Substitution shall be in accordance with the GENERAL PROVISIONS of the contract.
- B. The Contractor shall assume full responsibility for proper fit, performance and additional work relating to other sections of the specifications.

- 1.06. VERIFICATION OF DIMENSIONS: The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Engineer of any discrepancy before performing any work.
- 1.07. DELIVERY, STORAGE, AND HANDLING: Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Engineer. Replace damaged or defective items. Rusted pipe, fittings, and accessories delivered or installed at the job site will be rejected.
- 1.08. POSTED OPERATING INSTRUCTIONS: Provide for each system and principal item of equipment as specified in the technical sections for the use of the operation and maintenance personnel. The operating instructions shall include the following:
- A. System Descriptive Information: Wiring diagrams, control diagrams, piping diagrams, control sequence and operating points for each principal system and item of equipment. Post instructions where directed.
 - B. Equipment Instructions: Attach to or post adjacent to each principal item of equipment and include directions.
 - 1. Start up, proper adjustment, operating, lubrications, and shutdown procedures.
 - 2. Safety precautions, procedure in the event of equipment failure.
 - 3. Other areas as recommended by the manufacturer of each system or item of equipment.
- Print or engrave, and frame under glass or in approved laminated plastic. Operating instructions exposed to the weather shall be made of weatherproof materials or enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.
- 1.09. SAFETY REQUIREMENTS: Fully enclose or properly guard belts, pulleys, chains, gears, couplings, projecting setscrews, keys, rotating parts, and other power transmission apparatus, located where persons can come in close proximity thereto. Provide positive means of locking out equipment so that equipment cannot be accidentally started during maintenance procedures. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of the type specified. Ensure that access openings leading to equipment are large enough to carry through routine maintenance items such as filters and tools.

- 1.10. ELECTRICAL REQUIREMENTS: Provide electrical components of mechanical equipment and systems such as motors, controllers, contactors and disconnects under DIVISION 15, MECHANICAL, specified herein, and as necessary for complete and operable systems. These components shall meet the minimum requirements as specified in DIVISION 16, ELECTRICAL, and all additional requirements specified in the section covering the associated mechanical equipment. Provide interconnecting wiring for components of packaged equipment as an integral part of the equipment. Interconnecting power wiring and conduit for field erected equipment shall be as specified in DIVISION 16, ELECTRICAL. Control wiring and conduit shall be as specified in DIVISION 15, MECHANICAL.

Motor control equipment forming part of motor control centers or switchgear assemblies, the conduit and wiring connecting such centers, assemblies, or other power sources to mechanical equipment shall conform to DIVISION 16, ELECTRICAL.

- 1.11. SEISMIC RESTRAINTS: Provide seismic restraints for mechanical systems in accordance with the Building Code.
- 1.12. INSTRUCTION TO PERSONNEL: When specified in other sections, furnish the services of competent instructors to give full instruction to the designated personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over for regular operation. The number of man-days (8 hours per day) of instruction furnished shall be as specified in the individual section. When more than 4 man-days of instruction are specified, use approximately half of the time for classroom instruction. Use other time for instruction with the equipment or system. When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instruction to acquaint the operating personnel with the changes or modifications.
- 1.13. GUARANTEE: All materials and equipment provided and/or installed under this section of the specifications shall be guaranteed for a period of one year from the date of final acceptance of the work by the State. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall furnish all necessary labor and materials to correct the trouble without any cost to the State. Any defective materials or inferior workmanship noticed at time of installation and/or during the guarantee period shall be corrected immediately to the satisfaction of the State.

In the event of occupancy by the State prior to final acceptance of the project, the

guarantee date for equipment placed in operation shall be mutually agreed to by the Contractor and the State.

PART 2 - PRODUCTS

2.01. MATERIALS AND EQUIPMENT:

- A. Materials and equipment shall conform to the requirements of applicable technical sections, publications specified therein and shall be as shown. Materials and equipment shall be new and shall be the products of manufacturers regularly engaged in the manufacture of such products. All items shall essentially duplicate materials and equipment that have been in satisfactory use at least two (2) years prior to bid opening and shall be supported by a service organization that is, in the opinion of the Engineer, reasonably convenient to the site of installation.

2.02. SIMILAR PRODUCTS: Similar products shall be of the same manufacturer.

2.03. AMERICAN PRODUCTS PREFERENCE: Preference shall be given to American products, materials, and supplies. Foreign products may be used when it can be clearly shown to be superior.

PART 3 - EXECUTION

3.01. QUALITY CONTROL: The work shall be performed by workmen skilled in the type of work involved, under experienced supervision. Where methods of application or installation are specified by commercial standards in the Technical Sections, no departures will be permitted except as specified or as directed by the Engineer.

3.02. INSPECTION AND TESTS: The Contractor shall give the Engineer notice one week in advance when the work is ready for inspection and test. The tests shall be performed as required in the Technical Sections. All work rejected by the Engineer shall be repaired or replaced by the Contractor at no additional cost to the State.

3.03. PROTECTION OF WORK IN PROGRESS: Pipe openings shall be closed with caps or plugs until connections are made. Equipment shall be securely covered for protection against physical or chemical damage. In areas exposed to weather, materials unused at the end of each day's work shall be stored in weather-protected locations. Damage to materials or equipment due to the Contractor's neglect shall be repaired or replaced to the satisfaction of the Engineer by, and at the expense of the Contractor.

- 3.04. PROGRESS OF WORK AND COORDINATION: The work shall be coordinated with the work of other Contractors and other trades to avoid interferences, preserve headroom and operating clearances, and to expedite completion of the project.
- 3.05. INSTALLATION OF EQUIPMENT: Installation and adjustments shall be in accordance with the equipment supplier's written instructions. All accessories required shall be properly installed and connected. Supports shall be adequately anchored and vibration isolation shall be installed where required.
- 3.06. PERMITS, LICENSES AND INSPECTIONS: The Contractor shall obtain all permits and licenses required to perform the work, and pay all the fees therefore, and shall cooperate with all inspection required by authorities having jurisdiction. Inspection specified in the Technical Sections shall be permitted without interference. Corrections to work as a result of inspection shall be made promptly.
- 3.07. FIELD TESTS: The Contractor shall be responsible for test of the installed work, and shall provide all labor, equipment and instruments and shall conduct pressure tests and operating tests on the piping systems and equipment. During pressure tests, all items in piping systems not designed for test pressures shall be removed from, or isolated from the system and shall be reconnected or unblocked after tests are completed. Should operating tests require the presence of manufacturer's representatives, the Contractor shall cooperate with them and shall place at their disposal all assistance, materials and service required to perform such tests. Testing shall be as specified in technical sections of these specifications.
- 3.08. PAINTING: Painting shall be done under the PAINTING Section of these specifications. Factory finishes damaged during shipment or construction shall be touched up to provide a finish to match surrounding surfaces.
- 3.09. CODES AND STANDARDS: The entire installation shall comply with the applicable requirements of the Building Code of the City and County of Honolulu, the Health Department Regulations, and applicable NFPA Standards.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

SECTION 15600 – AIR CONDITIONING AND VENTILATION

PART 1 - GENERAL

- 1.01. GENERAL CONDITIONS: The General Provision of the contract, including the General Provisions for Construction Projects (2016) and General Requirements of the Specifications, apply to the work specified in this section.
- 1.02. DESCRIPTION OF WORK: This section covers the furnishing, fabrication, delivery and installation of the air conditioning and ventilation systems complete, including but not limited to the following:
- A. Air conditioning units, controls, and wiring.
 - B. Sheet metal duct, and duct insulation.
 - C. Air diffusers, registers, and grilles.
 - D. Ventilation system.
 - E. Air filters.
 - F. Chilled water piping and condensate drain piping.
 - G. Pipe insulation.
 - H. Vibration isolation.
 - I. Operation and maintenance instructions.
 - J. Manufacturers' literature, shop drawings, and record drawings.
 - K. Inspections, test, and guarantee.
 - L. One year maintenance service.
- 1.03. CODES, ORDINANCES AND PERMITS:
- A. Codes and Ordinances: The work shall be in accordance with the governing State and Local Ordinances, Codes and Regulations, including NFPA Regulations and Factory Mutual, all of which are hereby made a part of these requirements. However, when these and/or drawings call for or describe materials, workmanship or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these requirements and/or drawings shall take

precedence over the requirements of the said rules and regulations. The Contractor shall furnish, without any extra charge, any additional material or labor, or both, required for compliance with these rules and regulations, although not mentioned in these requirements nor indicated on the contract drawings.

- B. Permits: The Contractor shall secure and pay for all permits, inspections, and certificates of any inspection of any governmental body having jurisdiction over all or any part of the work included under this section, and/or such inspections, etc., required by these requirements.

1.04. CONTRACT DRAWINGS

- A. Contract drawings are essentially diagrammatic, indicating general layout and approximate locations towards establishing the scope for uniform estimating basis for all bidders; they are not intended to be detailed construction working drawings. Reasonable modifications to indicated locations and arrangement to suit job conditions shall not constitute basis for requesting of additional funds from the Owner.
- B. Where apparatus and equipment have been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The shop drawings shall show the details of construction and installation of the particular equipment furnished; they shall be fully dimensioned to show that the equipment and connections thereto fit the space provided with adequate maintenance space.
- C. Capacities of all equipment and materials shall be not less than those indicated.

1.05. SHOP DRAWINGS: Shop drawings shall be provided in accordance with Section 15010 - GENERAL MECHANICAL PROVISIONS.

1.06. MATERIAL AND EQUIPMENT: Material or equipment brochures shall be made in a single submittal for the following items in order to demonstrate that these items of material and equipment have been properly coordinated and will function properly with each other:

| | |
|-------------------------------|-------------------------------------|
| Air Filter | Air Handling Units |
| Automatic Flow Control Valves | Chilled Water & Condensate Drain |
| Dampers | Piping |
| Diffusers, Registers, Grilles | Duct Access Doors |
| Duct Insulation | Duct Sealer |
| Ductwork | Equipment Supports |
| Fans | Flexible Duct Connectors |
| Flexible Pipe Connectors | Gauges and Thermometers |
| High-Efficiency Motors | Needlepoint Bipolar Ionization Unit |
| Pipe Insulation | Temperature Controls |

Smoke Detectors
Variable Air Volume Terminal Units
Vibration Isolators

Valves and Accessories
Variable Frequency Drive

If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the shop drawings. Approved departures shall be made at no additional cost to the Owner.

Submittal shall be in accordance with Section 15010 - GENERAL MECHANICAL PROVISIONS.

1.07. AS-BUILT DRAWINGS

- A. The Contractor shall maintain at the job site one (1) set of full-size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction.
- B. Where a choice of material or method is permitted herein or where variations in scope or character of work from that of the original contract or authorized, the drawings shall be marked to define the construction actually provided. Where equipment installation is involved, the size, manufacturer's name, model number, power input or characteristic as applicable shall be shown on the as-built drawings.
- C. The representation of such changes shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction.
- D. The drawings shall be maintained and updated on a daily basis. The Contractor shall sign, and date each sheet to certify that the dimensions and details shown on the drawings reflect the dimensions and details, and specifications as constructed in the field. As-built drawings shall be provided in accordance with Section 15010 - GENERAL MECHANICAL PROVISIONS.

1.08. CONFORMANCE TO AGENCY REQUIREMENTS: Where materials or equipment are specified to be approved by the Underwriters' Laboratories, Inc., the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of or listing in the Underwriters' Laboratories, Inc., Building Materials List, or the Electrical Appliance and Utilization Equipment List will be acceptable as sufficient evidence that items conform to Underwriters' Laboratories, Inc., requirements.

1.09. NAMEPLATES: Each major component of equipment shall be provided with a nameplate engraved with the manufacturer's name, address, and catalog number,

serial number and electrical data on a metal plate mechanically attached to the item of equipment. Nameplates painted over by the contractor shall be cleaned and restored to its original condition or replaced with new engraved nameplate at no cost to the State.

- 1.10. VERIFICATION OF DIMENSIONS: The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Engineer of any discrepancy before performing any work. Fabrication of ductwork and piping shall be in accordance with field measurements.
- 1.11. OMISSIONS: It is the intent of the plans and specifications to provide a complete installation. Should there be omissions, the Contractor shall call the attention of the Engineer to such omissions in fifteen (15) days advance of the date of bid openings so that the necessary corrections can be made.
- 1.12. SUBSTITUTION OF EQUIPMENT
 - A. Substitutions shall be in accordance with GENERAL PROVISIONS FOR CONSTRUCTION PROJECTS, 2016.
 - B. The Contractor shall assume full responsibility for proper fit, performance and additional work relating to other sections of the specifications.
 - C. Redesign made necessary by the use of approved substitutions, including changes in voltage, horsepower, vibration isolators, ductwork and/or piping connections, etc., shall be the responsibility and at the expense of the Contractor.
- 1.13. ELECTRICAL REQUIREMENTS: Electrical motor driven equipment specified herein shall be provided complete with motors, motor starters, and controls. Electric equipment and wiring shall be in accordance with DIVISION 16 - ELECTRICAL. Electrical characteristics shall be as indicated. Motor starters shall be provided complete with properly sized thermal overload protection and other appurtenances necessary for the motor control. Each motor shall be of sufficient capacity to drive the rating of the motor. Manual or automatic control and protective or signal devices required but not shown on the electrical plans, shall be provided under this section of the specifications.
- 1.14. CLEANING EQUIPMENT AND PREMISES
 - A. During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work performed under the various sections of the General Contract. All such debris and rubbish shall be removed from

the site. No waste material shall be abandoned above the ceilings or within wall cavities.

- B. Upon completion and before final acceptance of the work, all debris, rubbish, left over materials, tools and equipment shall be removed from the site.
- 1.15. GUARANTEE: The entire mechanical installation described herein shall be guaranteed in writing as a complete working unit for a period of one year starting only after 30 days of trouble-free operation after the date of system acceptance. Other requirements shall be in accordance with Section 15010 - GENERAL MECHANICAL PROVISIONS.
- 1.16. GUARANTEE: All materials and equipment provided and/or installed under this section of the specifications shall be guaranteed for a period of one year from the date of final acceptance of the work by the State. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall furnish all necessary labor and materials to correct the trouble without any cost to the State. Any defective materials or inferior workmanship noticed at time of installation and/or during the guarantee period shall be corrected immediately to the satisfaction of the State.

PART 2 - PRODUCTS

2.01. MATERIALS AND EQUIPMENT:

- A. Materials and equipment shall conform to the requirements of applicable technical sections, publications specified therein and shall be as shown. Materials and equipment shall be new and shall be the products of manufacturers regularly engaged in the manufacture of such products. All items shall essentially duplicate materials and equipment that have been in satisfactory use at least two (2) years prior to bid opening and shall be supported by a service organization that is, in the opinion of the Engineer, reasonably convenient to the site of installation.

2.02. AIR HANDLING UNITS

- A. Furnish central station air handling units of the type, size and capacity shown on the equipment schedules. Unit performance shall be certified in accordance with Air Conditioning and Refrigeration Institute (ARI) Standard 430 for central station air handling units. Units shall be as manufactured by AAON, Carrier, Daikin-McQuay, Trane, York, or approved equal meeting the requirements of this specifications.
- B. Units shall be of the horizontal or vertical type as shown on the drawings and shall consist of a fan and coil section with factory installed coil and filter section.

C. Unit Casing:

1. Component modules shall be constructed of sectionalized formed panels, rigidly reinforced with external hat channels. Casing panels shall be removable for easy access to the unit. Panels shall be mill galvanized steel.
2. On all sections requiring access doors, the handles shall be safety latch type.

D. Insulation:

1. Coil section, fan section and accessory sections of unit shall be insulated with 1" thick 3-lb. density neoprene coated fiberglass.
2. Insulation shall be secured to casing with waterproof adhesive and permanent mechanical fasteners.
3. Insulation shall meet NFPA-90A flame spread and smoke generation requirements.

E. Drain Pan: The condensate drain pans shall have double wall construction with threaded drain connections on both ends. Condensate drain pan shall be insulated with 0.6" thick isocyanate foam faced with an additional aluminum foil vapor barrier and cemented between the steel outer pan and the heavy gauge steel inner pan. Inner pan shall be coated with corrosion resistant elastomeric based material. Insulation adhesive and inner coating to comply with NFPA-90A flame spread and smoke generation requirements.

F. Fan Section:

1. Fan sections shall be constructed of galvanized steel and shall have a formed channel base for integral mounting of fan, motor and casing panels. Fan scroll, wheel, shaft, and bearings shall be mounted on a structural steel frame rigidly secured to the channel base.
2. Each unit shall have one fan wheel and scroll only. Fans shall be double width, double inlet type, with forward curved blades or backward curved airfoil section blades as indicated on the equipment schedule. Forward curved wheels shall be bonderized steel painted with baked on enamel, or with galvanized steel. Airfoil wheels shall be steel painted with zinc chromate primer and an enamel finish coat.
3. Fan shafts shall be solid steel, turned, ground and polished.
4. Fan wheels shall be keyed to the shaft and shall be designed for continuous operation at the maximum rated fan speed and motor horsepower. Fan wheels

and shafts shall be selected to operate at least 25% below the first critical speed, and shall be statically and dynamically balanced as an assembly. After final assembly, the entire unit shall be given a final vibration test at the factory.

5. Fan bearings shall be self aligning, pillow block regreasable ball type selected for an average L10 life of 200,000 hours at design operating conditions, per ANSI Code B 3.15.
6. Fan motors shall be factory mounted inside the fan section casing, on slide rails having 2 adjusting screws. Motors shall be open drip proof type and 1750 RPM. Motor efficiency shall be as specified in paragraph "MOTORS".
7. Fan drives shall be factory mounted with final alignment and belt adjustment to be made by the Contractor after installation. Belt drives shall be variable pitch type up to and including 25 hp, fixed pitch type above 25 hp.

G. Coil Section:

1. Coil Sections shall have heavy duty coil tracks extending the full width of the unit to provide slip in, slip out coils for ease of service and maintenance.
2. All coils shall be tested at 350 PSIG air pressure with coil submerged in water.
3. Coils shall be plate fin type for use in factory fabricated units and shall be of the cartridge type, removable from the coil connection side of the casing and supported in tracks over the entire length of the coil. Coil performance shall be certified in accordance with Air Conditioning and Refrigeration Institute (ARI) Standard 410-72.
4. Chilled water coils shall be aluminum plate fins with belled collars and bonded to 5/8" minimum OD copper tubes by mechanical expansion. Coils shall have galvanized steel casings and steel headers with threaded connections. Working pressure shall be 300 psig at 200°F. Coils shall be drainable and have trapping circuits. No turbulence promoting devices will be permitted inside the tubes. Headers shall have drain and vent connections.

H. Filter Section:

1. Filter section shall be supplied by the air handling unit manufacturer, with the same casing construction as before specified for other unit sections. The type of filters to be housed within the filter section shall be of the type and efficiency indicated on the equipment schedule. Different types of filter sections shall be supplied as specified in the following paragraphs.
2. Low velocity filter sections shall be capable of receiving 2" thick filters of

standard sizes. Section to be complete with side access slide rails and hinged access doors on both sides. Low velocity filter section shall be arranged in horizontal V formation.

I. Mixing Box:

1. Mixing boxes shall have parallel blade, inter-connected outside air and return air dampers. Damper blades shall have parallel bends for stiffness and shall be welded to 1/2" diameter steel rods rotating in nylon bushings and mounted in rigid galvanized steel damper frames. Dampers shall be sectionalized to limit blade length to not more than 50" in order to prevent excess blade warping and assure tight closure.
2. Rated low leakage dampers having a leakage rate not to exceed 2% of air quantity calculated at 2000 FPM face velocity, at 4.0" w.g. pressure difference shall be furnished. Damper blades shall be gasketed and perimeter sealing strips shall be provided.
3. Mixing boxes may be factory or field fabricated.

2.03. RETURN AIR AND OUTSIDE AIR FANS: Fans shall be sound and air tested and rated in accordance with the standards of the Air Movement and Control Association, Inc. Fans shall be directly connected to the motor shaft or indirectly connected to the motor by means of a V-belt drive as noted on equipment schedule. Where V-belt drives are used, motor sheaves shall be adjustable to provide not less than 20 percent speed variation. Sheaves shall be selected to drive the fan at such speed as to produce the specified capacity at field static pressure when set at the approximate midpoint of the sheave adjustment. Motors for V-belt drives shall be provided with adjustable rails or bases. Fans shall be provided with personnel screens or guards on both suction and supply ends except where ducts or dampers are connected to the fan. Provide aluminum bird screen at discharge of aluminum fans and stainless steel bird screens for steel fans. Fans and motors shall be provided with vibration isolation supports or mountings. Each fan shall be selected to produce the capacity required at the fan total pressure indicated. Standard AMCA arrangement, rotation and discharge shall be as indicated on the drawing. Motor efficiency shall be as specified in paragraph "MOTORS". Fans shall be manufactured by Penn, Greenheck, ACME, Cook, Carnes or approved equal. When sound criteria is indicated on drawings, equipment shall be AMCA certified for Air and Sound. Otherwise, equipment shall be AMCA certified for Air only.

- A. Inline Fans: Supply or exhaust fans shall be belt driven inline type. The square shaped fan housing shall be of heavy gauge formed steel. One of the sides shall be hinged and shall support the entire drive assembly and wheel allowing the assembly to swing out for cleaning, inspection, or service without dismantling the unit in any way. The motor shall be mounted on the hinged side exterior isolated from the

airstream. The belt and pillow block ball bearing shall be protected from the airstream by an enclosure. The shaft shall be keyed to both the wheel and pulley.

The fan inlet shall be a spun venturi throat overlapped by a backward curved centrifugal wheel with spun cone for maximum performance.

2.04. MOTORS

- A. All motors 1 horsepower and larger shall be energy efficient type. Efficiency rating shall be in accordance with NEMA Premium.
- B. Motors shall have a 1.15 service factor.
- C. Motors to be used with variable speed drives shall be provided with phase isolation, Class F insulation and a winding thermostat that will detect any motor overheat conditions. Also provide circumferential microfiber motor shaft grounding ring to protect motor bearings.
- D. Motor shall be designed to operate at full capacity with a voltage variation of plus or minus 10 percent of the motor voltage rating. Motor size shall be sufficient for the duty to be performed and shall not exceed its full load nameplate current rating when driven equipment is operated at specified capacity under the most severe conditions likely to be encountered. When motor size provided differs from the size indicated or specified, the Contractor shall make the necessary adjustments to the wiring, disconnect devices, and branch circuit protection to accommodate the equipment actually provided, at no cost to the State.
- E. Provide a motor starter for each motor.

2.05. VARIABLE FREQUENCY DRIVE

- A. Furnish complete variable frequency drive (VFD) as specified herein for the fans designated on the drawing schedules to be variable speed. All standard and optional features shall be included within the VFD enclosure, unless otherwise specified. VFD shall be housed in a metal NEMA 1 or NEMA 12 enclosure, or other NEMA type according to the installation and operating conditions at the job site. The VFD's UL listing shall allow mounting in plenum or other air handling compartments. If a NEMA 12 enclosure is required for the plenum rating, the manufacturer must supply a NEMA 12 rated VFD.
- B. The VFD shall convert incoming fixed frequency three-phase AC power into a variable frequency and voltage for controlling the speed of three-phase AC motors. The motor current shall closely approximate a sine wave. Motor voltage shall be varied with frequency to maintain desired motor magnetization current suitable for centrifugal pump and fan control and to eliminate the need for motor derating.

- C. With the motor's rated voltage applied to the VFD input, the VFD shall allow the motor to produce full rated power at rated amps, RMS fundamental volts, and speed without using the motor's service factor. VFDs utilizing sine weighted/coded modulation (with or without 3rd harmonic injection) must provide data verifying that the motors will not draw more than full load current during full load and full speed operation.
- D. The VFD shall include an input full-wave bridge rectifier and maintain a fundamental power factor near unity regardless of speed or load.
- E. The VFD and options shall be tested to ANSI/UL Standard 508. The complete VFD, including all specified options, shall be assembled by the manufacturer, which shall be UL-508 certified for the building and assembly of option panels. Assembly of the option panels by a third-party panel shop is not acceptable. The appropriate UL stickers shall be applied to both the VFD and option panel, in the case where these are not contained in one panel. Both VFD and option panel shall be manufactured in ISO 9001 certified facilities.
- F. The VFD shall have a DC link reactor on both the positive and negative rails of the DC bus to minimize power line harmonics. VFDs without a DC link reactor shall provide a minimum 3% impedance line reactor.
- G. The VFD's full load amp rating shall meet or exceed NEC Table 430-150. The VFD shall be able to provide full rated output current continuously, 110% of rated current for 60 seconds and 160% of rated current for up to 0.5 second while starting.
- H. The VFD shall be able to provide full torque at any selected frequency from 28 Hz to base speed to allow driving direct drive fans without derating.
- I. An automatic energy optimization selection feature shall be provided standard in the VFD. This feature shall automatically and continually monitor the motor's speed and load and adjust the applied voltage to maximize energy savings and provide up to an additional 3% to 10% energy savings.
- J. Input and output power circuit switching shall be able to be accomplished without interlocks or damage to the VFD. Switching rate may be up to 1 time per minute on the input and unlimited on the output.
- K. An automatic motor adaptation test algorithm shall measure motor stator resistance and reactance to optimize performance and efficiency. It shall not be necessary to run the motor or decouple the motor from the load to run the test.
- L. Galvanic and/or optical isolation shall be provided between the VFD's power circuitry and control circuitry to ensure operator safety and to protect connected electronic

control equipment from damage caused by voltage spikes, current surges, and ground loop currents. VFDs not including either galvanic or optical isolation on both analog I/O and discrete I/O shall include additional isolation modules.

M. VFD shall minimize the audible motor noise through the use of an adjustable carrier frequency. The carrier frequency shall be automatically adjusted to optimize motor and VFD efficiencies while reducing motor noise.

N. Protective Features:

1. Class 20 I²t electronic motor overload protection for single motor applications and thermal-mechanical overloads for multiple motor applications shall be provided.
2. Protection against input transients, loss of AC line phase, output short circuit, output ground fault, overvoltage, undervoltage, VFD overtemperature and motor overtemperature. The VFD shall display all faults in plain English. Codes are not acceptable.
3. Protect VFD from sustained power or phase loss. The VFD shall provide full rated output with an input voltage as low as 90% of the nominal. The VFD will continue to operate with reduced output with an input voltage as low as 164 V AC for 208/230 volt units, and 313 V AC for 460 volt units.
4. The VFD shall incorporate a motor preheat circuit to keep the motor warm and prevent condensation build up in the stator.
5. VFD package shall include semi-conductor rated input fuses to protect power components.
6. To prevent breakdown of the motor winding insulation, the VFD shall be designed to comply with IEC Part 34-17. Otherwise the VFD manufacturer must ensure that inverter rated motors are supplied.
7. VFD shall include a "signal loss detection" circuit to sense the loss of an analog input signal such as 4 to 20 mA or 2 to 10 V DC and shall be programmable to react as desired in such an instance.
8. VFD shall function normally when the keypad is removed while the VFD is running and continue to follow remote commands. No warnings or alarms shall be issued as a result of removing the keypad.
9. VFD shall catch a rotating motor operating forward or reverse up to full speed.
10. VFD shall be rated for 100,000 amp interrupting capacity (AIC).

11. VFD shall include current sensors on all three output phases to detect and report phase loss to the motor. The VFD will identify which of the output phases is low or lost.
12. Drive shall continue to operate without faulting until input voltage reaches 300 V AC on 208/230 volt VFDs, and 539 V AC on 460 volt VFDs

O. Interface Features:

1. Hand/Start, Off/Stop and Auto/Start selector switches shall be provided to start and stop the drive and determine the speed reference.
2. The VFD shall be able to be programmed to provide a 24 V DC output signal to indicate that the VFD is in Auto/Remote mode.
3. The VFD shall provide digital manual speed control. Potentiometers are not acceptable.
4. Lockable, alphanumeric backlit display keypad can be remotely mounted up to 10 feet away using standard 9-pin cable.
5. The keypads for all sizes shall be identical and interchangeable.
6. To set up multiple VFDs, it shall be possible to upload all setup parameters to the VFD's keypad, place that keypad on all other VFDs in turn and download the setup parameters to each VFD. To facilitate setting up VFDs of various sizes, it shall be possible to download from the keypad only size independent parameters.
7. Display shall be programmable to display in 9 languages including English, Spanish and French.
8. A red FAULT light, a yellow WARNING light and a green POWER-ON light shall be provided. These indications shall be visible both on the keypad and on the drive when the keypad is removed.
9. A quick setup menu with factory preset typical HVAC parameters shall be provided on the VFD eliminating the need for macros.
10. The VFD shall include a standard RS 485 serial communications port and be connected the DOT-A Johnson Controls system no additional cost to the State. The connection shall be software selectable by the User.
11. As a minimum, the following points shall be controlled and/or accessible:
 - a. VFD Start/Stop

- b. Speed reference
 - c. Fault diagnostics
 - d. Meter Points
 - 1) Motor power in hp
 - 2) Motor power in kW
 - 3) Motor kW·hr
 - 4) Motor current
 - 5) Motor voltage
 - 6) Hours run
 - 7) Feedback signal #1
 - 8) Feedback signal #2
 - 9) DC link voltage
 - 10) Thermal load on motor
 - 11) Thermal load on VFD
 - 12) Heatsink temperature
12. Four additional Form C 230 volt programmable relays shall be available for factory or field installation within the VFD.
 13. BacNET communication shall be available for factory or field installation within the VFD.
 14. Two set-point control interface (PID control) shall be standard in the unit. VFD shall be able to look at two feedback signals, compare with two set-points and make various process control decisions.
 15. Floating point control interface shall be provided to increase/decrease speed in response to switch closures.
 16. Four simultaneous displays shall be available. They shall include frequency or speed, run time, output amps and output power. VFDs unable to show these four displays simultaneously shall provide panel meters.
 17. Sleep mode shall be provided to automatically stop the VFD when its speed drops below set "sleep" level for a specified time. The VFD shall automatically restart when the speed command exceeds set "wake" level.
 18. The sleep mode shall be functional in both follower mode and PID mode.
 19. Run permissive circuit shall be provided to accept a "system ready" signal to ensure that the VFD does not start until dampers or other auxiliary equipment are in the proper state for VFD operation. The run permissive circuit shall also be capable of sending an output signal as a start command to actuate external equipment before allowing the VFD to start.

20. The following displays shall be accessible from the control panel in actual units: Reference Signal Value in actual units, Output Frequency in Hz or percent, Output Amps, Motor HP, Motor kW, kWhr, Output Voltage, DC Bus Voltage, VFD Temperature in degrees, and Motor Speed in engineering units per application (in percent speed, GPM, CFM, etc.). VFD will read out the selected engineering unit either in a linear, square or cubed relationship to output frequency as appropriate to the unit chosen.
21. The display shall be programmed to read in inches of water column (in-wg) for an air handler application.
22. VFD shall be able to be programmed to sense the loss of load and signal a no load/broken belt warning or fault.
23. If the temperature of the VFD's heat sink rises to 80°C, the VFD shall automatically reduce its carrier frequency to reduce the heat sink temperature. If the temperature of the heat sink continues to rise the VFD shall automatically reduce its output frequency to the motor. As the VFD's heat sink temperature returns to normal, the VFD shall automatically increase the output frequency to the motor and return the carrier frequency to its normal switching speed.
24. The VFD shall have temperature controlled cooling fans for quiet operation and minimized losses.
25. The VFD shall store in memory the last 10 faults and record all operational data.
26. Eight programmable digital inputs shall be provided for interfacing with the systems control and safety interlock circuitry.
27. Two programmable relay outputs, one Form C 240 V AC, one Form A 30 V AC, shall be provided for remote indication of VFD status.
28. Three programmable analog outputs shall be provided and shall accept a direct-or-reverse acting signal. Analog reference inputs accepted shall include two voltage (0 to 10 V DC, 2 to 10 V DC) and one current (0 to 20 mA, 4 to 20 mA) input.
29. Two programmable 0 to 20 mA analog outputs shall be provided for indication of VFD status. These outputs shall be programmable for output speed, frequency, current and power. They shall also be programmable to provide a selected 24 V DC status indication.
30. Under fire mode conditions the VFD shall automatically default to a preset speed.

P. Adjustments:

1. VFD shall have an adjustable carrier frequency in steps of not less than 0.1 kHz to allow tuning the VFD to the motor.
2. Four acceleration and four deceleration ramps shall be provided. Acceleration and deceleration time shall be adjustable over the range from 0 to 3,600 seconds to base speed. The shape of these curves shall be automatically contoured to ensure no-trip acceleration and deceleration.
3. Four current limit settings shall be provided.
4. If the VFD trips on one of the following conditions, the VFD shall be programmable for automatic or manual reset: undervoltage, overvoltage, current limit, and inverter overload.
5. The number of restart attempts shall be selectable from 0 through 20 or infinitely and the time between attempts shall be adjustable from 0 through 600 seconds.
6. An automatic "on delay" shall be selected from 0 to 120 seconds.

Q. Bypass:

1. Provide a manual 3-contactor bypass consisting of a door interlocked main fused disconnect padlockable in the off position, a built-in motor starter and a four position DRIVE/OFF/BYPASS/TEST switch controlling three contactors. In the DRIVE position, the motor is operated at an adjustable speed from the VFD. In the OFF position, the motor and VFD are disconnected. In the BYPASS position, the motor is operated at full speed from the AC power line and power is disconnected from the VFD so that service can be performed. In the TEST position, the motor is operated at full speed from the AC line power while power is applied to the input of the VFD. This allows the VFD to be given an operational test while continuing to run the motor at full speed in bypass. In case of an external safety fault, a customer supplied normally closed dry contact shall be able to stop the motor whether in DRIVE or BYPASS mode. The BYPASS switch shall include "soft-start" motor starter.
2. Service personnel shall be able to defeat the main power disconnect and open the bypass enclosure without disconnecting power. This shall be accomplished through the use of a specially designed tool and mechanism while meeting all local and national code requirements for safety.

R. Service Conditions:

1. Ambient temperature, -10 to 40°C (14 to 104°F).

2. 0 to 95% relative humidity, non-condensing.
3. Elevation to 3,300 feet without derating.
4. AC line voltage variation, -10 to +10% of nominal with full output.
5. No side clearance shall be required for cooling of any units. All power and control wiring shall be done from the bottom.

S. Quality Assurance:

1. To ensure quality and minimize infantile failures at the jobsite, the complete VFD shall be tested by the manufacturer. The VFD shall operate a dynamometer at full load and speed shall be cycled during the test.
2. All optional features shall be functionally tested at the factory for proper operation.

T. Submittals:

1. Submit manufacturer's performance data including dimensional drawings, power circuit diagrams, installation and maintenance manuals, warranty description, VFD's FLA rating, certification agency file numbers and catalog information.
2. The specification lists the minimum VFD performance requirements for this project. Each supplier shall list any exceptions to the specification. If no departures from the specification are identified, the supplier shall be bound by the specification.
3. Harmonic filtering. The seller shall, with the aid of the buyer's electrical power single line diagram, providing the data required by IEEE-519, perform an analysis to initially demonstrate the supplied equipment will meet the IEEE standards after installation. If, as a result of the analysis, it is determined that additional filter equipment is required in the bid. A harmonic analysis shall be submitted with the approval drawings to verify compliance with the latest version of IEEE-519 voltage and current distortion limits as shown in table 10.2 and 10.3 at the point of common coupling (PCC). The PCC shall be defined as the consumer-utility interface or primary side of the main distribution transformer.

U. Start-Up Service:

1. The manufacturer shall provide start-up commissioning of the VFD and its optional circuits by a factory certified service technician who is experienced in

start-up and repair services. Sales personnel and other agents who are not factory certified shall not be acceptable as commissioning agents. Start-up services shall include checking for verification of proper operation and installation for the VFD, its options and its interface wiring to the building automation system.

2. Warranty: The VFD shall be warranted by the manufacturer for a minimum period of 18 months from date of shipment. The warranty shall include parts, labor, travel costs and living expenses incurred by the manufacturer to provide factory authorized on-site service. The warranty shall be provided by the VFD manufacturer.

V. Examination

1. Contractor to verify that job site conditions for installation meet factory recommended and code-required conditions for VFD installation prior to start-up, including clearance spacing, temperature, contamination, dust, and moisture of the environment. Separate conduit installation of the motor wiring, power wiring, and control wiring, and installation per the manufacturer's recommendations shall be verified.
2. The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD shall not be operated while the unit is covered.

2.06. VARIABLE AIR VOLUME TERMINAL UNITS

- A. Terminal units designated shall be of capacity and sizes shown on drawings or terminal unit schedule. Units shall have factory catalog performance ratings and shall be oversized as required to conform to C.F.M., Static Pressure, discharge and radiated sound power levels designated. Static pressure drop and sound power levels as scheduled on drawings shall not be exceeded. Units shall be of the physical dimensions shown on the drawings and fit the space provided.
- B. Cabinets shall be constructed of not lighter than 22-gauge, zinc-coated steel. Internal surfaces shall be acoustically and thermally insulated with 1-inch glass fiber material surface treated to prevent erosion and having U.L. approval meeting NBFU and NFPA 90A. Width of units shall not exceed 27 inches.
- C. Air volume damper shall be extruded aluminum and be constructed to prevent air leakage in excess of 2% of rated air quantity at 1" inlet static pressures.
- D. Automatic damper actuator/controllers shall be factory installed and thoroughly tested for proper performance. Damper actuator/controllers shall be 24-volt solid state electronic proportioning type with integral limit switches to de-energize the actuator

at full open, full closed and when the thermostat is satisfied. The electronic damper actuator shall consist of a reversible electric motor developing a minimum of 40 pounds thrust. All controllers shall be connected (in a daisy-chain wiring circuit), to a computer-based energy monitoring and control system. Provide under this contract electronic wall thermostats, 24-volt transformers, 120-volt wiring and conduit from dedicated circuit breakers in electric distribution panel to 24-volt transformers. Direct digital electronic controller shall be capable of the following information and command exchange with the EMCS:

Information Transmitted

Supply Air CFM
Supply Air Temperature
Space Temperature
Maximum CFM Set Point
Minimum CFM Set Point
Cooling Set Point

Commands Accepted

Cooling Set Point (70°F. to 85°F.)
Maximum Velocity Set Point (0 FPM to 2,000 FPM)
Minimum Velocity Set Point (400 FPM to 3,000 FPM)

- E. Thermostats shall be furnished with clear plastic vandal proof covers with lock.
- F. Acoustical Performance: The self noise of the high velocity terminal unit including both noise radiated by the box panels and throughout the discharge opening shall not exceed the sound power levels tabulated on schedule at the maximum design values of CFM and inlet static pressure indicated. Sound rating shall be ARI Certified in accordance with Standard 880.
- G. Test Conditions:
1. Applicable Standards: Performance of units shall be in accordance with ASHRAE Standard 36-72 and Air Diffusion Council Test Code No. 1062R4.
 2. Radiated Noise: In order to evaluate the noise radiated by the box panels, the high velocity terminal unit shall be installed in a reverberant room with 4 feet of high-pressure ductwork preceding the unit and with sufficient length of low pressure ductwork to duct the discharge air out of the room. The duct gauge, size and construction shall be similar to that shown on the drawings.
 3. Discharge Noise: In order to evaluate the noise emitted from the high velocity terminal unit discharge opening, the unit and a short length of lined ductwork

shall be installed outside the reverberant room, with the duct terminating at the face of the chamber.

4. The Manufacturer shall furnish all required test information and data to the Architect for review, prior to his units being accepted as suitable for installation.
- H. Terminal units shall be manufactured by Krueger, Titus, or approved equal.

2.07. NEEDLEPOINT BIPOLAR IONIZATION UNIT

Self-cleaning needlepoint bipolar ionization unit sized to handle the airflow indicated for the unit for which it is to be installed. Unit shall feature multi-point voltage input, on-off switch, programmable self-cleaning cycle, operational status LED, integral Building Automation System (BAS) alarm contacts, magnets for installation, and carbon fiber brush emitters. Unit shall be capable operating within 20°F through 140°F, 0-100% relative humidity, shall be UL listed, and shall not produce any ozone during its operation. GPS Air, ISO-Aire, Modine HVAC, and FSG are approved manufacturers.

2.08. DISPOSABLE FILTERS: Air filters shall be as scheduled, medium efficiency, pleated, disposable type. Each filter shall consist of a non-woven cotton fabric media, media support grid and enclosing frame. The filter shall be listed by Underwriters' Laboratories as Class II.

- A. Filter Media: Filter media shall be of the non-woven cotton fabric type. The filter media shall have MERV rating as indicated on the drawings.
- B. 4-Inch: The effective filter media shall be not less than 7.0 square feet of media per 1.0 square foot of filter face area and shall contain not less than 11 pleats per linear foot. Initial resistance at 600 fpm approach velocity shall not exceed 0.35" w.g.
- C. 2-Inch: The effective filter media shall be not less than 4.6 square feet of media per 1.0 square foot of filter face area and shall contain not less than 15 pleats per linear foot. Initial resistance at 500 fpm approach velocity shall not exceed 0.28" w.g.
- D. Media Support Grid: The media support shall be a welded wire grid with an effective open area of not less than 96%. The welded wire grid shall be bonded to the filter media to eliminate the possibility of media oscillation and media pull-away. The media support grid shall be formed in such a manner that it effects a radial pleat design, allowing total use of filter media.
- E. Enclosing Frame: The enclosing frame shall be constructed of a rigid, heavy duty, high wet strength beverage board, with diagonal support members bonded to the air

entering and air exit side of each pleat, to ensure pleat stability. The inside periphery of the enclosing frame shall be bonded to the filter pack, thus, eliminating the possibility of air bypass.

- F. Holding Frame: Holding frames shall be Farr Type 8, factory fabricated of 16-gauge galvanized steel and shall be equipped with gaskets and four spring type positive sealing fasteners. Fasteners shall be capable of being attached or removed without the use of tools.
- G. Spare Filters: A set of filters shall be supplied for use during the testing and balancing period. A new set of filters shall be installed after testing and balancing, and after system operation for an aggregate total of 24-hours.

2.09. CHILLED WATER AND CONDENSATE DRAIN PIPING AND FITTINGS

- A. General: All pipe and pipe fittings shall be suitable for 150 psi minimum working pressure, in accordance with the latest edition of ASTM and ANSI specification as indicated. All steel pipe and fittings shall be precoated and plugged at the factory. Rusted pipes delivered or installed at the job site will be rejected.
- B. Service: Aboveground.

| ITEM | SIZE | DESCRIPTION |
|------------------|-------------------|---|
| Pipe | 2" and smaller | Black steel, standard weight (Schedule 40), ASTM A120 or A53, threaded ends and couplings. |
| | 2-1/2" and larger | Black steel, standard weight, ASTM A120 or A 53, beveled ends. |
| Fittings | 2" and smaller | For black steel pipe shall be malleable iron, 150-lb, screwed, ASTM A126, ANSI B16.4 Pipe threads ANSI B2.1. |
| | 2-1/2" and larger | Black steel, standard weight, buttweld type, ASTM A234, ANSI B16.9. Use standard weight welding rings at joints of piping 6" and larger. Long radius bends shall be used whenever possible. |
| Grooved Fittings | 3/4" through 12" | Rigid grooved mechanical couplings shall be a system, including coupling housing, gasket, fasteners, all furnished by the same manufacturer. Coupling houses of malleable iron conforming to ASTM A47, Grade 32510; |

ductile iron conforming to ASTM A536, Grade 65-45-12; or steel conforming to ASTM A106, Grade B or ASTM A53. Gaskets shall be of molded synthetic rubber with central cavity, pressure responsive configuration and conforming to ASTM D2000 Grade No. 2CA615A15B44F17Z. Grooved mechanical connections shall conform to AWWA C606. Coupling nuts shall be steel per ASTM A563, Grade A, zinc electroplated and bolts shall be steel per SAE J429, Grade 5, zinc electroplated or shall conform to ASTM A183.]

| | | |
|---------|----------------|---|
| Unions | 2" and smaller | For threaded steel pipe shall be black malleable iron, 150-lb, screwed ground joint, brass seat, ASTM A197. Pipe threads ANSI B2.1. |
| Flanges | 2-1/2" and | Forged steel, 125-lb, weld neck flat-faced or larger raised-face to match flanges on valves or equipment, ASTM A181, ANSI B16.5. |

2.10. FLEXIBLE PIPING CONNECTORS

- A. Flexible rubber connectors shall be used on all equipment as indicated on the drawings or on the equipment schedule. They shall be manufactured of multiple plys of nylon tire cord fabric and Dupont Nordel both molded and cured in hydraulic rubber presses. No steel wire or rings shall be used as pressure reinforcement. Straight connectors shall have two spheres. Connectors up to and including 1-1/2" diameter may have threaded ends. Connectors 2" and larger shall be manufactured with floating galvanized flanges recessed to lock the connector's raised face neoprene flanges. Connectors shall be installed on the equipment side of the shut-off valves.
- B. Connectors shall be rated a minimum of 165 psi at 180°F. Flanged equipment shall be directly connected to neoprene elbows in the size range 2-1/2" through 12" if the piping makes a 90° turn at the equipment. All straight through connections shall be made with twin-spheres properly pre-extended as recommended by the manufacturer to prevent additional elongation under pressure. 12" and larger sizes operating above 100 psi shall employ control cables with end fittings isolated by means of 1/2" thick bridge bearing neoprene washer bushings designed for a maximum of 1000 psi.
- C. Straight connectors shall be Mason-Flex type MFTFU or MFTNC, and control cable assemblies type ACC, all as manufactured by Mason, Industries, Inc. Straight connector 14" and larger shall be Mercer style 5500. Control cables shall be used with each connector.

2.11. PIPING INSULATION

- A. Insulate all pipes with operating temperatures below 60°F and above 105°F, and where otherwise specified and/or indicated on drawings.
 - B. Piping shall be insulated with closed cell elastomeric insulation with all service vapor barrier jacket. Insulation and jacket system shall have a flame spread rating of 25 and smoke develop rating of 50 when tested in accordance with ASTM E-84, NFPA 255 or UL 723. Insulation shall have maximum "K" factor of 0.23 Btu·in/h·ft²·°F at a mean temperature of 75°F. Insulation shall be 1-1/2" thick for pipe size 2 inches and smaller and 2" thick for pipes 2-1/2" thru 6".
 - C. Flanges, Couplings, Unions, Valves, and Fittings: Unless otherwise shown, shall be insulated with factory premolded, prefabricated or field-fabricated sections of insulation of the same material and thickness as the adjoining pipe insulation. Sections of insulation shall be secured in place with wire by joining the sector with Class 2 adhesive. Vapor barrier coating shall be applied over the insulation in two coats with glass tape or cloth embedded between coats. Cloth or tape shall overlap itself one inch and adjoining insulation jacket 2 inches. The coating shall be applied to a total dry film thickness of not less than 1/16 inch. In lieu of the above vapor barrier coating, factory premolded one piece polyvinyl chloride fitting covers may be used. When required, insulated flanges, couplings, unions, valves, and fittings shall be covered with preformed or field fabricated sections of aluminum jacket applied over the vapor barrier and secured with bands. Ends of pipe insulation shall be sealed to the pipe with a brush coat of vapor barrier coating at termination points, valves, flanges and fittings and on long runs of pipe at intervals not to exceed 15 feet.
 - D. Clamp hangers in contact with pipe shall be insulated separately in the same manner as fittings. The insulation shall be applied upward along the vertical hanger rod to a point not less than 6" or 4 times the pipe insulation thickness and sealed off.
 - E. Hangers: Provide 12" long section of Foamglass pipe insulation with a Vapor Barrier Jacket installed at the hanger point and protected with a 16-gauge metal shield on the outside of the jacket, match thickness of adjacent pipe insulation.
- 2.12. DUCTWORK: All sheet metal ducts shall be erected in a first class and workmanlike manner, true to the dimensions indicated on the drawings, unless otherwise approved, straight and smooth on the inside with neatly finished airtight joints. The ducts shall be securely anchored to the building in an approved manner and shall be so installed as to be completely free from vibration under all conditions of operation. The ducts shall be properly braced and reinforced with steel angles or other structural members. All slip joints shall be made in the direction of flow, and unless otherwise indicated on the drawings, all elbows shall have a centerline radius equal to 1-1/2 times the width of the duct or turning vanes shall be used. The sheet metal used shall be

galvanized iron except as otherwise hereinafter specified. The thickness of the sheet metal and size and spacing of the stiffeners used shall be in accordance with the requirements of the latest edition of the ASHRAE Handbooks. Connections to diffusers, grilles and register faces shall be absolutely airtight.

- A. Duct pressure class shall be equal to or greater than 1.5 times the fan total static pressure.
 - B. Seal all transverse joints on ducts with Deign Polymerics DP 1010, Foster 32-19 Fire Resistive Duct Sealer, Minnesota Mining and Mfg. Co. Duct Sealer 800 Premium Grade, Polymer Adhesives Sealant Systems, Inc. Airseal # 22 or approved equal.
 - C. Flexible Duct: Flexible air duct shall be listed by Underwriters' Laboratories under UL 181 standards as Class 1 flexible Air Duct Material and complying with NFPA Standards 90A and 90B. Flexible duct shall be a factory fabricated assembly composed of a polymeric liner duct bonded permanently to a coated spring steel wire helix and supporting a fiber glass insulating blanket. Low permeability outer vapor barrier of fiber glass reinforced film laminate shall complete the assembly. Duct shall be rated for 6" w.g. positive pressure, 1" w.g. negative pressure, and operating temperature up to 250°F.
- 2.13. DUCT ACCESS DOORS: Hinged access doors shall be provided at all automatic dampers, thermostats, sensors and all other apparatus requiring service and inspection in the duct system. Access doors shall be 15 by 18 inches unless indicated otherwise. Where size of duct will not accommodate this size, access doors shall be made as large as practical. Doors shall be provided with galvanized continuous hinge with steel pin and galvanized steel cam latch at 12" O.C. maximum spacing. All doors 48 inches by 48 inches or larger shall be provided with fasteners that can be operated from both sides. Access doors in insulated ducts shall be of the insulated type with 1" foam or mineral fiber insulation. Doors in field fabricated air handlers shall be installed so that fan pressure or suction holds the door closed, unless otherwise indicated. Door and frame shall be galvanized sheetmetal.
- 2.14. FLEXIBLE DUCT CONNECTORS: Flexible connections of Dupont Hypalon-coated 26-oz. glass fabric to prevent the transmission of vibration through the ducts, shall be installed on both the supply and return sides of all fans and ventilating units, approximately where shown on drawings. Cloth used for flexible connections shall be UL approved, of heat resistant to 300°F, and shall be properly fitted to render it relatively tight. Fabric shall be a minimum of 3" wide between connection points to sheetmetal. Glass fabric connections shall be Ventfabrics, Inc. "Metaledge Ventlon", or approved equal.

2.15. DUCTWORK AND PLENUM INSULATION

- A. Material: 1-1/2" flexible glass fiber blanket, 1.5 lbs. per cubic feet density, K factor not to exceed 0.25 at 75° mean temperature. Insulation shall be furnished with a factory applied foilscrium-kraft facing consisting of aluminum foil (minimum 0.7 mil thick) reinforced with fiberglass yarn mesh and laminated to 40 lb. chemically treated, fire resistant kraft. Insulation shall have a 25/50 flame and smoke rating when tested as a composite installation, including insulation, facing materials, tapes, and adhesives as normally applied in accordance with ASTM E84.
- B. Application: Insulation shall be installed in accordance with manufacturer's recommendations.
- C. Plenum liner shall be the same as duct liner except liner shall be 2" thick.

2.16. DIFFUSERS, REGISTERS, AND GRILLES: Construction of diffusers, registers and grilles shall be extruded aluminum. All supply air outlets shall be supplied with gaskets to prevent smudging. Finish shall be white enamel. Air devices shall be as manufactured by Carnes, Anemostat, Krueger, Titus, Metalaire or approved equal.

- A. Ceiling Diffusers: Diffuser shall be louvered face and symmetrical in design with 1" nominal flange type frame, removable core, and air distribution pattern as shown on drawings. Provide factory fabricated, single key operated, opposed blade volume damper.
- B. Linear Diffusers: Linear slot diffuser with internal blade dampers, for VAV cooling, extruded aluminum diffuser face with coated steel fiber-free foam insulated plenum interior, aerodynamically curved steel deflector, factory white finish. Plenum shall be internally insulated, factory fabricated of the same manufacturer as the linear diffuser. Assembly shall include adjustable temperature setting. Sizes as shown on the drawings. Units shall have factory catalog performance ratings, which conform to CFM, Static Pressure Drop 0.1" max, Throw and Noise Criteria designated.
- C. Return registers shall be single deflection type with 1" nominal flange, 1/4" horizontal face bar spacing, and removable core. Provide factory fabricated, key operated opposed blade volume damper.

2.17. DUCT SMOKE DETECTOR: Provide in systems having air handling capacity over 2,000 cfm. Design for detection of abnormal smoke densities by the ionization principle, responsive to both invisible and visible particles of combustion, and not susceptible to operation by changes to relative humidity. Provide duct detectors with an approved duct housing, mounted exterior to the duct, and with perforated sampling tubes extending across the width of the duct. Activation of duct detectors shall cause shut down of the associated air handling unit and operation of dampers, and annunciation of the signal source and tripping of the master fire alarm box or other

building fire alarm transmitter, but shall not cause sounding of the building interior alarm devices. Smoke control and exhaust systems shall have provisions for manual operation by means of a key operated switch to override any other shutdown features and shall be located adjacent to the fire alarm system control panel. Provide contacts for connection to fire alarm system.

2.18. VOLUME DAMPERS

- A. Low Velocity (1,500 FPM or Less): Furnish and install Ruskin Model CD35 standard dampers suitable for use in temperature from 0°F to 200°F. Frames shall be 5" x 1" x 16 gage galvanized sheet hat channel. Blades shall be roll formed, triple V-groove 16 gage galvanized steel, maximum of 6" wide. Axles shall be 1/2" plated steel hex. Bearings shall be molded synthetic and linkage concealed in frame. Maximum single section size shall be 48" wide and 72" high. When applications require more than one damper section to fill opening, sections shall be interconnected by approximate jack shafting.
- B. Low Velocity/Low Leak For Outside Air Duct (1,500 FPM or Less): Furnish and install Ruskin Model CD35 standard dampers suitable for use in temperatures from -25°F to 180°F. Frames shall be 5" x 1" x 16 gage galvanized steel hat channel. Blades shall be roll formed, triple V-groove 16 gage galvanized steel, maximum of 6" wide. Axles shall be 1/2" plated steel hex. Bearing shall be molded synthetic and linkage concealed in frame. Maximum single section size shall be 48" wide and 72" high. When applications require more than one damper section to fill opening, sections shall be interconnected by appropriate jack shafting.
- C. Approved equal manufacturers are Titus, Carnes, Pottorff, Airstream, Metalaire, and Anemostat.

2.19. TURNING VANES AND EXTRACTORS

Factory-fabricated and factory-or-field-assembled units consisting of curved double thickness turning vanes for uniform air distribution and change of direction with minimum turbulence and pressure loss. Fabrication shall be in accordance with applicable SMACNA Publications.

2.20. AUTOMATIC FLOW CONTROL VALVES

Flow control valves shall be tamper-proof, factory calibrated, automatic pressure compensating. Each valve shall limit flow rates within a range $\pm 5\%$ regardless of system pressure fluctuations. Flow control valve shall have threaded ends with a union for 2" and smaller and flanged for 2-1/2" and larger. All flow control devices shall be provided with pressure tap. Flow control element shall be removable for cleaning or replacement without removing valve body from the pipe system.

2.21. PRESSURE GAUGES AND THERMOMETERS

- A. Pressure Gauges: Grade A, accurate within 1/2 of 1% of full scale range, of the Bourdon tube type, with 4-1/2" dials unless otherwise indicated, with recalibrating screws. Gauges shall have plain cases with screwed rings finished in black enamel and shall be installed with necessary piping, including a shut-off cock and pressure snubber. Gauges shall be Ashcroft, Marsh, Weiss, Trerice, or approved equal. Provide a pressure snubber and gauge cock on each gauge. Gauges shall not be installed until systems are cleaned as specified elsewhere in this section. Gauges exposed to weather shall be factory weatherproofed.
- B. Thermometers: Non-mercury filled lens tube type with separable socket. Adjustable, 9-inch scale, 0°F to 120°F range with 2°F maximum scale divisions. Cast aluminum case, with adjustable angle case. Provide wells of suitable length to accommodate pipe size. Accuracy shall be within 1% of full scale.

2.22. VIBRATION ISOLATORS: All isolators shall be hot dipped galvanized with galvanized or stainless steel fasteners. Isolators shall be as manufactured by Mason, Vibrex, Vibro-Acoustics, Korfund, California Dynamics Corporation, M.W. Sausse & Co., or approved equal.

- A. Neoprene Isolators: Double deflection neoprene mountings shall have a minimum static deflection of 0.35". All metal surfaces shall be neoprene covered to avoid corrosion and have friction pads both top and bottom so they need not be bolted to the floor. Bolt holes shall be provided for these areas where bolting is required. On equipment such as small vent sets and close coupled pumps, steel rails shall be used above the mountings to compensate for the overhang. Mountings shall be type ND or rails type DNR as manufactured by Mason Industries, Inc.
- B. Spring Mount Restrained Isolator: Equipment with operating weight different from the installed weight such as chillers, boilers, etc. and equipment exposed to the wind such as cooling towers shall be mounted on spring mountings above except a housing shall be used that includes vertical limit stops to prevent spring extension when weight is removed. The installed and operating heights shall be the same. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operations. Mountings used outdoors shall be hot dipped galvanized. Isolators shall have a 2" minimum static deflection unless otherwise indicated. Mountings shall be SLR as manufactured by Mason Industries, Inc.
- C. Spring/Neoprene Hanger Isolator: Vibration hangers shall contain a steel spring and 0.3" deflection neoprene element in series. The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to

swing through a 30° arc before contacting the hole and short circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include a scale drawing of the hanger showing the 30° capability. Isolators shall have a 2" minimum static deflection unless otherwise indicated. Hangers shall be type 30N as manufactured by Mason Industries, Inc.

- D. Steel Saddle: Vibration isolator manufacturer shall provide steel members welded to height saving brackets to cradle machines having legs or bases that do not require a complete supplementary base. Members shall be sufficiently rigid to prevent strains in the equipment. Inverted saddles shall be type ICS as manufactured by Mason Industries, Inc.
- E. Neoprene Pad: Vibration isolator manufacturer shall furnish waffle neoprene pad, 3/4" thick. When thicknesses of greater than 3/4" are indicated on drawing, multiple layers shall be used with 18-gauge 304 stainless steel sheets between layers. Pads shall be Super W as manufactured by Mason Industries or approved equal.

PART 3 - EXECUTION

3.01. PROTECTION OF WORK IN PROGRESS

Pipe and duct openings shall be closed with caps or plugs until connections are made. Equipment shall be securely covered for protection against physical or chemical damage. In areas exposed to weather, materials unused at the end of each day's work shall be stored in weather-protected locations. Damage to materials or equipment due to the Contractor's neglect shall be repaired or replaced to the satisfaction of the **Architect** by, and at the expense of the Contractor. Ductwork openings shall be covered and protected from dust and moisture daily. No equipment, ductwork, piping, or insulation shall be installed if contaminated by dust or moisture. Objects shall be cleaned or dried before installation.

3.02. EQUIPMENT INSTALLATION

- A. Air conditioning and ventilation equipment shall be installed in accordance with the respective manufacturer's installation guidelines, including the provisions of accessories not included in these specifications.
- B. Necessary supports shall be provided for equipment, appurtenances and pipe, as required. These include frames or supports for air conditioners, and other similar type items requiring supports.

3.03. PIPING

- A. Pipes shall be cut accurately to measurements established at the jobsite and worked into place without springing or forcing, properly clearing all windows, doors, and

other opening. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted without written approval. Pipes shall be cut square, shall have burs removed by reaming, and shall be so installed as to permit free expansion and contraction without damage to joints or hangers. Fittings, dust, or dirt shall be wiped from interior of the pipe before connections are made. Changes in direction shall be made with fittings, except that bending of pipe will be permitted, provided a hydraulic or mechanical pipe bender is used and wide sweep bends are formed. Bent pipe showing any kinks, wrinkles, or other malformations will not be accepted. All piping shall be installed with sufficient pitch to ensure adequate drainage.

- B. Provide accessible pet cock air vent at all high points in piping system where air pockets may develop.
- C. Opening in pipes, fittings, and equipment shall be plugged or capped to prevent construction debris from entering.
- D. Valves and accessories shall be line size.

3.04. DIELECTRIC UNIONS AND FLANGES: Dielectric unions or flanges shall be installed when connecting dissimilar metal water piping accessories or equipment.

3.05. JOINTS

- A. Screw joints shall be made with tapered threads properly cut conforming to requirements of NBS Handbook H 28. Joints shall be made perfectly tight with a stiff mixture of litharge and glycerin or other approved threaded joint compound applied with a brush to the male threads only. Not more than three threads shall show after the joint is made up.
- B. Unions: Unions shall be installed at all equipment and valves connections which are threaded. Dielectric unions or flanges shall be installed at all connections of dissimilar metals.

3.06. SLEEVES

- A. Pipes passing through wall waterproofing membrane or concrete floors shall be provided with pipe sleeves fitted into place at time of construction. Sleeves shall not be installed in structural members unless noted. Each sleeve shall extend through its respective wall or floor and shall be cut flush with each surface. Unless otherwise indicated, sleeves shall be of such size as to provide a minimum of 1/4" clearance between pipe or jacket over insulation and sleeves. Sleeves in bearing walls, waterproofing membrane floors, and wet areas shall be schedule 40 steel pipe or cast iron pipe.

- B. Where pipes or ducts penetrate fire rated walls and floors the space between the pipes or ducts and sleeves shall be sealed with fireproof sealant. Installation shall be in accordance with manufacturers instructions.

3.07. DUCTS

A. Supports:

1. Refer to structural drawings for type of construction from which ducts are to be suspended. Support from steel decking is prohibited unless specifically approved by the Engineer.
2. Drilled in Threaded Inserts: Where supports in beams and joists are required after concrete has been poured, Phillips "Redhead" Drilled In Threaded Inserts shall be provided, installed in accordance with manufacturer's recommendations.
3. Ducts and accessories shall be supported in accordance with SMACNA HVAC Duct Construction Standards Metal and Flexible Ducts (1995). Additional hangers shall be provided within 6" of each cross sectional joint on each duct section. This will result in all duct sections having two hanger locations, one at each end.
4. Ducts located in equipment room shall be supported on spring hanger isolators with 1" static deflection.

B. Duct Seams and Joints:

1. Longitudinal seams shall be Pittsburgh seams, standing seams, grooved, or snap lock. Snap lock seams shall be formed with rollers and designed and set up specifically for the metal gage being worked. Seams shall be caulked.
2. Transverse joints in low velocity round ducts shall be slip type secured with sheet metal screws equally spaced on 6" centers maximum with a minimum of 3 screws per joint. Exposed inside edge of duct at joint shall point in direction of air flow. Joints shall be sealed with an approved tape or mastic.
3. All seams and joints in rectangular ductwork shall be constructed in accordance with ASHRAE Handbooks, except as otherwise noted.

C. Duct Accessories: Turning vanes or extractors shall be installed in all changes in direction of air flow, whichever is applicable.

D. Duct Leakage Testing:

1. Contractor shall leak test medium pressure ductwork from AHU discharge to

terminal unit connections.

2. Contractor shall, at the beginning of the work construct, erect and leak test a representative sample of the duct construction to be used at the 3” pressure class. The sample specimen shall include at least five transverse joints, typical seams, and at least two typical branch connections plus two elbows, from the AHU discharge to the terminal unit.
3. The leakage amount shall not exceed the allotted amount for the pressure class or the allotted amount for that portion of the system, whichever is applicable.

| <u>DUCT CONSTRUCTION CLASS</u> | <u>LEAKAGE CLASS</u> |
|--------------------------------|----------------------|
| 3” w.g. | 12 |

4. Leakage test procedures shall follow the outlines and classifications in the SMACNA HVAC Duct Leakage Test manual and shall provide written test report results.
5. Contractor shall notify engineer a minimum of 3 days in advance of duct testing.
6. If specimen fails to meet allotted leakage level, the contractor shall modify to bring it into compliance and shall retest it until acceptable leakage is demonstrated. Engineer at his discretion may require additional duct sections tested.
7. Tests necessary repair shall be completed prior to concealment of ducts or installation of exterior duct wrap.

3.08. INSULATION

A. Ducts:

1. All air conditioning supply and return air ducts shall be insulated with duct wrap.
2. All edges of duct and plenum liners shall be coated. Provide metal nosing at all supply and return duct connections to all air handling equipment.

B. Piping: Insulate all chilled water pipes, condensate drain pipes, refrigerant suction pipes and refrigerant hot gas pipes between heat exchanger and compressor discharge. Butt joints on cold insulated pipes shall be sealed off with vapor barrier coating every 15 feet of straight run, immediately above penetration of each floor, and at the first joint on the horizontal pipe below a rise or drop of piping.

C. Equipment: Insulate return air fan and other equipment with operating temperatures below 60°F or above 105°F. Pipes connecting to equipment which do not normally

require insulation shall be insulated for at least 5'-0" run from equipment connection point.

3.09. PRESSURE GAUGES

- A. Pressure gauges shall be installed at the inlet and outlet of all heat exchangers and where shown on drawings.
- B. Pressure gauges shall be installed with gauge cock and pressure snubbers to provide easy replacement and protection from pressure surges.
- C. Pressure gauges shall be installed so they may be read while standing on the floor without the use of ladders.

3.10. THERMOMETERS

- A. Thermometers shall be installed at the inlet and outlet of all water chillers, heat exchangers and where shown on drawings.
- B. Thermometers shall be installed so they may be read by standing on the floor without the use of ladders.

3.11. VIBRATION ISOLATORS

No rigid connections between equipment and building structure shall be made that degrades the noise and vibration isolation system herein specified. Electrical conduit connections to isolated equipment shall be looped to allow free motion of isolated equipment. Provide vibration isolators to vibrating and/or dynamic equipment, and install per equipment manufacturer's instructions.

3.12. CLEANING AND ADJUSTING

- A. Pipes shall be cleaned free of scale and thoroughly flushed of all foreign matter. Strainers and valves shall be thoroughly cleaned. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and after all construction dirt has been removed from the building, new filters shall be installed.
- B. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. All control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions. Clean all strainer screens 10 days after acceptance of this project.

3.13. TEMPERATURE CONTROLS

- A. General: Temperature controls shall be electric type that will provide the required sequence of operation and control. Items not specified herein or shown on the drawings but necessary to perform the functions specified shall be provided.
- B. Installation: The automatic equipment shall be installed by or under the direct supervision of the manufacturer's representative, in strict accordance with manufacturer's instructions. All control wiring or tubing shall be provided under this section of the specifications. Before the air conditioning installation is accepted, the Contractor shall deliver to the Architect a statement from the manufacturer or his authorized agent, certifying that the automatic control equipment has been inspected and found to be properly installed and is functioning satisfactorily.

3.14. PIPE PRESSURE TEST

Hydrostatically test water piping systems at one and one half times the system pressure but at least 150 psig. Pressure shall be maintained for a period of not less than eight hours without pressure loss. Leaks found during test shall be repaired. Caulking of joints will not be permitted. Concealed piping shall be tested in place before concealing.

3.15. LEAK TESTING

Upon completion of installation of the system before any piping is insulated, test factory - and field-installed refrigerant piping with an electronic-type leak detector. Use same type of refrigerant to be provided in the system for leak testing. When nitrogen is used to boost system pressure for testing, ensure that it is eliminated from the system before charging. Minimum refrigerant leak field test pressure shall be as specified in ASHRAE 15, except that test pressure shall not exceed 1034 kPa (gage) 150 psig on hermetic compressors unless otherwise specified as a low side test pressure on the equipment nameplate. If leaks are detected at time of installation or during warranty period, remove the entire refrigerant charge from the system, correct leaks, and retest system.

3.16. TESTING, ADJUSTING AND BALANCING SYSTEMS

- A. The Contractor shall obtain the services of an independent test and balance agency that specializes in and whose business is limited to the testing and balancing of air conditioning systems.
- B. Testing, adjusting and balancing shall be performed in complete accordance with ASHRAE Testing, Adjusting and Balancing. Recommendations by ASHRAE shall be considered mandatory. Adjustment of equipment and air outlet quantities to suit actual field conditions shall be within the scope of Testing, Adjusting and Balancing.

- C. Instruments used for testing and balancing of air and hydronic systems must have been calibrated within a period of six months and checked for accuracy prior to start of work.
- D. Six copies of the complete test report shall be submitted to the Architect prior to final acceptance of the project. Reports shall be submitted on standard SMACNA Forms.
- E. All strainer screens shall be removed, cleaned and reinstalled after 8 hours of operation and prior to balancing.
- F. All air filters shall be replaced with new filters after 8 hours of operation and prior to balancing.
- G. Balancing:
 - 1. Variable Flow Chilled Water System Balancing: The following procedures shall be used to balance a variable flow chilled water system.
 - a. Close coil valves except the one on the critical branch that appears to have the highest pressure drop. This valve shall be left wide open.
 - b. Adjust the differential pressure controller so that the pump delivers design flow through this branch.
 - c. Then close the coil valve on this branch and run the pump at full speed to be sure that there is no flow in the branch and that the actuator closes the valve tightly against the maximum pump head. Check chiller chilled water flow to make sure minimum flow is achieved.
 - d. Check the other branches in the same manner to ensure that the drop on the remaining branches is less than the apparent critical branch and that all valves close tightly.
 - e. If another branch has a higher pressure drop, then reset the differential pressure controller upward to satisfy this branch.

When testing the pressure drop in the branches, all readings may be taken at the remote coil branch where the differential pressure sensor is located. There is no flow and, therefore, no pressure drop in the main between the sensor and the branch under test.

It is not necessary to move the differential pressure test gauge to the branch being tested because the differential pressure will read the same across the branch as it reads across the sensor as long as all other branch valves are closed.

If the building has an operational DDC system, all branch flows and all valves may be tested at the DDC console when the testing procedure outlined above is followed.

2. Duct systems shall be balanced as follows:
 - a. System (or air moving device) to not less than design CFM. Adjusting shall include changing of sheaves to suit field static pressures.
 - b. Control zones or major duct branches to plus or minus 5%.
 - c. Registers and grilles, initially, to plus or minus 10%, thereafter, adjust to field conditions.
3. Test Data: The Contractor shall provide the Architect with typewritten schedules of readings taken during the balancing and testing operations indicating the required or specified reading, the first reading taken, and final balanced reading for the following items:
 - a. Air Handling Units: Size, type, fan speed in rpm, outlet velocity in fpm, external static pressure in inches of water, total static pressure in inches of water, air quantity cfm, and motor load in amperes.
 - b. Coils: Size; face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb degrees F.; water temperature entering coil and water temperature leaving coil, degrees F; and water quantity in gpm.
 - c. Fans: Size, Type, speed in rpm, outlet velocity in fpm, static pressure in inches of water, air quantity in cfm, and motor load in amperes. Fan pulleys shall be changed or adjusted to meet system field static pressure requirement.
 - d. Air outlets and inlets: Size, velocity in fpm, and air quantity in cfm.
 - e. Ducts: Size, velocity in fpm, and air quantity in cfm.
 - f. Control Settings: On-site settings for all automatic controls including thermostats, humidity controls, safety controls, minimum damper settings, fire-safety thermostats, pressure controls, temperature controls, and other similar items shall be provided in the form of a typed tabulated list indicating type of control, location, setting, and function.

3.17. SPARE PARTS DATA

After approval of materials and equipment and 2 months prior to the date of beneficial occupancy, the Contractor shall furnish a complete list of parts and supplies, with current source of supply.

3.18. VALVE TAGS AND INDEX

Identification tags made of brass or aluminum shall indicate valve number, function, size, and working pressure and shall be installed on all valves. Tags shall be 1-1/2 inches minimum in diameter, and marking shall be stamped. Tags shall be wired to valve with 0.0808-inch diameter, No. 12 AWG, copper wires. Furnish a chart indicating location, index number and purpose of all valves for the Architect's review and approval.

3.19. OPERATING AND MAINTENANCE MANUAL:

Provide operating and maintenance manual on all equipment and the system in accordance with Section 15011- GENERAL MECHANICAL PROVISIONS.

3.20. ONE YEAR GUARANTEE AND MAINTENANCE SERVICE CONTRACT

- A. In addition to the Guarantee on material and workmanship, the installer shall submit seven (7) copies of the Maintenance Service Contract, countersigned by the General Contractor, that will validate said Guarantee.
- B. The Guarantee and maintenance service shall extend for a period of one year commencing after 30 consecutive days of trouble-free operation after the Project Acceptance Date or the air conditioning equipment acceptance date, if earlier than the Project Acceptance Date, and shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the attached Schedule of Maintenance Service, so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the Contractor. This maintenance period and the guarantee period shall run concurrently (same start and end dates).

Trouble-free operation is defined as a non-disabling condition or a non-recurring failure or disruption and the following:

- 1. The system shall be free of all discrepancies, contamination and debris which requires correction in excess to those described for the monthly service which is included in the Schedule of Maintenance Service.
- 2. The system is maintaining operational conditions and other parameters as measured during acceptance test.

C. The Contractor shall keep a separate log recording all regular and emergency maintenance calls to the project at his office. The log shall include at least the following information:

1. Name of person making service call.
2. Date of call.
3. Time in and out from project.
4. Nature of call; if emergency, who contacted service company.
5. Temperature and pressure readings from all available pressure gauges and thermometers. Readings from all other gauges, thermometers, level indicators, status indicators, sensors, Ambient temperature and humidity at the site.
6. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.
7. All items indicated to be recorded in the Schedule of Maintenance Service.
8. Other data required.

In addition, the Contractor shall submit written reports of maintenance service performed within 5 working days of performance of service to the State. The maintenance service report shall include pertinent pages of the maintenance log.

D. The Installer shall include a listing of the following items along with the Maintenance Service Contract:

1. Name of the Servicing Contractor.
2. Air Conditioning system acceptance date.
3. Service contract expiration date. Service contract expiration date shall be amended after the completion of the 30 consecutive days of trouble free operation specified in paragraph B. above.
4. Monthly inspection schedule for the maintenance period.
5. Itemized listing of the equipment covered under the service contract, including a description of the equipment identified, its model and serial number(s) and manufacturer's name(s).

- E. The Maintenance Service Contract shall be submitted along with the Operations and Maintenance Manual 30 days before the Project Acceptance Date.
- F. Certification of Maintenance Work: All work done under this maintenance contract shall be certified by a responsible employee of the Contractor who is in charge of or who performs the maintenance work. Service reports shall be made out for all service periods, i.e., monthly, quarterly, semi-annual, annual, emergency, etc.. Certification of work by the Contractor shall be construed to mean that work has been performed in accordance with recommended and accepted maintenance procedures in conformance with the full intent of the service contract. Service reports shall include findings by the service personnel and description of work performed to maintain the systems in proper operating condition.
- G. Work Schedule/Advance Notification:
 - 1. All maintenance work shall be performed between the hours of 7:30 a.m. to 4:00 p.m., on normal working days, Monday through Friday, excluding State Holidays.
 - 2. Contractor shall notify State prior to any maintenance work that will cause mechanical equipment outages or in any way affect the facility's user in the performance of their duties. Contractor shall inform the State a minimum of five (5) working days in advance of any work.
- H. Trouble Calls: Emergency service and repairs required between regular service calls shall be rendered within 24 hours after the Contractor is notified, non-work days included.

The Contractor shall call State Dept of Transportation Airports Division the next working day after being notified of the problem and report the status of repairs.

- I. Maintenance Report/Checklist: The Contractor shall prepare and maintain a maintenance service report/checklist which shall include the following:
 - 1. Date maintenance service was performed.
 - 2. The name of the mechanic who performed said maintenance.
 - 3. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.
 - 4. Documents and other data pertaining to the maintenance performed. It will be the responsibility of the Contractor to maintain the report/checklist by recording the above noted data after each scheduled maintenance and emergency repairs, and have the checklist available for inspection at the building site. The report

shall be sufficiently detailed to properly reflect the past maintenance history of the equipment.

- J. Cleanup and Work Practices: The Contractor shall keep the job site free of debris, litter, discarded parts, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts, and equipment from the service areas upon completion of the work.

The Contractor shall exercise caution during the progress of his maintenance and repair work to prevent damage to the ceilings, roofing, and other building structure. The Contractor shall restore all damages, caused by his negligence, to its original condition, at his own expense.

- K. All periodic maintenance services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks:

SCHEDULE OF MAINTENANCE SERVICE

1. AIR HANDLING UNIT/FAN COIL UNIT

Monthly Service

- a. Clean and clear all drain pan and flush all related condensate drain line with compressed air. Install drain pan tablets to control algae growth. (Note: Contractor will be liable for water damage due to clogged drains under this contract.) Repair, record and report all discrepancies and actions taken.
- b. Change all disposable air filters at least once a month. Use filters of equal capacity and performance characteristics as original design. Repair, record and report all discrepancies and actions taken.
- c. Perform operational test of all motorized inlet vanes and variable frequency drives (VFD) where installed, to ensure that equipment is operating properly. Correct, record and report all discrepancies and actions taken.
- d. Lubricate and oil all fan and motor bearings, connections of dampers and vanes, linkages, automatic motors, valves, and actuators. Correct, record and report all discrepancies and actions taken.
- e. Check all drives for wear; adjust belt tension if necessary. Change belts as required. Correct, record and report all discrepancies and actions taken.
- f. Check pressure and temperature differential across cooling coils and log readings. Clean strainers, vents and drains on chilled water coils. Correct, record and report all discrepancies and actions taken.
- g. Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all equipment and controls as required; clean-up all equipment. Provide operational simulation of controls at various conditions. Correct, record and report all discrepancies and actions taken.
- h. Read and record motor power supply voltage and amperes. Correct, record

- and report all discrepancies and actions taken.
- i. Certify performance of monthly scheduled maintenance service and that all discrepancies have been reported and corrected.

Annual Service

- a. Adjust alignment of bearings and sheaves; lubricate fan and motor bearings. Replace worn or noisy bearings or sheaves. Repair, record and report all discrepancies and actions taken.
 - b. Check condition of fan blades. Replace fan wheel as required. Repair, record and report all discrepancies and actions taken.
 - c. Clean cooling coils of dirt accumulation using nitrogen, high pressure air/water, steam, or chemical coil cleaner solution. Correct, record and report all discrepancies and actions taken.
 - d. Clean supply and return air grilles, registers, and diffusers, and outside air intake grilles, screens and dampers. Repair or replace deteriorated bird screens. Correct, record and report all discrepancies and actions taken.
 - e. Clean and adjust water valves, clean strainers and clean all fan wheels and interior and exterior of equipment housings. Correct, record and report all discrepancies and actions taken.
 - f. Verify proper operation of needlepoint bipolar ionization unit. Repair, record and report all discrepancies and actions taken.
 - g. Secure all loose housing, seal leaks and touch up paint after cleaning rust. Correct, record and report all discrepancies and actions taken.
 - h. Check and calibrate control valve. Repack valve stem as necessary. Correct, record and report all discrepancies and actions taken.
 - i. Service thermostats, clean, and calibrate. Correct, record and report all discrepancies and actions taken.
 - j. Check and calibrate all direct digital and/or electric/electronic temperature controls. Correct, record and report all discrepancies and actions taken.
 - k. Check and record motor power supply voltage and amperes. Record chilled water supply and return temperatures, chilled water supply and return pressures. Correct, record and report all discrepancies and actions taken.
 - l. Certify performance of annual scheduled maintenance service and that all discrepancies have been reported and corrected.
2. VENTILATING FANS (Return and Outside Air)

Quarterly Service

- a. Check motor-controlled and back-draft dampers for proper operation; lubricate linkage for free movement. Correct, record and report all discrepancies and actions taken.
- b. Lubricate fan motors and bearings. Correct, record and report all discrepancies and actions taken.

- c. Check belt wear and tension and record findings; adjust or replace as needed. Correct, record and report all discrepancies and actions taken.
- d. Check sheaves for wear and record findings. Replace as needed. Correct, record and report all discrepancies and actions taken.
- e. Check fan collar, bearings, and shaft for wear. Correct, record and report all discrepancies and actions taken.
- f. Replace air filters where installed; clean grilles, registers and diffusers. Correct, record and report all discrepancies and actions taken.
- g. Read and record motor power supply voltage and amperes. Correct, record and report all discrepancies and actions taken.
- h. Check two-speed motor for proper operation; check refrigerant sensor control of motor speed for proper operation. Correct, record and report all discrepancies and actions taken.
- i. Certify performance of quarterly scheduled maintenance service and that all discrepancies have been reported and corrected.

Semi-Annual Service

- a. Check and clean fan wheels and housings of dust, dirt, and grease. Correct, record and report all discrepancies and actions taken.
- b. Remove and wash all intake grilles and dampers and repair or replace deteriorated bird screens. Correct, record and report all discrepancies and actions taken.
- c. Certify performance of semi-annual scheduled maintenance service and that all discrepancies have been reported and corrected.

3. PIPING, VALVES, AND PIPE SUPPORTS

Annual service

- a. The Contractor shall exercise all equipment shut-off valves annually for proper operation and tightness. Repair, record and report all discrepancies and actions taken.
- b. Wirebrush rust from pipe, equipment and support surface. Then prime and paint cleaned equipment and support surface to prevent further rusting. Repair, record and report all discrepancies and actions taken.
- c. Certify performance of annual scheduled maintenance service and that all discrepancies have been reported and corrected.

4. CLEANING OF MECHANICAL EQUIPMENT ROOMS

Monthly Service

- a. Vacuum or wipe clean all equipment surfaces and all related appurtenances. Repair, record and report all discrepancies and actions taken.
- b. Vacuum clean or sweep complete floor and platform areas. DO NOT wet floor and platform area where there is no waterproofing. Repair, record and report all discrepancies and actions taken.
- c. Wet wash complete floor and platform area with tap water where there is waterproofing. Correct, record and report all discrepancies and actions taken.
- d. Remove all used, deteriorated, replaced, discarded parts and related debris. Report all discrepancies and actions taken.

CAUTION: DO NOT splash water onto the electrical and mechanical equipment.

- e. Notify Manager-in-Charge of any dangerous conditions, improper storage of furniture, materials and supplies which impacts your work within rooms and enclosures, including vandalism. Repair, record and report all discrepancies and actions taken.
- f. Certify performance of monthly scheduled maintenance service and that all discrepancies have been reported and corrected.

END OF SECTION

SERVICE MAINTENANCE REPORT

DATE: _____ SHEET NO. _____

1. Name of Facility and Location: _____

2. Submitted By: _____

3. Date of Service Call: _____

4. Name of Person(s) Making Call: _____

5. Time In; Time Out at Site: _____

6. Person(s) Contacted: _____

7. Nature of Service Call: (Routine Maintenance, or Emergency Explain).

8. Equipment Readings and Maintenance Performed: (List all items serviced; identify - 8a, 8b, 8c...etc.)

SECTION 15955 – DIRECT DIGITAL CONTROL SYSTEMS

PART 1 - GENERAL

1.01. GENERAL CONDITIONS

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

1.02. DESCRIPTION OF WORK

- A. A complete Energy Management and Control System (EMCS) shall be provided to control and/or to monitor building systems as outlined in the descriptions of operation, drawings, and this specification. The EMCS shall employ direct digital control (DDC).
 - 1. Provide all software, hardware and cabling necessary for communication between operator stations, controllers, sensors, actuators, and other devices.
 - 2. Controls contractor shall be responsible for connecting all BACnet compatible equipment to the EMCS network. The connection may be via the contractor's specific network or ethernet. The controls contractor is not required to add BACnet translation devices for equipment that does not include a BACnet option by its manufacturer.
- B. Related sections:
 - 1. Section 15010 - General Mechanical Provisions
 - 2. Section 15600 - Air Conditioning and Ventilation

1.03. APPROVED MANUFACTURERS

- A. Provide an HVAC control system with input/output units, integrate all new components with the facility's existing Johnson Controls Metasys BAS.
- B. Design, component selection, installation, custom programming, documentation, testing, training, and warranty service shall be the direct responsibility of the manufacturer or their local representative.

1.04. REFERENCES

- A. NFPA 70 – 2011, National Electric Code

- B. ASHRAE 135-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks
- C. UL 916-2015, Standard for Energy Management Equipment
- D. ANSI C12.10-2011, Physical Aspects of Watt-hour Meters – Safety Standard
- E. IEEE C57.13.2-2005, Standard Conformance Test Procedure for Instrument Transformers
- F. SMACNA DCS-2020, HVAC Duct Construction Standards – Metal and Flexible
- G. ASME B16.5-2020, Pipe Flanges and Flanged Fittings: NPS ½ Through NPS 24
- H. ASTM A 126-04-2019, Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
- I. UL 506-2017, Standard for Specialty Transformers
- J. UL 1449-2021, Standard for Surge Protective Devices
- K. NFPA 90A-2021, Standard for the Installation of Air Conditioning and Ventilating Systems
- L. UL 555S-2014, Standard for Smoke Dampers
- M. ANSI/ASME B40.100-2022, Pressure Gauges and Gauge Attachment

1.05. DEFINITIONS

- A. BACnet: BACnet is a standard communication protocol under development by the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE). The controller manufacturer shall have a company policy to support the implementation of BACnet.
- B. Digital Controller: A control module which is microprocessor based, programmable by the user, has integral I/O, and performs stand-alone operations.
- C. Direct Digital Control (DDC): A digital controller as defined in this document. The controller directly senses building environment and makes control decisions based on user defined, controller resident programs. The controller outputs control signals that directly operate valves, dampers, and motor controllers. No conventional control devices, pneumatic or electronic, such as receiver-controllers, thermostats, and logic units are present within or interface with a direct digital control loop. Actuators are electric or pneumatic, and the controller output is converted to the appropriate type of

signal.

- D. DDC System: A system made up of one or more digital controllers. Required climate control and energy management functions for complete operation of an HVAC system are provided by DDC from digital controllers. No conventional control devices (pneumatic or electronic) such as receiver-controllers, thermostats, and logic units are used. Digital controllers in a system are linked in a communication network composed of one or more levels of local area networks (LAN).
- E. Distributed Control: The intent of distributed control is to install the controllers near the equipment being controlled, and to distribute the processing to each standalone DDC panel. The control system is built up of stand-alone controllers, utilizing sensor inputs and control outputs.
- F. Dynamic Control: A process that optimizes operation of HVAC systems (air handler units, converters, chillers, and boilers) by increasing and decreasing setpoints or starting and stopping equipment in response to heating and cooling needs of downstream equipment. A requirement of dynamic control is knowing the heating/cooling demand status of downstream equipment, therefore dynamic control requires controllers connected in a communications network.
- G. Firmware: Firmware is software programmed into read only memory (ROM) and erasable programmable read only memory (EPROM) chips. Software may not be changed without physically altering the chip.
- H. Graphic Sequence of Operation: A drawing or graphic showing all interlocks and control loop sequences between the input and output points. Graphic sequence of operation is a graphical representation of the sequence of operation. The graphic sequence of operation will show all inputs, outputs, and logic blocks.
- I. Hand-Held Terminal: A hand-held terminal is a portable device, control system manufacturer-specific, which can be connected directly to a communications port on a digital controller and through which the digital controller can be interrogated and, in some cases, programmed.
- J. Input/Output (I/O): I/O refers to analog inputs (AI), digital inputs (DI), analog outputs (AO), and digital outputs (DO) in a digital controller. Inputs are from analog sensors (temperature, pressure, humidity, flow) and digital sensors (motor status, flow switches, switch position, and pulse output devices). Outputs operate modulating and on/off control devices.
- K. I/O Unit: An I/O unit provides additional point capacity to a digital controller and communicate with the stand-alone digital controller on LAN. An I/O unit is not stand-alone because the control program does not reside in the I/O units

- microprocessor.
- L. Integration: The ability of control system components to have interoperability between different manufacturers to connect together and provide coordinated control via real-time data exchange and control functions through a common communications data exchange protocol. Integration shall extend to the operator's workstation software, which shall support user interaction with all control system components. Methods of integration include industry standard protocols such as: BACnet, ARCnet, LonMark/LonTalk, OLE for Process Control (OPC) or integrator interfaces between cooperating manufacturer's systems.
 - M. Local Area Network (LAN):
 1. A communications bus that interconnects digital controllers for peer-to-peer communications. Different levels of LANs are possible within a single DDC system. In this case a digital controller on a higher-level LAN acts as a network controller to the controllers on the lower-level LAN. The network controller, then, has at least two LAN communications ports. One port supports peer-to-peer communications with other digital controllers on the higher-level LAN. The other port supports communications with the digital controllers on the lower-level LAN.
 2. LANs permit sharing global information, make it possible to apply building wide control strategies such as peak demand limiting, permit dynamic control strategies, allow coordinated response to alarm conditions, and permit remote monitoring and programming of digital controllers.
 3. Facility-wide LAN refers to a commercially available local area network. These LANs allow the connection to an existing or new facility-wide LAN.
 - N. Microprocessor: A microprocessor refers to the central processing unit (CPU) that contains all the registers and logic circuitry that make it possible for digital controllers to do computing.
 - O. MS/TP: Master slave/token passing.
 - P. Open Protocol Bus (OPB): A pre-programmed communications integrator that allows devices from one manufacturer to communicate and interact with those of another.
 - Q. Open System Port (OSP): A user programmable communications port that provides the ability to develop custom communications processes to integrate other operating systems with the DDC System.
 - R. Output Signal Conversion: Output signal conversion refers to the changing of one kind of control output into a proportionally related signal appropriate for direct actuation of the controlled device. Signals are converted by a transducer which may be external to the digital controller originating the output.

1. Examples in modulating control of pneumatic actuators are conversion of 4-20 mA signals into proportional 3-15 psig signals.
 2. An example of output signal conversion in on/off or open/close control is a contact closure originating in a digital controller which activates a solenoid air valve which passes main air, thereby forcing a damper to open fully.
- S. Optimum Start: Optimum start is a method of starting the HVAC equipment prior to occupancy time in order to have the building at setpoint at occupancy. Optimum start shall be based on the zone temperatures, zone setpoints, and outdoor temperature. Optimum start will bring the zone to setpoint at occupancy time.
- T. PC: Personal computer.
- U. Peer-to-Peer: Peer-to-Peer refers to controllers connected on a communications LAN that act independently, as equals and communicate with each other to pass information which facilitates control.
- V. PID: PID refers to proportional, integral, and derivative control; the three types of action that are used in controlling modulating equipment.
- W. Resolution: Refers to the number of possible states an input value or output value can take and is a function of the digital controller I/O circuitry; the A/D converter for input and the D/A converter for output. Ten-bit resolution has 1024 possible states and 16-bit resolution has 65,536 possible states.
- X. RTD: Resistance temperature detector.
- Y. Stand-Alone Control: Refers to the digital controller being able to perform required climate control, and energy management functions without connection to another digital controller or central site computer. Digital controller requirements for stand-alone control are a time clock, a microprocessor, microchip resident control programs, PID control, a communications port for interfacing with and programming the controller, firmware for interrogation and programming, and I/O for sensing and effecting control of its control environment.
- Z. Terminal Control Unit (TCU): An off-the-shelf, stand-alone digital controller equipped for communication on a lower-level local area network. TCUs may deviate from stand-alone only in receiving energy management and time information from a standalone digital controller. A TCU is commonly application specific and is used for distributed control of specific HVAC subsystems. A TCU communicates with the digital controllers. Typically, a TCU communicates on a lower-level LAN. Examples where TCUs might be used to control of small air handling units (AHUs), variable air volume (VAV) boxes, fan coil units, and heat pumps.

1.06. SUBMITTALS

A. Manufacturer's Catalog Data:

1. DDC hardware
2. DDC capabilities
3. Input devices
4. Output devices
5. Surge and transient protection
6. Panel mounted display and keypad

B. Equipment and software for which specification compliance data shall be submitted include but not limited to the following:

1. DDC Hardware:
 - a. I/O; capable of supporting platinum RTD, precision thermistor, 4-20 ma, 0-10 VDC.
 - b. Programs will reside in microprocessor; controllers are stand-alone.
 - c. Communications ports; all communications ports as specified
 - d. Protected memory; minimum hours required by this specification.
 - e. Operating temperature limits
2. DDC Capabilities:
 - a. Communications; baud rate, communication ports, stand-alone.
 - b. Trending; capable of trending every point.
 - c. Alarming; capable of alarm generation as indicated.
 - d. Messages; as indicated.
 - e. Self-diagnostics; identification of a failed module.
 - f. PID control; capable of PID control
3. Input Devices:
 - a. Transmitters; accuracy, 4-20 mA, 0-10 VDC.
 - b. Temperature sensors; accuracy, stability, 100 percent factory screening, platinum RTD or thermistor.
 - c. Humidity sensors; type of sensor, accuracy, range, and stability.
 - d. Pressure sensor; accuracy.
 - e. Flow or motor proof; type.
 - f. Sensor wells; type
4. Output Devices:
 - a. Dampers; types
 - b. Valves; types
 - c. Actuators
 - d. Control Relays
5. External Surge and Transient Protection:
 - a. Power line
 - b. Communications links and/or devices (between buildings)

- C. Drawings: Submit the following drawings:
1. Control system schematic.
 2. Layout of floor showing location of panels, equipment, sensors and other control devices.
- D. Design Data: Submit test data demonstrating the following installed components will meet specification requirements.
1. Temperature sensor accuracy: Submit manufacturer specification of temperature sensor accuracy. Literature shall make clear sensor accuracy as specified.
 2. Temperature sensor stability: Provide manufacturer specification of five year stability of RTDs and thermistors. Literature shall make clear sensor stability as specified.
- E. Schedules:
1. List of shop drawings.
 2. List of symbols and abbreviations used on shop drawings.
 3. List of I/O points: For each input and output physically connected to a digital controller provide, on a controller by controller basis, provide the following:
 - a. Point description: for example: mixed air temperature, supply fan start/stop, etc.
 - b. Point type: AO, AI, DO, or DI.
 - c. Point range: 4-20 mA, 3-15 psi, platinum RTD resistance ohm, thermistor.
 - d. Sensor range associated with point range: for example, 0-100°F, 0-2-inches of water.
 - e. Software name(s) associated with point, if any.
 - f. Terminal number to which point is connected.
 4. Equipment components list: Submit a listing of controllers and connected devices shown on control system schematic. List the following:
 - a. Control system schematic component name.
 - b. Description.
 - c. Manufacturer of controller.
 - d. Controller's name.
 - e. Equipment part numbers.
 - f. Cv for valves.
 - g. For actuators:
 - 1) Motive force (such as pneumatic, or electric)
 - 2) Normal position
 - 3) Response time
 - 4) Nominal operating range (such as 3-7 psi, 4-8 mA)
 5. AC power table: Submit a table listing each controller and the circuit breaker number, panel box number, and physical location of each controller's source of AC power.

F. Statements:

1. Contractors' qualifications: Submit statements required in Part 1, Quality Assurance, Qualifications.
2. Training: Submit schedule, syllabus, and training materials in accordance with PART 3 - EXECUTION.

G. Records:

1. Training course documentation: Training course documentation shall include a manual for each trainee plus two additional copies and two copies of audiovisual training aids, if used. Documentation shall include an agenda, defined objectives for each lesson and detailed description of the subject matter of each lesson.
2. Service organization: Qualified service organization list that shall include the names and telephone numbers of organizations qualified to service the HVAC control systems.
3. Contractor certification: Provide certification that the installation of the control system is complete and the technical requirements of this section have been met.

H. Operations and Maintenance Manuals:

1. Controls and HVAC System Operators Manual: Construct and provide a Control and HVAC Systems Operators Manual. This manual is designed to document the HVAC and control system. Construct this manual using a 3-ring binder with a minimum of the following 7 sections. Use tabs to divide each section.
 - a. Section 4. Current Operating Parameters: Provide printouts of input and output setup information, database setups. This section is intended to provide information such as point addresses, slopes and offsets for all points, database of points, etc.
 - b. Section 5. Design Information: Provide tab but leave this section blank.
 - c. Section 6. Control Equipment Cut Sheets: Provide cut sheets of all controller hardware and accessories. Include temperature versus resistance charts for temperature sensors, and calibration charts for pressure transducers.
2. DDC Manufacturer's Hardware and Software Manuals:
 - a. Section 1. Installation and Technical Manuals for all digital controller hardware.
 - b. Section 2. Operators Manuals for all digital controllers.
 - c. Section 3. Programming Manuals for all digital controllers.

1.07. QUALITY ASSURANCE

A. General:

1. The Direct Digital Control (DDC) System herein specified shall be fully integrated and installed as a complete package by the Direct Digital Control System Contractor. The System shall include all wiring, piping, installation supervision, calibration, adjustments, and checkout necessary for a complete and fully operational system.

2. The Direct Digital Control System Contractor shall be regularly engaged in the engineering, programming, installation and service of Direct Digital Control Systems of similar size and complexity.
 3. The DDC Contractor shall have a local facility on Oahu. Emergency service shall be available on a 24-hour, 7-day-a-week basis.
 4. The DDC Contractor shall be responsible for all work fitting into place in a satisfactory and neat workmanlike manner acceptable to the Officer-in-Charge.
- B. Experience Record:
1. The DDC Contractor shall have a minimum of five years experience with the complete installation of Direct Digital Control Systems of similar size and technical complexity. The DDC Contractor shall provide a list of three comparable projects that have Direct Digital Control Systems with the features as specified for this project. These projects must be on-line and functional.
 2. The DDC Contractor shall employ specialists in the field of Direct Digital Control Systems including: Programming, Engineering, Field Supervision and Installation. Specialists shall present factory training certification of the submitted equipment upon request.
- C. Governing Code Compliance: The DDC Contractor shall comply with all current governing codes, ordinances and regulations, including UL, NFPA, the local Building Code, NEC, etc.
- D. FCC Regulations: All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Section 15, Governing Radio Frequency Electromagnetic Interference, and be so labeled.
- E. Standard Products:
1. Materials and equipment shall be standard products of manufacturer regularly engaged in the manufacturing of such products, using similar materials, design and workmanship. The standard products shall have been in commercial or industrial use for 2-years prior to bid opening. The 2-year use shall include applications of similarly sized equipment and materials used under similar circumstances. The 2-year experience must be satisfactorily completed by a product which has been sold on the commercial market through advertisements, manufacturer's catalogs, or brochures.
 2. The equipment items shall be supported by a service organization.
- F. Nameplate and Tags:
1. Nameplates bearing legends as shown and tags bearing device unique identifiers as shown shall be engraved or stamped. Nameplates shall be permanently attached to HVAC control panel doors.
 2. For each field mounted piece of equipment, not in a finished area, a plastic or metal tag with equipment name and point identifier shall be attached.

- G. Verification of Dimensions: The contractor shall become familiar with all details of the work, shall verify all dimensions in the field, and shall advise the Officer-in-Charge of any discrepancies before performing the work.
- H. Drawings: Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. The Contractor shall carefully investigate the mechanical, electrical, and finish conditions that could affect the work to be performed and shall finish all work necessary to meet such conditions.
- I. Modification of References: The advisory provision in ASME B31.1 and NFPA 70 shall be considered mandatory. Substitute the word “shall” for “should” wherever it appears and interpret all references to the “Authority Having Jurisdiction” and “Owner” to mean the State.
- J. Storage: Stored products shall be protected from the weather, humidity and temperature variations, dirt and dust, and other contaminants, within the storage condition limits published by the equipment manufacturer.

1.08. WORK INCLUDED

- A. Installation of Direct Digital Control (DDC) System:
 - 1. The DDC Contractor shall furnish and install a complete Direct Digital Control (DDC) System for all mechanical systems and other facility systems as included in the project documents. The DDC system will provide the functional features as defined in Part 1 - General Requirements, Part 2 - Products, and Part 3 – Execution, of these Specifications. The DDC Contractor shall provide a complete and operational system to perform all sequences of operations stated within Part 3 or shown on the control drawings.
 - 2. The work under this Section shall include all materials and labor to perform all work required for the installation of the DDC as specified.
 - 3. The drawings and specifications are complementary to one another - meaning that what is called for on one is to be considered called for in both. Where conflicts exist between the specifications and/or drawings, the more stringent requirement shall apply.
 - 4. The DDC Contractor shall be responsible for field verification of site conditions and for gathering all necessary field data for all items to be provided under this contract prior to submitting his or her bid.
 - 5. Where work specified under other Sections of this Specification connects to equipment or systems that are listed and described in this Section, the DDC Contractor shall provide proper connection(s) to such equipment including trade coordination.

1.09. COORDINATION

A. Divisions:

1. The DDC Contractor shall cooperate with other divisions performing work on this project as necessary to achieve a complete and neat installation. The Contractor shall also consult the drawings and specifications of all trades to determine the nature and extent of others' work.
2. Contractors, Sub-contractors, Employees - It will be the duty of this Contractor to work in cooperation with other contractors, and with other sub-contractors and employees, rendering assistance and arranging his or her work so that the entire project is complete and neat installation.

1.10. MANUALS

- A. All manuals shall be provided in hard copy format or on a single CD (compact disc) or DVD as part of an on-line documentation system through the operator workstation.

PART 2 - PRODUCTS

2.01. SYSTEM ARCHITECTURE

A. First Tier Network:

1. The first tier network shall be based on a PC industry standard of Ethernet TCP/IP, or ARCnet. PC Workstation LAN controller cards shall be standard "off the shelf" products available through normal PC vendor channels.
2. The DDC system shall network multiple operator workstations, network controllers, system controllers, and application-specific controllers. The first tier network shall provide communications between operator workstations and first tier DDC (Direct Digital Control) controllers.
3. The first tier network shall operate at a minimum communication speed of 10 Mbps, with full peer-to-peer network communication.
4. Network Controllers shall reside on the first tier.

B. First Tier Network Protocol Integration:

1. The protocol used between two different vendor systems will be BACnet over Ethernet and shall comply with the ASHRAE BACnet Standard 135-2016.
2. The system installed under this contract shall allow bi-directional communications between the existing host system if applicable or a BACnet system over an Ethernet TCP/IP data link, or ARCnet. Supported media shall include fiber, 10base2, and 10baseT.
3. A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.

4. The ability to share data and change of state (COS) between the existing designated host system and the system installed under this contract shall be provided.
- C. Second Tier Network:
1. The second tier network is used to communicate between the first tier DDC controllers and field controllers.
 2. Second tier networks shall utilize either “Peer-to-Peer,” Master-Slave, or Supervised Token Passing communications or LONWORKS.
- D. Second Tier Controller Protocol Integration:
1. Hardwired:
 - a. Analog and digital signal values shall be passed from one system to another via hardwired connections.
 - b. There will be one separate physical point on each system for each point to be integrated between the systems.
 - c. Analog points will be 4-20 mA signals originating at the “from system” and being received by the “to system”.
 - d. Digital points will be “dry contact” signals originating at the “from system” and being received by the “to system.”
 2. Direct Protocol:
 - a. The DDC system shall include appropriate hardware equipment and software to allow data communications between the DDC system and 3rd party manufacturers control panels. The DDC shall receive, react to, and return information from multiple building systems, variable frequency drives, power monitoring systems, etc.
 - b. All data required by the application shall be mapped into the First Tier Network DDC Controller’s database and shall be transparent to the operator.
 - c. Point inputs and outputs from the third-party controllers shall have real-time interoperability with DDC software features such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, Totalization, and Dial-Up and Local Area Network Communications.
 - d. Integration shall be via RS-232 or RS-485 technologies.
 - e. The system operator shall have the ability to verify and diagnose communication messages and point information between third-party controllers and the DDC system.

2.02. DDC SYSTEM

- A. The existing DOT-A Direct Digital Control System (DDCS) is a Johnson Controls, Inc. (JCI) Metasys system. Contractor shall hire JCI to provide all work related to the DDCS and controls under this contract. JCI is required to connect all DDCS points to the existing DOT-A system, including necessary programming.

- B. Provide an operator programmable system, based on the user applications, to perform closed-loop, modulating and/or on-off control of building equipment. Connect all digital controllers through the communication network to share common data and report to workstation computers. The workstation computers will be capable of being programmed to supervise the digital controllers. The control system shall be capable of down-loading and up-loading of programs between the workstation and the digital controllers.

- C. Provide the quantity of digital controllers indicated on the drawings that will perform required climate control, energy management, and alarm functions. The quantity of controllers shall be no less than the number shown on drawings. All material used shall be currently in production.
 - 1. Direct Digital Controllers: DDC hardware shall be UL 916 rated.
 - a. Distributed Control: Apply digital controllers in a distributed control manner.
 - b. Environmental Operating Limits: Provide digital controllers that operate in environmental conditions between 32 and 120°F.
 - c. Stand-Alone Control: Provide stand-alone digital controllers.
 - d. Internal Clock: Provide clock with each controller on the first tier local area network (LAN) and shall have its clock backed up by a battery or capacitor with sufficient capacity to maintain clock operation for a minimum of 72 hours during a line power outage.
 - e. Memory:
 - 1) Provide sufficient memory for each controller to support required control and communication functions.
 - 2) Memory Protection: Programs residing in memory shall be protected either by using EEPROM or by an uninterruptible power source (battery or uninterruptible power supply (UPS)). The backup power source shall have sufficient capacity to maintain volatile memory in event of an AC power failure. Where the uninterruptible power source is rechargeable (a rechargeable battery), provide sufficient capacity for a minimum of seventy-two hours back-up. The rechargeable power source shall be constantly charged by charging circuitry while the controller is operating under normal line power. Where a non-rechargeable power source is used, provide sufficient capacity for a minimum of two years accumulated power failure. Batteries shall be designed to allow replacement without soldering.
 - f. Inputs: Provide input function integral to the direct digital controller. Provide input type as required by the DDC design.
 - 1) Analog Inputs: Allowable input types are three wire 100 ohm or higher platinum RTD's, stable 10,000 ohm thermistors, 0-10 VDC and 4 to 20 mA. Thermistor and direct RTD inputs must have appropriate conversion curves stored in controller software or firmware. Analog to digital (A/D) conversion shall be a minimum of 10-bit resolution.

- 2) Digital Inputs: Digital inputs shall sense open/close, on/off, or other two state indications.
- g. Outputs: Provide output function integral to the direct digital controller. Provide output type as required by the DDC design. Ensure that outputs of controllers are compatible with controlled devices.
 - 1) Analog Outputs: Provide controllers with a minimum output resolution of 8 bits. Output shall be 4 to 20 mA or 3 to 15 psi or 0-10 VDC. Each pneumatic output shall have feedback for monitoring of the actual pneumatic signal. Feedback shall be integral to the output function.
 - 2) Digital Outputs: Provide contact closure with contacts rated at a minimum of 1 ampere at 24 volts.
- h. PID Control: Provide controllers with proportional, proportional plus integral, and proportional plus integral plus derivative control capability. Terminal controllers are not required to have the derivative component.
- i. Digital Controller Networking Capabilities: The upper level digital controllers shall be capable of being networked with other similar upper level controllers. Upper level controllers shall also be capable of communicating over a network between buildings.
- j. Communications Ports:
 - 1) Controller-to-Controller LAN Communications Ports: Controllers in the building DDC system shall be connected in a communications network. Controllers shall have controller to controller communication ports to both peer controller (lower level controller). Network may consist of more than one level of local area network and one level may have multiple drops. Communications network shall permit sharing between controllers of sensor and control information, thereby allowing execution of dynamic control strategies and coordinated response to alarm conditions.
 - 2) On-Site Interface Ports: Provide a RS-232, RS-485, or RJ-11, or RJ-45 communications port for each digital controller that allows direct connection of a computer or hand-held terminal and through which the controller may be fully interrogated. Controller access shall not be limited to access through another controller. On-site interface communication ports shall be in addition to the communications port(s) supporting controller to controller communications. Communication rate shall be 56K Baud minimum. Every controller on the highest level LAN shall have a communications port supporting direct connection of a computer; a hand held terminal port is not sufficient. By connecting a computer to this port, every controller in the direct digital control system shall be able to be fully interrogated and programmed. The following operations shall be available: downloading and uploading control programs, modifying programs and program data base, and retrieving or accepting trend reports, status reports, messages, and alarms.

- 3) Remote Work Station Interface Port: Provide one additional direct connect computer port in each DDC system for permanent connection of a remote operator's workstation, unless the workstation is a node on the LAN. All operations possible by directly connecting a computer to a controller at the highest level LAN shall be available through this port.
 - 4) Telecommunications Interface Port: Provide one additional telecommunications port in each DDC system permitting remote communications via telephone. All operations possible by directly connecting a computer to a controller at the highest level LAN shall be available through the telecommunications port. A telecommunications port provided on a digital controller shall be in addition to the port required for directly connecting a computer to the controller. Telecommunication baud rate shall be 96K minimum.
- k. Digital Controller Cabinet: Each digital controller cabinet shall protect the controller from dust and be rated NEMA 1, unless specified otherwise. Controller cabinets or enclosures the controllers are mounted in shall be provided with a lock.
 - l. Main Power Switch: Each controller on the highest level LAN shall have a main power switch for isolation of the controller from AC power. The switch shall be protected from tampering within the DDC cabinet.

2.03. SENSORS AND INPUT HARDWARE

A. Field Installed Temperature Sensors:

1. Thermistors: Precision thermistors may be used in temperature sensing applications below 200°F. Sensor accuracy over the application range shall be 0.36°F or less between the range of 32 to 150°F. Sensor manufacturer shall utilize 100 percent screening to verify accuracy. Thermistors shall be pre-aged, and inherently stable. Stability error of the thermistor over five years shall not exceed 0.25°F cumulative. Sensor element and leads shall be encapsulated. Bead thermistors are not allowed. A/D conversion resolution error shall be kept to 0.1°F. Total error for a thermistor circuit shall not exceed 0.5°F, which includes sensor error and digital controller A/D conversion resolution error. Provide thermistor and digital controller manufacturer documentation and the Contractor's engineering calculations which support the proposed thermistor input circuit will have a total error of 0.5°F or less. Provide 18 gage twisted and shielded cable for thermistors.
2. Resistance Temperature Detectors (RTDs): Provide RTD sensors with 1000 ohm, or higher, platinum element that is compatible with digital controllers. Sensors shall be encapsulated in epoxy, series 300 stainless steel, anodized aluminum, or copper. Temperature sensor accuracy shall be 0.1 percent (1 ohm) of expected ohms (1000 ohms) at 32°F. Temperature sensor stability error over five years shall not exceed 0.25°F cumulative. Direct connection of RTDs to

digital controllers, without transmitters, is preferred provided controller supports direct connection of RTDs. When RTDs are connected directly to the controller, keep lead resistance error to 0.25°F or less. Provide 3 wire sensing circuits to not exceed the 0.25°F lead resistance error. Total error for a RTD circuit shall not exceed 0.5°F, which includes sensor error, lead resistance error or 4 to 20 mA transmitter error, and A/D conversion resolution error. Provide manufacturer documentation and the Contractor's engineering calculations which support the proposed RTD circuit will have a total error of 0.5°F or less for the specified application.

- a. Wiring: Provide 18-gage twisted and shielded pair cable for direct connected RTDs. Provide 18-gage twisted and shielded pair cable for RTDs using 4 to 20 milliampere transmitters.
- b. Transmitters: Provide 4 to 20 mA transmitters for RTDs where Digital controllers do not support direct connection of RTDs to controllers; Digital controllers do not meet temperature resolution requirement of 0.5°F.

3. Temperature Sensor Details:

- a. Room: Conceal element behind protective cover matched to the room interior. Room temperature sensor shall have integral pushbutton, digital input to the controller for system override, and a setpoint adjustment, analog input to the controller. Digital sensors that communicate directly with the terminal control unit are acceptable. Provide a connection to allow interrogation of the digital controller.
- b. Duct Averaging Type: Continuous averaging RTDs for ductwork applications shall be 1 foot in length for each 4 square feet of ductwork cross-sectional area with a minimum length of 6 feet. Probe type duct sensors of one foot length minimum are acceptable in ducts 12 feet square and less.
- c. Immersion Type: 3 inches and 6 inches where needed total immersion for use with sensor wells, unless otherwise indicated.
- d. Sensor Wells: Brass materials; provide thermal transmission material compatible with the immersion sensor. Provide heat-sensitive transfer agent between exterior sensor surface and interior well surface.
- e. Outside Air Type: Provide element on the buildings north side with sunshade to minimize solar effects. Mount element at least 3 inches from building outside wall. Sunshade shall not inhibit the flow of ambient air across the sensing element. Shade shall protect sensing element from rain.

- B. Transmitters: Transmitters shall have 4 to 20 mA, or 0-10 VDC output linearly scaled to the temperature, pressure, humidity, or flow range being sensed. Transmitter shall be matched to the sensor, factory calibrated, and sealed. Total error shall not exceed 0.1 percent of 20 milliampere (0.02 milliampere) at any point across the 4 to 20 mA span. Supply voltage shall be 24 volts ac or dc. Transmitters shall have non-interactive offset and span adjustments. For temperature sensing, transmitter stability shall not exceed 0.05°F a year.

1. Spans and Ranges: Transmitter spans or ranges shall be the following and shall be suitable for the application:

- a. Temperature
 - 1) 50°F span: Room, chilled water, cooling coil, discharge air, return air sensors.
 - 2) 100°F span: Outside air, hot water, heating coil discharge air, mixed air sensors
- b. Pressure:
 - 1) 0 to 100 psi differential: Water differential range
 - 2) 0 to 5 inches water range: Duct static pressure
- C. Relative Humidity Transmitters: Provide integral humidity transducer and transmitter. Output of relative humidity instrument shall be a 4 to 20 milliamper or 0 to 10 VDC signal proportional to 0 to 100 percent relative humidity input. Accuracy shall be 2 percent of full scale within the range 20 to 80 percent relative humidity. Sensing element shall be chilled mirror type, polymer, or thin film polymer type. Supply voltage shall be 24 VDC. Transmitter shall meet specified requirements.
- D. Pressure Transmitters: Provide integral pressure transducer and transmitter. Output of pressure instrument shall be a 4 to 20 milliamper or 0 to 10 VDC signal proportional to the pressure span. Span shall be as specified. Accuracy shall be 1.0 percent. Linearity shall be 0.1 percent. Supply voltage shall be 24 VDC. Transmitter shall meet specified requirements.
- E. Current Transducers: Provide current transducers to monitor amperage of motors. Select current transducer range for normal amperage to be above 50 percent of the range. Current transducers shall have an accuracy of 1 percent and a 4 to 20 milliamper output signal.
- F. Input Switches:
 - 1. Differential Static Pressure Switch: Provide diaphragm type differential static pressure switches for binary (two position) operation as specified in sequence of operation. Devices shall withstand pressure surges up to 150 percent of rated pressure. Contacts shall be single pole double throw and switch may be wired for normally open or normally closed operation. Trip set point shall be adjustable. Pressure switch shall be sized so that operating pressure trip point is approximately midpoint of pressure switch adjustable range. Repetitive accuracy shall be 2 percent.
 - 2. Induced Current Operated Solid-State Switches: Provide adjustable ranging to monitor continuous loads up to 200 amperes. Switch shall indicate whether it is normally open or normally closed. Limit off-state leakage to 2 milliamper or less.
 - 3. Timed Local Override: Provide momentary contact push button override with override time set in controller software. Provide to override DDC time of day program and activate occupancy program for assigned units. Upon expiration of

override time, the control system shall return to time-of-day program. Time interval for the length of operation shall be software adjustable and shall expire unless reset.

2.04. OUTPUT HARDWARE

A. Damper: Damper shall conform to SMACNA DCS

1. A single damper section shall have blades no longer than 48 inches and shall be no higher than 72 inches. Maximum damper blade width shall be 8 inches. Larger sized damper shall be made from a combination of sections.
2. Dampers shall be steel, or other materials where shown. Flat blades shall be made rigid by folding the edges. Blades shall be provided with compressible seals at points of contact. The channel frames of the dampers shall be provided with jamb seals to minimize air leakage. Dampers shall not leak in excess of 20 cfm per square foot at 4-inches water gage static pressure when closed. Seals shall be suitable for an operating temperature range of minus 40°F to 200°F. Dampers shall be rated at not less than 2000 fpm air velocity. All blade-connecting devices within the same damper section will not be located directly in the air stream. Damper axles shall be 0.5-inch (minimum) plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically shall be supported by thrust bearings. Pressure drop through dampers shall not exceed 0.04-inch water gage at 1000 fpm in the wide open position. Frames shall not be less than 2-inches in width. Dampers shall be tested in accordance with AMCA 500.
3. Operating links external to dampers (such as crankarms, connecting rods, and line shafting for transmitting motion from damper actuators to dampers) shall withstand a load equal to twice the maximum required damper-operating force. Rod lengths shall be stainless steel. Working parts of joints and clevises shall be brass, bronze, or stainless steel. Adjustments of crankarms shall control the open and closed position of dampers.

B. Valves:

1. Valve Assembly: Valves shall have stainless steel stems. Valve bodies shall be designed for not less than 125-psig working pressure or 150 percent of the system operating pressure, whichever is greater. Valve leakage rating shall be 0.01 percent of rated Cv. Class 125 copper alloy valve bodies and Class 150 steel or stainless steel valves shall conform to ASME/ANSI B16.5 as a minimum. Cast iron valve components shall conform to ASTM A 126 Class B or C as a minimum.
2. Butterfly Valve Assembly: Butterfly valves shall be threaded lug type suitable for dead-end service and for modulation to the fully closed position, with noncorrosive discs, stainless steel shafts supported by bearing, and EPDM seats suitable for temperatures from minus 20°F to plus 250°F. Valves shall have a manual means of operation independent of the actuator.
3. Two-Way Valves: 2-way control valves shall be full modulation type.

4. Valves for Chilled Water Service: Bodies for valves 1-1/2 inches and smaller shall be brass or bronze, with threaded or union ends. Bodies for valves from 2-inches to 3-inches inclusive shall be of brass, bronze or iron. Bodies for 2-inch valves shall have threaded ends. Bodies for valves from 2-1/2- to 3-inches shall have flanged-end connections. Internal valve trim shall be brass or bronze except that valve stems may be Type 316 stainless steel. Water valves shall be sized for a 3-psi differential through the valve at rated flow, except as indicated otherwise. Select valve flow coefficient (Cv) for an actual pressure drop not less than 50 percent or greater than 125 percent of the design pressure drop at design flow. Valves 4-inches and larger shall be butterfly valves.
- C. Actuator: Provide electric type with spring return so that, in the event of power failure, actuators shall fail safe in either the normally open or normally closed position as specified. Actuators shall be quiet operating and function properly within the range of 85 to 110 percent of the motive power. Provide a minimum of one actuator for each damper.
1. Electric Actuators: Provide direct drive electric actuators for all damper control applications. When operated at rated voltage, each operator shall be capable of delivering the torque required for continuous uniform movement of the valve or damper and shall have end switch to limit travel or shall withstand continuous stalling without damage. Operators shall function properly with range of 85 to 110 percent of line voltage. Provide gears of steel or copper alloy. Fiber or reinforced nylon gears may be used for torques less than 16-inch pounds. Provide hardened steel running shafts in sleeve bearing of copper alloy, hardened steel, nylon, or ball bearing. Provide two-position operators of the single direction, spring return, or reversing type. Provide proportioning operators capable of stopping at all points in the cycle and starting in either direction, from any point. Provide reversing and proportioning operators with limit switches to limit travel in either direction unless operator is stall type. Equip valve operators with a force limiting device such as spring yield so that, when in a relaxed position, device shall maintain a pressure on valve disc equivalent to system pressure at valve. Provide reversible shaded pole, split capacitor, synchronous, or stepped type electric motors.
- D. Output Switches
1. Control Relays: Shall be double pole, double throw (DPDT), UL listed, with contacts rated to the application, and enclosed in a dustproof enclosure. Equip with a light indicator which is lit when coil is energized and is off when coil is not energized. Relays shall be socket type, plug into a fixed base, and be replaceable without need of tools or removing wiring.

PART 3 - EXECUTION

3.01. INSTALLATION

A. General:

1. Workmanship: Provide properly trained skilled technicians, regularly employed in installation of DDC systems, qualified for the work and directed by experienced engineers.
2. Work Coordination: Sections 01400, CONTRACTOR QUALITY CONTROL PROGRAM.
3. Electrical Work and Safety Requirements: NFPA 70 and ANSI C2, and referenced electrical sections of these specifications.
4. Wiring: Comply with DIVISION 16 - ELECTRICAL. The term wiring is construed to include furnishing of wire, conduit, miscellaneous material, and labor to install a working system. Outdoor installations shall be of waterproof construction or in NEMA 3R or 4 enclosures.
5. Except for short apparatus connections, run conduit parallel to or at right angles to the building structure. Conceal conduit and tubing in finished spaces.
6. Do not run conduit concealed under insulation or inside ducts. Mount control devices and conduit located on ducts or apparatus with external insulation on stand-off support to avoid interference with insulation.
7. Run wire connecting devices on or in control cabinets parallel with the sides of the cabinet neatly racked to permit tracing. Rack connections bridging a cabinet door along hinge side and protect from damage. Provide grommets, sleeves, or vinyl tape to protect plastic tubing or wires from sharp edges of panels, conduit and other items.
8. Equipment and Materials Identification: DIVISION 1 - GENERAL REQUIREMENTS.

B. Field Materials

1. Sensors and Controls:
 - a. Provide all remote sensors and instrumentation.
 - b. Permanently mark terminal blocks for identification. Protect all circuits to avoid interruption of service due to short-circuiting or other conditions. Line-protect all wiring that comes from external sources to the site from lightning and static electricity.
 - c. Label or code each field wire at each end. Permanently label or code each point of all field terminal strips to show the instrument or item served. Color-coded cable with cable diagrams may be used to accomplish cable identification.
 - d. Temperature Sensors:
 - 1) Temperature sensors shall be readily accessible and adaptable to each type of application in such a manner as to permit for quick, each replacement and servicing without special tools or skills. Calibrate sensors to accuracy specified.

- 2) Mount sensors in locations to sense the correct temperature of the chilled water supply and return within the vibration and velocity limits of the sensing element. Mount extended surface element, when used, securely within the pipe and position to measure the best average temperature. Do not locate sensors in dead end runs or positions obstructed by valves or equipment. Thermally isolate elements from brackets and supports to respond to steam/water temperature only. Surely seal pipe penetrations.
 - 3) String pipe averaging sensors between two rigid supports in a serpentine position to sense average conditions. Thermally isolate the sensing elements from supports.
 - 4) Locate flash protection sensors in appropriate locations to sense highest temperatures, to avoid potential problems with stratification.
 - 5) Provide thermometers at locations indicated. Mount thermometers to allow readability when standing on the floor.
- e. Pressure Sensors:
- 1) Provide all pressure sensor and gauges.
 - 2) Install pressure sensing tips in locations to sense appropriate pressure conditions and at locations shown on the drawings.
 - 3) Install high pressure side of the differential switch between pump discharge and check valve.
- f. Digital Controllers:
- 1) Keep cable runs as short as possible. Allow extra length for connecting to the terminal board.
 - 2) Do not bend flexible coaxial cables in a radius less than ten times the cable outside diameter.
 - 3) Use vinyl tape, sleeves, or grommets to protect cables from vibration at points where they pass around sharp corners, through walls, panel cabinets, etc.

C. Signal Transmission System Equipment

1. General: Install all system components in accordance with the National Electrical Code and other applicable codes as necessary in accordance with the manufacturer's recommendations.
 - a. Splices: Splices in shielded and coaxial cables shall consist of terminations and the use of shielded cable couplers. Terminations shall be in accessible locations. Cables shall be harnessed with cable ties.
 - b. Equipment: Fit all equipment contained in cabinets or panels with service loops, each loop being at least 300 mm (12 inches) long. Equipment for fiber optics system shall be rack mounted, as applicable, in ventilated, self-supporting, code gauge steel enclosure. Cables shall be supported for minimum sag.
- c. Cable Runs:
 - 1) Keep cable runs as short as possible. Allow extra length for connecting to the terminal board.

- 2) Do not bend flexible coaxial cables in a radius less than ten times the cable outside diameter.
 - 3) Use vinyl tape, sleeves, or grommets to protect cables from vibration at points where they pass around sharp corners, through walls, panel cabinets, etc.
2. Grounding: Ground system per manufacturer's requirements for proper and safe operation.

3.02. FIELD TESTS AND INSPECTIONS

A. General:

1. Demonstrate function of the heating, ventilating and air-conditioning systems in compliance with the contract documents. Furnish personnel, instrumentation, and equipment necessary to perform calibration and site testing. Ensure that tests are performed by competent employees of the DDC system manufacturer regularly employed in the testing and calibration of DDC systems.
2. Testing will include the field tests and the performance verification tests. Field tests shall demonstrate proper calibration of input and output devices, and the operation of specific equipment. Performance verification tests shall ensure proper execution of the sequence of operation and proper tuning of control loops.
3. Contractor shall schedule the performance verification tests and coordinate with the Owner. Contractor shall also furnish the field test documentation to the Owner that the installed system(s) has been calibrated, tested, and ready for the performance verification test.

B. Field Testing and Performance Verification Tests:

1. Document all tests with detailed test results. Explain in detail the nature of each failure and corrective action taken.
2. During and after completion of the Field Tests, and again after the performance verification test, identify, determine causes, replace, repair, or calibrate equipment that fails to meet the contract specification, and deliver a written report to HMC.
3. Application Software Operation Test:
 - a. Test application software for ability to communicate with the digital controllers, uploading and downloading of control programs.
 - b. Demonstrate the software ability to edit the control program offline.
 - c. Demonstrate reporting of alarm conditions for each alarm and ensure that workstations receives these alarms.
 - d. Demonstrate ability of software to receive and save trend and status reports.
4. Performance Verification Tests:
 - a. Conduct the performance verification tests to demonstrate control system maintain setpoints, control loops are tuned, and controllers are programmed

for the correct sequence of operation. Conduct performance verification test during --- of continuous air handler and DDC systems operation and before final acceptance of work. The performance verification test shall demonstrate the following as a minimum:

- 1) Furnish DOT-A graphed trends to show the sequence of operation is executed in correct order, and that the steam system operates properly through the complete sequence of operation, for example seasonal, occupied/unoccupied, warm up.
- 2) Demonstrate hardware interlocks and safeties work, and that the control system perform the correct sequence of control after a loss of power.

C. Inspection and Adjustment

1. Observe the steam system in its shut down condition. Check valves for proper normal positions. Document each position for the test report.
2. Check the operation of each output to verify correct operation. Command digital outputs on and off. Command analog outputs to minimum range, such as 4mA, and maximum range--10mA, measure and record commanded and actual values. Document each command and result for the test report.
3. With the digital controller, apply a control signal to each actuator and verify that the actuator operates properly from its normal position to full range of stroke position. Record actual spring ranges and normal positions for all modulating control valves and dampers. Include documentation in the test report.
4. Demonstrate that programming is not lost after power failure, and digital controllers automatically resume proper control after a power failure.

D. Signal Transmission System Equipment:

1. Ground Rod Tests: Before any wire is connected to the ground rods, use a portable ground testing instrument to test each ground or group of grounds.
2. Coaxial Cable Tests: Implement NEMA WC41 as a minimum.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16050 - ELECTRICAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. The work covered by this section of the Specifications shall include furnishing all labor, materials, equipment and services to construct and install the complete electrical system shown on the accompanying Drawings and specified herein. This work shall include but is not necessarily limited to:
1. Removal and re-installation of ceiling mounted light fixtures and exit signs.
 2. Complete branch circuit wiring system for motors.
 3. Power wiring for air conditioning and ventilation equipment including mounting of starters furnished by mechanical contractor.
 4. Wiring, up to and including safety switches, for items described under other sections of these Specifications.
 5. Wiring and connecting of all electrical equipment supplied for installation and use in this contract and not specifically listed as work by others, including the furnishing of disconnects for all motors.
 6. Test the completed installation.
 7. Removal and re-installation of PA speaker system.
 8. Removal and re-installation of cctv cameras.
 9. Prepare as-built drawings.

1.03 GENERAL REQUIREMENTS

A. It is the intent of the plans and specifications to provide a complete installation. Should there be omissions or discrepancies in the plans and specifications, the Contractor shall call the attention of the Contracting Officer to such omissions and discrepancies in advance of the date of bid opening so that the necessary corrections can be made. Otherwise the Contractor shall furnish and install the omissions or discrepancies as if the same were specified and provided for.

1. Before bidding on this work, carefully examine each of the drawings and the site. By submitting a proposal of the work included in this contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.

2. Standards:

a. The entire installation shall be made in strict accordance with the latest rules and regulations of the National Electrical Code, the National Board of Fire Underwriters, NFPA, ANSI, NEMA, and IPCEA, and the local ordinances, rules and regulations of the State.

b. The Electrical Contractor shall obtain and pay for the electrical permit as required by local laws and rules. All work shall be inspected by the proper local authorities as it progresses. The Electrical Contractor shall pay all inspection fees and shall deliver certificates of completion and inspection to the Contracting Officer before final payment will be made. Cost of permit and inspection fees shall be included in the Electrical Contractor's quoted price for the installation.

3. Drawings:

a. Contract Drawings: These specifications are accompanied by floor plans of the building, and diagrammatic electrical layouts showing the approximate location of the outlets, switches, devices and other equipment.

The wiring layouts and schedules show the approximate locations of all outlets, switch controls, service runs and other electrical apparatus. These locations are approximate and before installing, the Contractor shall study adjacent architectural details and make installation in most logical manner. Any device may be relocated within 10'-0" before installation at the direction of the Contracting Officer, whose decision shall be final.

1.04 SUBMITTALS

- A. Shop drawings, or catalog cuts, of the following equipment shall be submitted:

1. Circuit breakers, safety switches, manual motor starter(s).

Shop drawings and catalog cut submittals processed by the Contracting Officer are not Change Orders. The purpose of the submittals by the Contractor is to demonstrate to the Contracting Officer that he understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

- B. As-Built Drawings: The Contractor shall keep at the job site a complete, neat and accurate record of all approved deviations from the contract drawings, shop drawings and specifications, indicating the work as actually installed. These changes shall be recorded on prints of the drawings affected and the shop drawings. Above reference to deviation shall not be construed to allow deviations without prior approval. As-builts shall be submitted prior to final acceptance to Contracting Officer. .
- C. Symbols: The standard electrical symbols together with special symbols, notes, and instructions shown on the drawings indicate the work and equipment required and are all to be included as a part of these specifications.

1.05 QUALITY ASSURANCE

- A. For actual fabrication, installation and testing of the work of this section, use only thoroughly trained and experienced workmen completely familiar with items required and with manufacturers' recommended methods of installation. In acceptance or rejection of installed work, no allowance will be made for lack of skill on part of workmen.
- B. Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the installed work and materials of all other trades.

1.06 WARRANTY

- A. All work and materials executed under this Section shall be under warranty to be free from defects of materials and workmanship for one (1) year from date of final acceptance of project as a whole, except lamps, which shall be warranted for 50 percent of the rated life as published by the manufacturer. All repair and replacement work required, including other work damaged by this work's defects shall be performed without cost to the State.
- B. The Surety shall not be held liable beyond two (2) years of Project Acceptance.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials shall be new and of the best quality available in their respective kinds, free from all defects, comply with applicable provisions of ASTM Standards, NEC Articles 90-7 and 110-3 and those items listed by the Underwriters' Laboratories shall bear "UL" label of approval and shall be tested by a nationally recognized electrical testing laboratory and shall be of the make and types specified for approval.
- B. Brand names and catalog numbers indicate standards of design and quality required. In case of obsolescence, supersedure, or error in catalog number, the associated description and intent implied by the application shall govern. Substitute materials may be used if qualified by written permission from Contracting Officer. List of substitute materials together with qualifying data shall be submitted for approval.

Example:

| Item | Manufacturer & Catalog Number Specified | Substitute Manufacturer & Catalog Number |
|-------|---|--|
| Cable | Joe Doe - No. 3200 | King - No. 3200 |

Qualifying data shall include cuts, shop drawings, and specifications to show equality with material specified herein and in drawings. The decision of the Contracting Officer shall govern as to what materials or equipment may be substituted for that specified. The burden of proof as to the equality of any proposed substitution shall be upon the Contractor.

2.02 MATERIALS

- A. Raceways:
 - 1. Rigid metal conduit- Rigid steel, hot-dipped galvanized inside and outside, round bore for use with threaded fittings, 3/4 inch minimum diameter, except as noted. Other sizes to conform to NEC requirements, based on THW wires. Manufacture and install according to NEC Article 344. Aluminum conduits not allowed.
 - 2. Flexible metallic tubing - Flexible, galvanized steel used in conjunction with factory approved fittings. 3/4 inch minimum diameter, except as noted. Manufacture and install according to NEC Article 360.
 - 3. Electrical Metallic Tubing (EMT) - Zinc coated or galvanized, round bore, thin walled metal tubing, 3/4 inch minimum diameter except as noted. Manufacture and install according to NEC Article 358.

4. Liquid tight flexible metal conduit - Flexible steel, zinc-coated, jacketed with high density polyethylene or polyvinyl-chloride jacket. Use with factory approved fittings. Manufacture and install according to NEC Article 350.

B. Wires:

1. Conductors shall be copper, 600 volts, No. 12 AWG minimum. Conductors No. 10 and smaller, solid and round, or 7 or 19 strands, concentric. Conductor No. 8 and larger, 7 or 19 strands, concentric. All conductors No. 6 and smaller shall be NEC Type THWN, XHHW and THW. All conductors No.4 and larger shall be NEC Type XHHW or THWN.

Fixture wiring shall be NEC Type RHH or THHN. Exterior conductors shall be Type RHW-USE or cross-linked polyethylene, Style USE. Fire alarm conductors shall be Type THWN/THHN.

2. Color Code: Black-Phase "A", Red-Phase "B", Blue-Phase "C", White Neutral, Green-Ground. (208Y/120V System). Brown-Phase "A", Orange-Phase "B", Yellow-Phase "C", Gray Neutral, Green-Ground. (480Y/277V System). Color coding shall be maintained throughout entire system. Use other colors when more wires than above listed are contained on one raceway. Contracting Officer shall determine whether deviation from color coding will be permitted.

- C. Disconnect Switch: Heavy duty non-fusible safety switch shall be horsepower rated when used as motor disconnect. Contacts shall be lever operated and spring loaded. When for use with fuses, conventional or of current limiting type, blades shall be rejection type. Enclosures to have provision for padlocking. Provide NEMA 1 enclosure for interior locations and NEMA 4X 316 stainless steel for exterior locations.

- D. Circuit Breakers: Individual breakers shall be molded plastic case, with toggle operated mechanism thermal-magnetic overload trips. Inter-changeable trip shall be provided when available. Toggle positions "ON", "TRIPPED" and "OFF", engraved on body of toggle. Enclosed in NEMA style steel box Boxes shall be NEMA 1 for interior locations and NEMA 4X stainless steel for exterior locations.

- E. Nameplates: Nameplates for identification or instruction on equipment enclosures shall be engraved laminated phenolic plastic, screw mounted. Plates shall be three layered, black-white-black. Plates shall be engraved to show 3/8" high engraved white letters on black background. Provide nameplates for all feeder breakers, switches, panels, cabinets and large junction boxes.

1. Breakers and Switches: By panels or loads served
2. Boxes: By use and voltages

- F. Pullboxes: Pullboxes shall be provided where required by the NEC or Utility Company requirements. Boxes shall be code gauge steel with screw cover and raintight construction when installed in locations exposed to rain. For exterior locations provide in ground Handholes or Manholes as required.
- G. Enclosures and Cabinets: Enclosures and cabinets for panelboards, breakers, and switches shall be NEMA type, fabricated from galvanized steel, prime painted and enamel finished according to NEMA specifications.
- H. Outlet Boxes: Outlet boxes shall be of size and type best suited to particular use or location but in any case shall be of sufficient size to contain without crowding all conductor and connections which may be required in any outlet box. Manufacture and install according to NEC Article 351.
 - 1. Boxes in interior locations shall be code gauge galvanized steel, not less than 14 gauge, not less than minimum size required by Code. Pressed galvanized steel boxes: In ceilings and dry walls, 4-11/16" square by 2-1/8" deep minimum. For mounting of single device such as a switch or receptacle, 2" by 3" by 2-1/8" deep minimum.
 - 2. Exposed boxes and weather exposed boxes, recessed boxes, including lighting outlets on exterior shall be galvanized cast iron or alloyed aluminum with threaded hubs for conduit connections. Aluminum boxes shall be prime painted and enamel finished. Cast metal boxes: In exposed and wet locations, 4" square by 2-1/8" deep with threaded hubs, prime painted, gasketed covers.
- I. Devices: Accepted equivalent products manufactured by Arrow-Hart, Bryant, Cooper, Hubbell, Leviton, Pass & Seymour.
 - 1. Switches: Single or double pole, 3 or 4 way as required, non-mercury quiet, 20 amperes, 120-277 volts, UL labeled AC type, silvered contacts, color as noted plastic body, tumbler switch with endurance of 10,000 make breaks. Hubbell No. 1220 series, Arrow Hart No. 1990 series, Bryant No. 4000 series, Cooper 1220 series or accepted equivalent.
 - 2. Duplex Convenience Receptacles: Duplex, 20-amperes, 125 volts, back and side wired, 3 wire, self-grounding type, specification grade, color as noted plastic body, with parallel and ground U-shaped slots, NEMA 5-20R; Cooper #5362, Leviton #5362A or accepted equivalent.
 - 3. GFI Receptacles: Duplex, 20-amperes, 125 volts, back and side wired, 3 wire, specification grade, color as noted plastic body, with parallel and ground U-shaped slots, NEMA 5-20R; Cooper #XGF201, Hubbell #GF53621, or accepted equivalent.

4. Manual Motor Starter: NEMA ICS 2, AC general-purpose Class A manually operated, full voltage controller with horsepower rated overload element, red pilot light and toggle operator.
5. Device Plates:
 - a. Plates for interior flush construction shall be molded plastic of high dielectric strength and arc resistance, meeting or surpassing UL 514, color as noted color or matching surrounding area. Plates for communication outlets shall be blank cover plates.
 - b. Plates for exposed and weather exposed boxes shall be cast metal with neoprene gasket for sealing against entry of water and moisture into box. Switch plates shall be provided with neoprene cover over handle or raintight lever mechanism.
 - c. Receptacle safety outlet enclosure shall consist of an outlet plate with a hinged safety cover that shall remain weatherproof while in use or idle. The enclosure shall have a latching mechanism to allow the enclosure to maintain weatherproof integrity. The enclosure shall have a cord port(s) capable of allowing an appropriate size electrical cord(s) to pass through when the safety cover is closed. The enclosure shall be UL Listed and conform to NEC Article 410.57. Body materials shall be of flame resistant, ultra violet inhibiting, impact resistant, polycarbonate resin. Gasket materials shall be of sufficient thickness to form a weatherproof seal. Attachment screw shall be stainless steel. TAYMAC Corporation or accepted equivalent.
- J. Hardware, Supports, Backing, Etc.: All hardware, supports, backing, and other accessories necessary to install electrical equipment shall be provided. Wood materials shall be "wolmanized" treated against termites; iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be brass or bronze. All wood screws shall be brass or galvanized steel.
- K. Other Materials: All other materials not specifically described but required for a complete and operable electrical installation, shall be new, first quality of their respective kinds, and as selected by Contractor subject to approval by Contracting Officer.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

- A. Perform all work in accordance with equipment manufacturer's requirements and applicable NFPA standards. Install equipment and materials in a workmanlike manner conforming to recognized commercial standards.

B. Construction Methods

1. Comply with local ordinances and regulations of the Maui County. Workmanship subject to approval of Contracting Officer who shall be afforded every opportunity to determine skill and competency. Concealed work re-opened at random during formal inspection by Contracting Officer without additional charge to the State.
2. Construction shall conform to construction practices as recommended by American Electricians Handbook by Croft (latest edition) Edison Electric Institute, National Electrical Code, National Electrical Safety Code and applicable instructions of manufacturers of equipment and materials supplied for project.

3.02 SURFACE CONDITIONS

- A. Inspection: Prior to work of this section, carefully inspect installed work of other trades and verify that all such work is complete to point where this installation may properly commence.
- B. Discrepancies: In event of discrepancy, immediately notify Contracting Officer. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.03 PREPARATION

- A. Coordination: Coordinate installation of electrical items with schedules for work of other trades to prevent unnecessary delays in total work. Where electrical items are shown in conflict with locations of structural members and mechanical or other equipment, furnish and install required supports and wiring to clear encroachments.
- B. Accuracy of Data: The data indicated on drawings and in specifications are as exact as could be secured but their absolute accuracy is not guaranteed. Exact locations, distances, levels and other conditions will be governed by job decisions of Contracting Officer.

3.04 INSTALLATION OF RACEWAYS AND FITTINGS

- A. All conduits within building line shall be rigid steel conduits or electrical metallic tubing. Electrical metallic tubing may be used above floor. EMT installation shall be installed exposed not less than 84" above floor. Paint steel conduits in or under ground floor slabs with asphaltic corrosion resistance base paint or compound.
- B. Conduits shall be of ample size to allow drawing in or removing of wires and cables without undue strain and suitable bushings shall be installed on each end of every run of conduit where wires are installed.

- C. Conduit system shall be continuous from outlet to outlet or fitting to fitting so that electrical continuity is obtained between all conduits of the system.
- D. Cut raceways square, and ream inner edges. Adjoining lengths shall butt together evenly in couplings to provide passage for installing conductors. Factory threads shall be cleaned with die before installation of conduit. Use of running threads not permitted. Where conduits cannot be joined by standard threaded couplings, approved watertight conduit unions shall be used.
- E. Bends, offsets, and crossing of conduits shall be avoided wherever possible. When necessary make bends and offsets with hickey or conduit bending machine. Do not use vise or pipe tee. Flattened or crushed conduit shall not be acceptable. Bends made so that interior cross-sectional area will not be reduced. Radius of curve of inner edge of field bend shall be not less than ten times internal diameter of raceway.
- F. Cap raceways during construction with plastic or metal-capped bushings to prevent entrance of dirt or moisture. Swab all raceways out and dry before wires or cables are pulled in.
- G. Mount raceway free from other pipes, valves, or mechanical equipment. Keep all conduits at least six inches away from the covering on hot water pipes, and 18" away from kitchen exhaust ducts.
- H. Fish wires, cords, strings, chains or the like shall not be placed or inserted in the conduit system during installation of the conduits.
- I. After conduit system has been installed, empty conduits shall be left with a nylon drag wire.
- J. Install insulating bushings and two locknuts on each end of every run of conduit at enclosures and boxes. Provide grounding bushings as required to grounding receptacles and connect conduits to service ground, per NEC Article 250.
- K. Run exposed raceways parallel with, or at right angles to structural or architectural elements.
- L. Securely fasten raceways with two-hole galvanized pipe straps, or with approved beam clamps, or approved single or gang pipe hangers spaced not more than 7 feet apart, as conditions require. Vertical runs shall be supported at intervals not exceeding 5 feet by approved clamp hangers. Conduit runs with three 90-degree bends or equivalent, 150 feet maximum length without pullbox shall be permitted. Support raceways from structure. Do not support raceways from or on mechanical pipes, ducts or ceiling suspension wires.

3.05 INSTALLATION OF CONDUCTORS

- A. Except for cables and wires otherwise called for, install all conductors in conduit.

- B. Color Coding: Wires shall be color-coded in accordance with requirements of the NEC.
- C. Tag all feeders for identification.
- D. Splicing:
 - 1. Wires shall be formed neatly in enclosures and boxes. Conductors, #10 and smaller shall be twisted and made secure with wirenut suitable for the purpose. Splice conductors #8 through #4/0 with high pressure compression (indent) copper sleeve connectors.
 - 2. Insulate all splices with a minimum of two half-lapped layers of vinyl-plastic electrical tape where insulation is required.
 - 3. Splice insulation shall be 200% in thickness of original wire insulation and of same electrical and mechanical characteristics.
- E. Lubricants: Chemically neutral to insulation and sheath. Sherwin-Williams "flaxsoap". Apply liberally during pulling. Other means of lubricating allowed with written approval of Contracting Officer.
- F. Pulling Conductors: Mechanical means for pulling to be torque limiting type and not to be used for No. 2 AWG and smaller wires. Pulling tensions shall not exceed manufacturer's recommendations. Form neatly in enclosure for minimum of cross-overs.

3.06 INSTALLATION OF OUTLET BOXES

- A. Provide outlet boxes to suit conditions encountered. Provide outlet boxes in spaces with extension or raised rings of such depth that metal will be flush with surrounding surfaces of opening. When two or more switches are installed at single location, mount in gang box under single device plate. Close all unused knockouts and hubs.

3.07 INSTALLATION OF RECEPTACLES

- A. Receptacles installed vertically, shall be installed with the ground prong up. Receptacles installed horizontally, shall be installed with the neutral prong up.

3.08 INSTALLATION OF LIGHT FIXTURES

- A. Support fixtures securely and safely by means of fixture studs in the outlet boxes or other approved means. Ceiling fixtures arranged to hang vertically unless otherwise directed by Contracting Officer. Provide accessories, such as straps, mounting plates, nipples or brackets for proper installation. Provide additional stems and channels for mounting on suspended ceilings as recommended by fixture manufacturer. Pendant hung fixtures shall be supported directly from the structure above as noted without

using the ceiling suspension system for direct support. Pendant mounted fixtures with stems exceeding 9 feet in length shall be braced for seismic level requirements.

3.09 GROUNDING

- A. All metallic enclosures, raceways, and electrical equipment shall be grounded according to requirements of National Electrical Code, Article 250.
 - 1. All grounding wire runs within buildings shall be in metallic conduits. Where practicable, all ground wires shall be run together with circuit conductors.

3.10 EQUIPMENT CONNECTIONS

- A. Connect all equipment and appliances. Make power connections to motor on equipment with short section of flexible conduit. Provide disconnect switches for all motorized equipment if none is furnished by other trades. Furnish starters with overload protection on each leg for all motorized equipment if none is furnished by other trades.

3.11 MISCELLANEOUS DETAILS

- A. Cut, core and patch as required to install electrical system. Repair any surface damaged or marred by notching, coring or any other process necessary for installation of electrical work. Cutting, repairs and refinishing shall be subject to the approval of the Contracting Officer. Need for remedial work determined by the Contracting Officer as attributable to poor coordination and workmanship shall be cause for reconstruction to the satisfaction of the Contracting Officer at no cost to the State.

3.12 FINISHING

- A. Patch, repair and restore all structural and architectural elements cut or drilled for installation of electrical system. Drilling, cutting, patching, repairing and restoring shall be finished by suitable trades subject to approval of Contracting Officer.
- B. Attach electrical equipment to wood by wood screws, and attach to concrete by embedded or expansion inserts and bolts. Use power-driven charge with approval only. Close unused knock-outs on boxes or enclosures with metal cap. Powder actuated fasteners shall not be used on precast concrete. Do not use powder activated fasteners to attach enclosures and boxes to the building.
- C. Wipe clean all exposed raceways and enclosures with rag and solvent. Apply prime painting and finishing of unfinished raceways and enclosures shall conform to . Factory finished enclosures shall not be painted. Panelboard, switches, circuit breakers, junction boxes, and equipment shall be identified by stenciling with engraved plastic nameplates on cover or door. Voltage and phase shall be indicated on nameplates for panelboards, switches and circuit breakers.

- D. Connect circuits to circuit assignments shown on drawings. Provide neatly typewritten circuit directory for all panelboards. Circuit directory shall indicate location of loads served by each circuit. For example: "LTS - PARKING, RECEP - OFFICE."
- E. Mark all control, communication wires and fire alarm wires with wire markers attached to conductors in all enclosures.

3.13 TESTING AND INSPECTIONS

- A. After the installation has been completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct all tests required to secure approval of the installation from all agencies having jurisdiction. The equipment shall be demonstrated to operate in accordance with the requirements of this section of the specifications. The test shall be performed in the presence of the Contracting Officer. The Contractor shall furnish the necessary instruments and personnel required for the test, and the State will furnish the necessary electrical power.
 - 1. All wiring shall be tested to insure proper operation according to functions specified. All systems shall test free from short circuits and grounds, shall be free from mechanical and electrical defects. All systems shall show proper neutral connections.
 - 2. Interior installation, 600 volts and less shall be tested for insulation resistance after all wiring is completed and ready for connection to equipment. With a 500V megger, measure and record the insulation resistance from phase to phase, and phase to neutral. The above tests shall be witnessed by the Contracting Officer and resistances of feeder cables shall be recorded and four (4) copies submitted to the Contracting Officer.
 - 3. Proper operation of all electrical devices shall be demonstrated at request of Contracting Officer during final inspection.
 - 4. Balance loading on each feeder.
 - 5. Measure ground resistance at service equipment in the presence of the Contracting Officer. Submit four (4) copies of test results to Contracting Officer.
- B. The Contractor shall retape splices which have been bared for inspection. The Electrical Contractor shall test all portions of the electrical system furnished by him for proper operation and freedom from accidental grounds. All tests shall be subject to the approval of the Contracting Officer.
- C. Wherever test or inspection reveals faulty equipment or installation, the Contractor shall take corrective action, at his own expense repairing or replacing equipment or installation as directed.

D. If the Contracting Officer shall discover any of the following errors, the Contractor, at his own expense shall go over all similar portions of the entire job, taking the necessary or directed remedial action.

1. Loose connections.
2. Impaired clearance.
3. Improper finish.
4. Improper adjustment.

3.14 CLEAN UP

A. Upon completion of all installation and testing, thoroughly inspect all exposed portions of the electrical installation and completely remove all exposed labels, debris, markings and foreign material.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the price bid for the various items of work in this project.

END OF SECTION

Requirements of Chapter 104, HRS Wages and Hours of Employees on Public Works Law

Chapter 104, HRS, applies to every public works construction project over \$2,000, regardless of the method of procurement or financing (purchase order, voucher, bid, contract, lease arrangement, warranty, SPRB).

Rate of Wages for Laborers and Mechanics

- Minimum prevailing wages (basic hourly rate plus fringe benefits), as determined by the Director of Labor and Industrial Relations and published in wage rate schedules, shall be paid to the various classes of laborers and mechanics working on the job site. [§104-2(a), (b), Hawaii Revised Statutes (HRS)]
- If the Director of Labor determines that prevailing wages have increased during the performance of a public works contract, the rate of pay of laborers and mechanics shall be raised accordingly. [§104-2(a) and (b), HRS; §12-22-3(d) Hawaii Administrative Rules (HAR)]

Overtime

- Laborers and mechanics working on a Saturday, Sunday, or a legal holiday of the State or more than eight hours a day on any other day shall be paid overtime compensation at not less than one and one-half times the basic hourly rate plus the cost of fringe benefits for all hours worked. If the Director of Labor determines that a prevailing wage is defined by a collective bargaining agreement, the overtime compensation shall be at the rates set by the applicable collective bargaining agreement [§§104-1, 104-2(c), HRS; §12-22-4.1, HAR]

Weekly Pay

- Laborers and mechanics employed on the job site shall be paid their full wages at least once a week, without deduction or rebate, except for legal deductions, within five working days after the cutoff date. [§104-2(d), HRS]

Posting of Wage Rate Schedules

- Wage rate schedules with the notes for prevailing wages and special overtime rates, shall be posted by the contractor in a prominent and easily accessible place at the job site. A copy of the entire wage rate schedule shall be given to each laborer and mechanic employed under the contract, except when the employee is covered by a collective bargaining agreement. [§104-2(d), HRS]

Withholding of Accrued Payments

- If necessary, the contracting agency may withhold accrued payments to the contractor to pay to laborers and mechanics employed by the contractor or subcontractor on the job site any difference between the wages required by the public works contract or specifications and the wages received. [§104-2(e), HRS]

Certified Weekly Payrolls and Payroll Records

- A certified copy of all payrolls shall be submitted weekly to the contracting agency. [§104-3(a), HRS; §12-22-10, HAR]
- The contractor is responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates listed are not less than the applicable rates contained in the applicable wage rate schedule, and that the classifications for each laborer or mechanic conform with the work the laborer or mechanic performed. [§104-3(a), HRS; §12-22-10, HAR]
- Payroll records shall be maintained by the contractor and subcontractors for three years after completion of construction. The records shall contain: [§104-3(b), HRS; §12-22-10, HAR]
 - the name and home address of each employee
 - the last four digits of social security number
 - a copy of the apprentice's registration with DLIR
 - the employee's correct classification
 - rate of pay (basic hourly rate + fringe benefits)
 - itemized list of fringe benefits paid
 - daily and weekly hours worked
 - weekly straight time and overtime earnings
 - amount and type of deductions
 - total net wages paid
 - date of payment
- Records shall be made available for examination by the contracting agency, the Department of Labor and Industrial Relations (DLIR), or any of its authorized representatives, who may also interview employees during working hours on the job. [§§104-3(c), 104-22(a), HRS; §12-22-10, HAR]

Termination of Work on Failure to Pay Wages

- If the contracting agency finds that any laborer or mechanic employed on the job site by the contractor or any subcontractor has not been paid prevailing wages or overtime, the contracting agency may, by written notice to the contractor, terminate the contractor's or subcontractor's right to proceed with the work or with the part of the work in which the required wages or overtime compensation have not been paid. The contracting agency may complete this work by contract or otherwise, and the contractor or contractor's sureties shall be liable to the contracting agency for any excess costs incurred. [§104-4, HRS]

Apprentices

- Apprentice wage rates apply to contractors who are a party to a bona fide apprenticeship program which has been registered with the DLIR. In order to be paid apprentice rates, apprentices must be parties to an agreement either registered with or recognized as a USDOL nationally approved apprenticeship program by the DLIR, Workforce Development Division, (808) 586-8877, and the apprentice must be individually registered by name with the DLIR. [§12-22-6(1) and (2), HAR]
- The number of apprentices on any public work in relation to the number of journeyworkers in the same craft classification as the apprentices employed by the same employer on the same public work may not exceed the ratio allowed under the apprenticeship standards registered with or recognized by the DLIR. A registered or recognized apprentice receiving the journeyworker rate will not be considered a journeyworker for the purpose of meeting the ratio requirement. [§12-22-6(3), HAR]

Enforcement

- To ensure compliance with the law, DLIR and the contracting agency will conduct investigations of contractors and subcontractors. If a contractor or subcontractor violates the law, the penalties are: [§104-24, HRS]
 - First Violation Equal to 25% of back wages found due or \$250 per offense up to \$2,500, whichever is greater.
 - Second Violation Equal to amount of back wages found due or \$500 for each offense up to \$5,000, whichever is greater.
 - Third Violation Equal to two times the amount of back wages found due or \$1,000 for each offense up to \$10,000, whichever is greater; and
Suspension from doing any new work on any public work of a governmental contracting agency for three years.
- A violation would be deemed a second violation if it occurs within two years of the **first notification of violation**, and a third violation if it occurs within three years of **the second notification of violation**. [§104-24, HRS; §12-22-25(b), HAR]
- **Suspension:** For a first or second violation, the department shall immediately suspend a contractor who fails to pay wages or penalties until all wages and penalties are paid in full. For a third violation, the department shall penalize and suspend the contractor as described above, **except that if the contractor continues to violate the law, then the department shall immediately suspend the contractor for a mandatory three years. The contractor shall remain suspended until all wages and penalties are paid in full.** [§§104-24, 104-25, HRS]
- **Suspension:** Any contractor who fails to make payroll records accessible or provide requested information within 10 days, or fails to keep or falsifies any required record, shall be assessed a penalty including suspension as provided in Section 104-22(b) and 104-25(a)(3), HRS. [§104-3(c), HRS; §12-22-26, HAR]
- If any contractor interferes with or delays any investigation, the contracting agency shall withhold further payments until the delay has ceased. Interference or delay includes failure to provide requested records or information within ten days, failure to allow employees to be interviewed during working hours on the job, and falsification of payroll records. The department shall assess a penalty of \$10,000 per project, and \$1,000 per day thereafter, for interference or delay. [§104-22(b), HRS; §12-22-26, HAR]
- Failure by the contracting agency to include in the provisions of the contract or specifications the requirements of Chapter 104, HRS, relating to coverage and the payment of prevailing wages and overtime, is not a defense of the contractor or subcontractor for noncompliance with the requirements of this chapter. [§104-2(f), HRS]

For additional information, visit the department's website at <http://labor.hawaii.gov/wsd> or contact any of the following DLIR offices:



Oahu (Wage Standards Division).....(808) 586-8777
Hawaii Island(808) 974-6464
Maui and Kauai(808) 243-5322

SURETY BID BOND

Bond No. _____

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full name or legal title of offeror)

as Offeror, hereinafter called the Principal, and

(name of bonding company)

as Surety, hereinafter called Surety, a corporation authorized to transact business as a Surety in the State of Hawaii, are held and firmly bound unto

(State/county entity)

as Owner, hereinafter called Owner, in the penal sum of

(required amount of bid security)

Dollars (\$ _____), lawful money of the United States of America, for the payment of which sum well and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS:

The Principal has submitted an offer for

(project by number and brief description)

NOW, THEREFORE:

The condition of this obligation is such that if the Owner shall reject said offer, or in the alternate, accept the offer of the Principal and the Principal shall enter into a contract with the Owner in accordance with the terms of such offer, and give such bond or bonds as may be specified in the solicitation or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof as specified in the solicitation then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed this _____ day of _____, _____

Name of Principal (Offeror) (Seal)

Signature

Title

Name of Surety (Seal)

Signature

Title

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

PROPOSAL

**PROPOSAL TO THE
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION**

PROJECT: Replace Admin Tower
5th Floor AC System
Daniel K. Inouye International Airport
Honolulu, Oahu, Hawaii

PROJECT NO.: CO1328-43

COMPLETION TIME: **TWO HUNDRED FORTY (240) Working Days** from the date indicated in the Notice to Proceed from the Department.

LIQUIDATED DAMAGES:

FIVE HUNDRED DOLLARS (\$500.00) per calendar day for failure to complete project in the time stated above.

DESIGN PROJECT MANAGER:

Mr. Steve Tagupa
Department of Transportation
Airport Division
Daniel K Inouye International Airport
400 Rodgers Boulevard, Suite 700
Honolulu, HI 96819-1880
Phone: (808) 838-8805
FAX: (808) 838-8017
Email: Steve.Tagupa@hawaii.gov

ELECTRONIC SUBMITTAL:

The bidder shall submit the proposal in HlePRO. The proposal shall be **UPLOADED** to HlePRO prior to the bid opening date and time. See **SPECIAL PROVISIONS - 2.8 PREPARATION AND DELIVERY OF BID** - for additional information.

Director of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned Bidder declares the following:

1. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.
2. It has not been assisted or represented on this matter by any individual who has, in a State capacity, been involved in the subject matter of this contract within the past two years.
3. It has not and will not, either directly or indirectly offered or given a gratuity (i.e. an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.

The undersigned Bidder further agrees to the following:

1. If this proposal is accepted, it shall execute a contract with the Department to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the time therein prescribed in the contract, and that it shall accept in full payment therefore the sum of the unit and/or lump sum prices as set forth in the attached proposal schedule for the actual quantities of work performed and materials furnished and furnish satisfactory security in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Transportation may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 103D-323, Hawaii Revised Statutes.
2. That the quantities given in the attached proposal schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.
3. That the Department does not either expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Director of Transportation, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached proposal schedule except as provided for in the specifications.

4. In case of a discrepancy between unit prices and the totals in said Proposal Schedule, the unit prices shall prevail.
5. Agrees to begin work within 10 working days after the date of notification to commence with the work, which date is in the notice to proceed, and shall finish the entire project within the time prescribed.
6. The Director of Transportation reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.

The Bidder acknowledges receipt of and certifies that it has completely examined the following listed items: the Hawaii Department of Transportation, Air and Water Transportation Facilities Division General Provisions for Construction Projects dated 2016, the Notice to Bidders, the Special Provisions, if any, the Technical Provisions, the Proposal, the Contract and Bond Forms, and the Project Plans.

In accordance with Section 103D-323, Hawaii Revised Statutes, this proposal is accompanied with a bid security in the amount of 5% of the total amount bid, in the form checked below. (Check applicable bid security submitted with bid.)

Surety Bid Bond (Use standard form),

Cash,

Cashier's Check,

Certified Check, or

(Fill in other acceptable security.)

The undersigned Bidder acknowledges receipt of any addendum issued by the Department by recording in the space below the date of receipt.

Addendum No. 1 _____

Addendum No. 3 _____

Addendum No. 2 _____

Addendum No. 4 _____

In accordance with Section 103D-302, Hawaii Revised Statutes, the undersigned as Bidder, has listed the name of each person or firm, who will be engaged by the Bidder on the project as a Subcontractor or Joint Contractor and the nature of work to be done by each. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Subcontractor or Joint Contractor. For each listed firm, the Bidder declares the respective firm is a Subcontractor or Joint Contractor and is subject to evaluation as a Subcontractor or Joint Contractor. It is understood that failure to comply with the aforementioned requirements may be cause for rejection of the bid submitted.

| <u>Name of Subcontractor</u> | <u>Nature and Scope of Work</u> |
|------------------------------|---------------------------------|
| 1. _____ | _____ |
| 2. _____ | _____ |
| 3. _____ | _____ |
| 4. _____ | _____ |
| 5. _____ | _____ |
| 6. _____ | _____ |
| 7. _____ | _____ |
| 8. _____ | _____ |

| <u>Name of Joint Contractor</u> | <u>Nature and Scope of Work</u> |
|---------------------------------|---------------------------------|
| 1. _____ | _____ |
| 2. _____ | _____ |
| 3. _____ | _____ |

("None" or if left blank indicates no Subcontractor or Joint Contractor; if more space is needed, attach additional sheets.)

The undersigned hereby certifies that the bid prices contained in the attached proposal schedule have been carefully checked and are submitted as correct and final.

This declaration is made with the understanding that the undersigned is subject to the penalty of perjury under the laws of the United States and is in violation of the Hawaii Penal Code, Section 710-1063, unsworn falsification to authorities, of the Hawaii Revised Statutes, for knowingly rendering a false declaration.

Bidder (Company Name)

By _____
Authorized Signature

Print Name and Title

Business Address

Business Telephone Email

Date

Contact Person (If different from above)

Phone: _____ Email: _____

NOTE:

If Bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts for the corporation. Please attach to this page current (not more than six months old) evidence of the authority of the officer(s) to sign for the corporation.

If Bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above, with the signature(s) of the general partner(s). Please attach to this page current (not more than six months old) evidence of the authority of the partner authorized to sign for the partnership.

If Bidder is an INDIVIDUAL, the bidder's signature shall be placed above.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department before opening bids or submitted with the bid. Otherwise, the Department may reject the bid as irregular and unauthorized.

PREFERENCES

Bidders agree that preferences shall be taken into consideration to determine the low bidder in accordance with said Sections and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive of any preferences.

A. HAWAII PRODUCTS PREFERENCE

In accordance with ACT 174, SLH 2022, effective June 27, 2022, Hawaii Products Preference shall not apply to solicitations for public works construction. Therefore, the Hawaii Products Preference shall not apply to this project.

B. APPRENTICESHIP PROGRAMS PREFERENCE

In accordance with ACT 17, SLH 2009 – Apprenticeship Program, a 5% bid adjustment for bidders that are parties to apprenticeship agreements pursuant to Hawaii Revised Statutes (HRS) Section 103-55.6 may be applied to the bidder's price for evaluation purposes.

Any bidder seeking this preference must be a party to an apprenticeship agreement registered with the Department of Labor and Industrial Relations at the time the offer is made for each apprenticeable trade the bidder will employ to construct the public works projects for which the offer is being made.

The bidder is responsible for complying with all submission requirements for registration of its apprenticeship program before requesting the preference.

() Yes, I wish to be considered for the Apprenticeship Programs Preference. I have included Certification Form(s) 1 with my bid.

C. RECYCLED PRODUCT PREFERENCE

Recycled product preference shall not apply to this proposal.

PROPOSAL SCHEDULE

FOR

REPLACE ADMIN TOWER 5TH FLOOR AC SYSTEM
DANIEL K. INOUE INTERNATIONAL AIRPORT
STATE PROJECT NO. CO1328-43

Bids shall include sales tax and all other applicable taxes and fees. The prices bid herein shall include all labor, materials, equipment, and incidentals necessary to construct all items in place, including installation and testing of equipment, complete and ready for operation, all in accordance with the plans and specifications.

| <u>Item No.</u> | <u>Item</u> | <u>Qty (A)</u> | <u>Unit (B)</u> | <u>Unit Price (C)</u> | <u>Amount (AxC)</u> |
|-----------------|---|----------------|-----------------|-----------------------|---------------------|
| <u>001</u> | <u>Basic Scope of Work</u> | | | | |
| 001a | Basis of Bid for Item No. 001 shall be the entire work, complete in accordance with the drawings and specifications, but not including the work indicated or specified to be provided under the Allowances. | | LS | | \$ _____ |
| <u>002</u> | <u>Allowances</u> | | | | |
| 002a | 01000.1 – Temporary Traffic Signs & Controls | | Allowance | | \$ 5,000 |
| 002b | 01000.2 - Unforeseen Site Conditions | | Allowance | | \$ 7,500 |
| 002c | 01000.3 - Material Short Supply | | Allowance | | \$ 15,000 |
| 002d | 01561.1 – Construction Site Runoff Control Program | | LS | | \$ _____ |
| 002e | 01562.1 - Management of Contaminated Medias | | Allowance | | \$ 5,000 |
| 002f | 01565.1 - Security Measures | | Allowance | | \$ 15,000 |
| 002g | 01700.1 - Mobilization & Demobilization (Not to exceed 6% of sum of all items, excluding this item, all allowances and force account items) | | LS | | \$ _____ |

TOTAL BID AMOUNT FOR COMPARISON OF BIDS
(Total Bid Item Nos. 001 and 002)

\$ _____

- Note 1: The State reserves the right to reject any or all Proposals and to waive any defects in said Proposals in the best interest of the State.
- Note 2: Submission of a Proposal is a warranty that the bidder has made an examination of the project site and is fully aware of all conditions to be encountered in performing the work and the requirements of the plans and specifications.
- Note 3: The bidder's attention is directed to SECTION 2.11 BID SECURITY and SECTION 2.24 REQUIREMENTS OF CONTRACT BONDS of the "General Provisions".
- Note 4: Bidder shall be paid for actual work performed as directed by the State Project Manager for allowance items. Bidder will not be paid overhead and profit for unused allowance funds.
- Note 5: Bid to include all Federal, State and local taxes.
- Note 6: The lowest responsible bidder will be determined by evaluating the TOTAL AMOUNT FOR COMPARISON OF BIDS.

If the lowest total bid is less than, or approximately equal to the funds available for this project, an award will be made to the lowest responsible bidder.

If the lowest bid exceeds the funds available, the State reserves the right to negotiate with the lowest responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes, to further reduce the scope of work and award a contract thereafter.

SUPPLEMENT TO PROPOSAL SCHEDULE

The Department recognizes that certain items of material to be incorporated into the project and/or consumed in the prosecution of the project are temporarily in short supply and beyond the control and without the fault of the Contractor. The effect of such shortages has, among other things, resulted in periodic fluctuations in the posted prices of such short supply materials, thereby making the proposal difficult for the Contractor to bid with confidence.

The only materials considered to be in short supply are asphalt cement, portland cement, reinforcing steel, structural steel and galvanized steel.

Each bidder shall submit with the proposal a written statement from the supplier of each short supply material indicating the supplier's current posted price, effective date of that price and the location of the material at that posted price (by island).

If the price of such short supply material is increased or decreased by more than 5% by the supplier prior to the completion of that contract item requiring the short supply material, the Contractor shall submit to the Department a written statement from the supplier indicating the effective date and changed price the Contractor will thereafter be charged for such short supply material. The Contractor shall also obtain whenever possible, quotations for furnishing the material from other available local suppliers. The quotations shall be obtained sufficiently in advance of the need for the material to allow review by the Department so as not to delay the work. The Contractor's request to the Department for adjusted compensation due to such changed prices will be computed only with prices in effect at the time of delivery. Only the lowest quotation obtained will be accepted by the Department. Transportation, handling, loading, processing and other similar costs will not be subject to adjusted compensation.

No adjustment to the unit bid prices will be made when the increase or decrease in the price of the short material is less than 5% of the original posted price.

If the adjustment to the unit bid price is decreased in the price of the short supply material by more than 5% of the original posted price, the State will be credited. The Contractor shall notify the State within five (5) working days in the event of such an occurrence.

When an adjustment in price is made in accordance with this section, the adjustment will be allowed only so long as the purchase price remains more or less than 5% of the original posted price.

If an increase in the price of any short supply material exceeds or is scheduled to exceed 5% of the original posted price, the Contractor must notify the State within five (5) working days before using the short supply material. Upon receipt of such notification from the Contractor, the State will direct the Contractor to either (1) authorize work to

proceed as usual with the assurance that the indicated incremental price increase above the 5% will be compensable, (2) issue such change orders as the State may deem necessary to reduce further requirements of the short supply material which is to be paid at the increase price, or (3) if the material is considered to have priced itself beyond reason or beyond what the State can pay, the State may order cessation of further use of such short supply material on the project. Such notification by the Contractor will be required at each instance of incremental price increase above the 5% limit. If the Contractor fails to notify the State of any such incremental price increase within five (5) working days before using the short supply material and continues to utilize the short supply material on the project, the State will not be responsible for payment for the incremental cost increase of which the State was not forewarned.

Computation for the adjusted compensation will be as follows:

(A) Portland Cement

If, X = Adjustment per cubic yard of concrete,

P = Portland cement content of the approved mix design expressed in hundredweight per cubic yard of concrete,

Q = Increase or decrease in the price of portland cement in dollars per hundredweight,

Then, $X = QP$

Example: Posted price of Portland cement increases from \$1.40 to \$1.70 per cwt. and the hundredweight (cwt) of concrete is 5.6 cwt per c.y., then the adjustment will be:

$$\begin{aligned}
 \$1.70 - \$1.40 &= \$0.30 \\
 (\$1.40) \times (5\%) &= \$0.07 \\
 \$0.30 - \$0.07 &= \$0.23 \\
 X &= (\$0.23) \times (5.6) \\
 &= \$1.29 \text{ per c.y. of concrete}
 \end{aligned}$$

(B) Asphalt Cement

If, X = Adjustment per ton of mix,

P = Asphalt cement content, expressed in percentage of dry weight of the aggregates, as determined and accepted by the Department for each of the design plant mixes,

Q = Increase or decrease in the price of asphalt cement, in dollars per ton,

Then, $X = Q \times (P) \div (100 + P)$

Example: Posted price of asphalt concrete increases from \$70 to \$80 per ton and the asphalt content of the A.C. mix was accepted at 6.0%, then the adjustment shall be:

$$\begin{aligned} \$80.00 - \$70.00 &= \$10.00 \\ (\$70.00) \times (5\%) &= \$3.50 \\ \$10.00 - \$3.50 &= \$6.50 \\ X &= \$6.50 \times 6 / (100 + 6) \\ &= \$0.37 \text{ per ton A.C. mix} \end{aligned}$$

(C) Reinforcing Steel

If, X = Adjustment for reinforcing steel,

P = Weight of reinforcing steel, expressed in hundredweight,

Q = Increase or decrease in the price of reinforcing steel in dollars per hundredweight,

Then, $X = QP$

Example: Posted price of grade 40 reinforcing steel increases from \$14.00 to \$15.00 per cwt and the weight of the grade 40 reinforcing steel is 80,000 pounds, then the adjustment shall be:

$$\begin{aligned} \$15.00 - \$14.00 &= \$1.00 \\ (\$14.00) \times (5\%) &= \$0.70 \\ \$1.00 - \$0.70 &= \$0.30 \\ X &= (\$0.30) \times (800) \\ &= \$240 \text{ for grade 40 reinforcing steel} \end{aligned}$$

The contractor shall submit to the Department original receipted bills covering the short supply material used on the project as soon as practicable after shipments are completed. The bills shall be accompanied by a tabulation on which the bills are listed in chronological order showing for each bill the quantity, the date shipped from the supplier's terminal and the price per unit at the place indicated in the posted price (reflecting any deductions for quantity shipments). These bills shall be subject to audit verification.

The Department reserves the right to alter the quantities of material to be furnished in

accordance with the provisions of SP Article IV, Paragraph. 4.2.

The Department also reserves the right, during construction, to decrease or increase the scope of work, because of limitations of funds, with no adjustment in unit prices other than that specified hereinabove.

Price increases as specified hereinabove shall not exceed the remaining unpaid balance in the contract at any point in time without prior review and approval from the Engineer or designated representative.

SURETY BID BOND

Bond No. _____

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full name or legal title of offeror)

as Offeror, hereinafter called the Principal, and

(name of bonding company)

as Surety, hereinafter called Surety, a corporation authorized to transact business as a Surety in the State of Hawaii, are held and firmly bound unto

(State/county entity)

as Owner, hereinafter called Owner, in the penal sum of

(required amount of bid security)

Dollars (\$ _____), lawful money of the United States of America, for the payment of which sum well and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS:

The Principal has submitted an offer for

(project by number and brief description)

NOW, THEREFORE:

The condition of this obligation is such that if the Owner shall reject said offer, or in the alternate, accept the offer of the Principal and the Principal shall enter into a contract with the Owner in accordance with the terms of such offer, and give such bond or bonds as may be specified in the solicitation or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof as specified in the solicitation then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed this _____ day of _____, _____

Name of Principal (Offeror) (Seal)

Signature

Title

Name of Surety (Seal)

Signature

Title

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

FORMS

PERFORMANCE BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

(Name and Street Address of Bonding Company)

as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a
surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____ DOLLARS (\$ _____), to which payment Principal and Surety bind themselves,
their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by
these presents.

WHEREAS, the above-bound Principal has signed a Contract with Obligee on
_____, for the following project: _____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part
hereof.

NOW THEREFORE, the condition of this obligation is such that:

If the Principal shall promptly and faithfully perform, and fully complete the Contract in
strict accordance with the terms of the Contract as said Contract may be modified or amended
from time to time; then this obligation shall be void; otherwise to remain in full force and effect.

Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

In the event of Default by the Principal, of the obligations under the Contract, then after written Notice of Default from the Oblige to the Surety and the Principal and subject to the limitation of the penal sum of this bond, Surety shall remedy the Default, or take over the work to be performed under the Contract and complete such work, or pay moneys to the Oblige in satisfaction of the surety's performance obligation on this bond.

Signed this _____ day of _____, _____.

(Seal)

Name of Principal (Contractor)

*

Signature

Title

(Seal)

Name of Surety

*

Signature

Title

***ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC**

PERFORMANCE BOND

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto the

(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount

_____ DOLLARS \$ _____),
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

- Legal Tender;**
- Share Certificate** unconditionally assigned to or made payable at sight to _____
Description: _____;
- Certificate of Deposit**, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Cashier's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Teller's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Treasurer's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Official Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Certified Check** No. _____, dated _____ accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project: _____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The Condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, and shall deliver the Project to the Obligee, or to its successors or assigns, fully completed as in the Contract specified and free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder.

Signed and sealed this _____ day of _____, _____.

(Seal) _____

Name of Contractor

Signature*

Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

(Name and Street Address of Bonding Company)

as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Oblige, in the amount of _____

_____ Dollars (\$ _____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed Contract with the Oblige on _____ for the following project: _____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to any Claimant, as hereinafter defined, for all labor and materials supplied to the Principal for use in the performance of the Contract, then this obligation shall be void; otherwise to remain in full force and effect.

1. Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

2. A "Claimant" shall be defined herein as any person who has furnished labor or materials to the Principal for the work provided in the Contract.

Every Claimant who has not been paid amounts due for labor and materials furnished for work provided in the Contract may institute an action against the Principal and its Surety on this bond at the time and in the manner prescribed in Section 103D-324, Hawaii Revised Statutes, and have the rights and claims adjudicated in the action, and judgment rendered thereon; subject to the Obligee's priority on this bond. If the full amount of the liability of the Surety on this bond is insufficient to pay the full amount of the claims, then after paying the full amount due the Obligee, the remainder shall be distributed pro rata among the claimants.

Signed this _____ day of _____, _____.

(Seal)

Name of Principal (Contractor)

*

Signature

Title

(Seal)

Name of Surety

*

Signature

Title

***ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC**

LABOR AND MATERIAL PAYMENT BOND

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto _____
(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount
_____ DOLLARS (\$ _____)
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

- Legal Tender;
- Share Certificate unconditionally assigned to or made payable at sight to _____
Description: _____
- Certificate of Deposit, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Cashier's Check No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Teller's Check No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Treasurer's Check No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Official Check No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;
- Certified Check No. _____, dated _____ accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project: _____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

AND IT IS HEREBY STIPULATED AND AGREED that this bond shall inure to the benefit of any and all persons entitled to file claims for labor performed or materials furnished in said work so as to give any and all such persons a right of action as contemplated by Sections 103D-324(d) and 103D-324(e), Hawaii Revised Statutes.

The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payments of mechanics' liens which may be filed of record against the Project, whether or not claim for the amount of such lien be presented under and against this bond..

Signed this _____ day of _____, _____.

(Seal) _____

Name of Contractor

Signature*

Title

ALL SIGNATURES MUST BE ACKNOWLEDGED BY A NOTARY PUBLIC

CHAPTER 104, HRS COMPLIANCE CERTIFICATE

The undersigned bidder does hereby certify to the following:

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

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

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

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

DATED at Honolulu, Hawaii, this _____ day of _____.

Name of Corporation, Partnership, or Individual

Signature and Title of Signer

Subscribed and sworn before me this
_____ day of _____.

Notary Public, _____ Judicial Circuit,
State of Hawaii
My Commission Expires: _____

**PROVISIONS TO BE INCLUDED IN
CONSTRUCTION PROCUREMENT SOLICITATIONS**

1. Definitions for terms used in HRS Chapter 103B as amended by Act 192, SLH 2011:
 - a. "Contract" means contracts for construction under 103D, HRS.
 - b. "Contractor" has the same meaning as in Section 103D-104, HRS, provided that "contractor" includes a subcontractor where applicable.
 - c. "Construction" has the same meaning as in Section 103D-104, HRS.
 - d. "General Contractor" means any person having a construction contract with a governmental body.
 - e. "Procurement Officer" has the same meaning as in Section 103D-104, HRS.
 - f. "Resident" means a person who is physically present in the State of Hawai'i at the time the person claims to have established the person's domicile in the State of Hawai'i and shows the person's intent is to make Hawai'i the person's primary residence.
 - g. "Shortage trade" means a construction trade in which there is a shortage of Hawai'i residents qualified to work in the trade as determined by the Department of Labor and Industrial Relations.

2. HRS Chapter 103B as amended by Act 192, SLH 2011--Employment of State Residents Requirements:
 - a. A Contractor awarded a contract shall ensure that Hawai'i residents comprise not less than 80% of the workforce employed to perform the contract work on the project. The 80% requirement shall be determined by dividing the total number of hours worked on the contract by Hawai'i residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees within shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

- b. Prior to award of a contract, an Offeror/Bidder may withdraw an offer/bid without penalty if the Offeror/Bidder finds that it is unable to comply with HRS Chapter 103B as amended by Act 192, SLH 2011.
- c. Prior to starting any construction work, the Contractor shall submit the subcontract dollar amount for each of its Subcontractors.
- d. The requirements of this section shall apply to any subcontract of \$50,000 or more in connection with the Contractor; that is, such Subcontractors must also ensure that Hawai'i residents comprise not less than 80% of the Subcontractor's workforce used to perform the subcontract.
- e. The Contractor and any Subcontractor whose subcontract is \$50,000 or more shall comply with the requirements of HRS Chapter 103B as amended by Act 192, SLH 2011.
 - 1) Certification of compliance shall be made in writing under oath by an officer of the General Contractor and applicable Subcontractors and submitted with the final payment request.
 - 2) The certification of compliance shall be made under oath by an officer of the company by completing a "Certification of Compliance for Employment of State Residents" form and executing the Certificate before a licensed notary public.
 - 3) In addition to the certification of compliance as indicated above, the Contractor and Subcontractors shall maintain records such as certified payrolls for laborers and mechanics who performed work at the site and time sheets for all other employees who performed work on the project. These records shall include the names, addresses and number of hours worked on the project by all employees of the Contractor and Subcontractor who performed work on the project to validate compliance with HRS Chapter 103B as amended by Act 192, SLH 2011. The Contractor and Subcontractors shall retain these records and provide access to the State for a minimum period of four (4) years after the final payment, except that if any litigation, claim, negotiation, investigation, audit or other action involving the records has been started before the expiration of the four-year period, the Contractor and Subcontractors shall retain the records until completion of the action and resolution of all issues that arise from it, or until the end of the four-year period, whichever occurs later. Furthermore, it shall be the Contractor's responsibility to enforce compliance with this provision by any Subcontractor.

- f. A General Contractor or applicable Subcontractor who fails to comply with this section shall be subject to any of the following sanctions:
- 1) With respect to the General Contractor, withholding of payment on the contract until the Contractor or its Subcontractor complies with HRS Chapter 103B as amended by Act 192, SLH 2011.
 - 2) Proceedings for debarment or suspension of the Contractor or Subcontractor under Hawai'i Revised Statutes §103D-702.
3. Conflict with Federal Law: This section shall not apply if the application of this section is in conflict with any federal law, or if the application of this section will disqualify the State from receiving Federal funds or aid.

**CERTIFICATION OF COMPLIANCE
FOR
EMPLOYMENT OF STATE RESIDENTS
HRS CHAPTER 103B, AS AMENDED BY ACT 192, SLH 2011**

Project Title: _____

Agency Project No: _____

Contract No.: _____

As required by Hawai'i Revised Statutes Chapter 103B, as amended by Act 192, Session Laws of Hawaii 2011--Employment of State Residents on Construction Procurement Contracts, I hereby certify under oath, that I am an officer of _____ and
(Name of Contractor or Subcontractor Company)
for the Project Contract indicated above, _____ was in
(Name of Contractor or Subcontractor Company)
compliance with HRS Chapter 103B, as amended by Act 192, SLH 2011, by employing a workforce of which not less than eighty percent are Hawai'i residents, as calculated according to the formula in the solicitation, to perform this Contract.

I am an officer of the **Contractor** for this contract.

I am an officer of a **Subcontractor** for this contract.

CORPORATE SEAL

(Name of Company)

(Signature)

(Print Name)

(Print Title)

Subscribed and sworn to me before this
____ day of _____, 2011.

Doc. Date: _____ # of Pages _____ 1st Circuit

Notary Name: _____

Doc. Description: _____

Notary Public, 1st Circuit, State of Hawai'i
My commission expires: _____

Notary Signature

Date

NOTARY CERTIFICATION