

**STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS**

**GENERAL REQUIREMENTS, GENERAL PROVISIONS, TECHNICAL PROVISIONS
FOR
SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
KAHULUI, MAUI, HAWAII**

STATE PROJECT NO. AM1095-10

AIP PROJECT NO. 3-15-0006-##

JULY 2023

NOTICE TO BIDDERS
(Chapter 103D, HRS)

SEALED BIDS for SOUTH TSA CHECKPOINT, KAHULUI AIRPORT,
KAHULUI, MAUI, HAWAII, STATE PROJECT NO. AM1095-10, AIP PROJECT NO.
3-15-0006-## will begin as advertised 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 September 15, 2023, 2:00 p.m., Hawaii Standard Time
(HST). **The complete bid Proposal Schedule shall be uploaded into HIEPRO prior to the**
bid opening date and time. All other required 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 the said due date and time
shall not be considered.

The bid plans include airport security system drawings that contain sensitive
security information. The Electrical Security System sheets (pages 313 to 327 of the bid
plans) are not included in the bid plans. Bidders that are interested in obtaining the
Electrical Security System sheets shall complete and sign the "Confidentiality and Non-
Disclosure Agreement" form, "Request for Airport Plans and CAD/Computer Graphics
Data" form, and "Recipient's Indemnification Clause" form as provided in the
Specifications. The Requestor shall email a scanned copy of the completed signed forms
to Mr. Daryl Yokomizo, our Airports State Project Manager, at
daryl.k.yokomizo@hawaii.gov, and shall allow seven (7) calendar days for processing of

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Notice to Bidders
NTB-1

the Request. All forms must be completed, signed and returned unaltered and without any conditions. Upon approval, the Requestor will then be emailed the PDF of the Electrical Security System sheets and a password to access the sheets. Any requests for airport plans that are received less than seven (7) calendar days prior to the bid opening date (i.e., after September 8, 2023, 2:00 p.m. Hawaii Standard Time (HST)) will not be responded to.

The scope of work consists of construction of a new Transportation Security Administration (TSA) Security Screening Checkpoint Building and air-conditioning of existing TSA Checkpoint at Kahului Airport. Estimated construction cost is between \$50,000,000 and \$60,000,000.

To be eligible for award, bidders must possess a valid State of Hawaii General Building Contractor “B” license prior to the award of contract.

The General Provisions dated 2016 are applicable to this project and are available at <http://hidot.hawaii.gov/administration/con/>.

A pre-bid conference is scheduled for August 3, 2023, at 10:30 a.m., HST on Microsoft Teams. All bidders that wish to attend must send an email indicating their interest to Mr. Daryl Yokomizo, our Airports State Project Manager, at daryl.k.yokomizo@hawaii.gov. They will be added to the Microsoft Teams attendance list and will be sent an invitation email with a Microsoft Teams web-link. This will allow each person to attend the pre-bid conference via the internet. The invitation will also contain teleconference information, so bidders may call in instead. The deadline to sign up for the pre-bid conference is one (1) working day prior to the date of the pre-bid

conference. Anything said at the pre-bid conference is for clarification purposes and any changes to the bid documents will be made by addendum and posted in HIePRO.

All prospective bidders or their representatives (employees) are encouraged to attend the pre-bid conference, but attendance is not mandatory.

All requests for information (RFI) and substitution requests shall be received in writing to Mr. Daryl Yokomizo, our Airports State Project Manager by email, at daryl.k.yokomizo@hawaii.gov no less than 17 calendar days before bid opening. Questions received after the deadline will not be addressed. Verbal requests for information will not receive a response. Reference Special Provisions Section 2.7 for additional information regarding substitution requests.

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.

Campaign contributions by State and County Contractors. Contractors are hereby notified of the applicability of Section 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.

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).

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 Regulations entitled "Participation by Disadvantaged Business Enterprise in Department of Transportation Financial Assistance Programs", Title 49, Code of Federal Regulations, Part 26 is applicable to this project. Bidders are hereby notified that the Department of Transportation will strictly enforce full compliance with all of the requirements of the DBE program with respect to this project.

Bidders are directed to read and be familiar with the DBE Requirements, which establishes the program requirements pursuant to Title 49 Code of Federal Regulations Part 26 and, particularly, the requirements of certification, method of award, and evidence of good faith. All bidders must email Mr. Daryl Yokomizo, our Airports State Project Manager, at daryl.k.yokomizo@hawaii.gov, the Disadvantaged Business Enterprise (DBE) Contract Goal Verification and Good Faith Efforts (GFE) Documentation for Construction, the Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement – Trucking Company, and the Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement – Subcontractor, Manufacturer, or Supplier by the close of business, 4:30 p.m., HST, five (5) Calendar Days after bid opening. Failure to provide these documents shall be cause for bid/proposal rejection.

For additional information, contact Mr. Daryl Yokomizo, our Airports State Project Manager, by phone at (808) 838-8825 or by email at daryl.k.yokomizo@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.

Ford Fuchigami

FORD N. FUCHIGAMI
Airports Deputy Director

Posted on HiePRO: July 26, 2023

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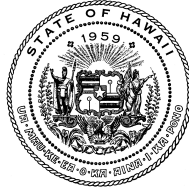
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART 0 - GENERAL REQUIREMENTS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART 0.A - BIDDING REQUIREMENTS



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION ENGINEERING BRANCH
400 RODGERS BOULEVARD, SUITE 700
HONOLULU HI 96819-1880
FAX: (808) 838-8751

REQUEST FOR AIRPORTS PLANS

TO BE COMPLETED BY REQUESTOR:

FIRM NAME: _____ DATE: _____

ADDRESS: _____

REQUESTED BY (NAME): _____ PHONE NO: _____ FAX: N/A

EMAIL ADDRESS: _____

PROJECT NUMBER: AM1095-10 PROJECT TITLE: OGG South TSA Checkpoint

REFERRED BY (AIRPORTS STAFF): Daryl Yokomizo, State Project Manager

ARE YOU MAKING AIRPORT TENANT IMPROVEMENTS? YES [] NO [x]

DETAILS OF PLANS/ELECTRONIC DATA REQUESTED: _____

Electrical Security System Bid Drawing Sheets

PURPOSE OF PLANS/ELECTRONIC DATA REQUESTED: _____

Drawings are necessary to assist Bidders in providing costs for the engineering and installation of the electrical security system.

Airports will contact you as soon as clearance is granted. However, if you do not hear from us 3 working days after you have submitted this request, please call (808) 838-8825 to check on the status.

Requestor is required to sign Confidentiality and Non-Disclosure Agreement.

By taking receipt of the requested plans/electronic data, Requestor agrees to the terms and conditions of the Indemnification Clause.

Requestor:

NAME _____

SIGNATURE _____ DATE _____

TO BE COMPLETED BY AIRPORTS:

State Project Manager/Property Manager/District Engineer Approval:

NAME _____

SIGNATURE _____ DATE _____

APPROVED / DISAPPROVED

CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT

A. I acknowledge and confirm my understanding of the following with respect to the requested bid documents, which includes but not limited to, plans and specifications, are hereinafter collectively referred to as the "Requested Documents".

- The "Requested Documents" contains sensitive security information ("SSI") that is controlled under 49 CFR parts 15 and 1520. No part of this record may be disclosed to persons without a "need to know", as defined in 49 CFR parts 15 and 1520, except with the written permission of the Administrator of the Transportation Security Administration or the Secretary of Transportation. Unauthorized release may result in civil penalty or other action. For U.S. government agencies, public disclosure is governed by 5 U.S.C. 552 and 49 CFR parts 15 and 1520.
- The "Requested Documents" may be protected from disclosure under the federal Freedom of Information Act and other application federal laws.
- The "Requested Documents" are considered by DOTA to contain information that is vital to the security and safe operation of the Airport, whether or not the documents are classified by any other governmental entity or law as containing such information.
- The "Requested Documents" are considered by DOTA possible to contain information that is commercially or financially sensitive or which is a trade secret.

B. I agree to the following with respect to the "Requested Documents":

- I will safeguard the "Requested Documents": to prevent disclosure (whether inadvertent or otherwise) of them or any portion of them by keeping the "Requested Documents" when in use under the control of a limited number of authorized persons, of suitable age and discretion and when not in use stored in a secure container, such as locked desk, file cabinet, or locked room.
- I will not release, disclose, distribute or disseminate all or any portion of the "Requested Documents" to, any person, company, entity, organization or firm for any reason that does not relate to the work of the project, or the purposes mentioned on the request. Any such permitted review, release distribution or dissemination of the "Requested Documents" that does not relate to the work of the project, or the purpose mentioned on the request shall be made only by an employee of the Firm with and utilizing appropriate supervisory and decision-making authority and discretion and only the following compliance with all application federal, state, and local laws and regulations.
- I will not provide access to, or release distribute, or disseminate all or any portion of the "Requested Documents" in response to requests made pursuant to or based on the Hawaii Public Record law, the federal Freedom of Information Act, or any other public records or sunshine laws (collective "Public Record Laws"). I will immediately refer all such Public Record Laws request for access to or copies of all or any portion of the "Requested Documents" to DOTA for appropriate disposition.

ATTACHMENT B

- C. Neither DOTA granting me permission to review, nor DOTA allowing me to obtain copies of, the "Requested Documents" constitutes a waiver of the confidential, security sensitive, or disclosure exempt status of all or any portion of the "Requested Documents."

AM1095-10

Project Number

Signature of Requestor Date

OGG South TSA Checkpoint

Project Title

Print Name

Company Name

INDEMNIFICATION CLAUSE

I, the "Recipient" of Department of Transportation Airport Division's Instruments of Service, agree to the following:

Instruments of Service

The Recipient acknowledges that Drawings, Specifications and other documents, including electronic data received from Department of Transportation Airport Division ("DOTA") for this Project are for use solely with respect to this Project. DOTA makes no warranties, either express or implied, of merchantability and fitness of DOTA's Instruments of Service for any particular purpose. DOTA's Instruments of Service shall not be used by the Recipient or others on other projects.

In no event shall DOTA be liable for indirect or consequential damages as a result of the use, reuse or modification of DOTA's Instruments of Service by the Recipient or any person or entity that acquires or obtains DOTA's Instruments of Service from or through the Recipient.

Limits of Use

Because the information stored in electronic form can be modified by other parties, intentionally or otherwise, without notice or indication of said modifications, DOTA reserves the right to remove all indicia of its ownership and/or involvement in the material from each electronic medium not held in its possession.

Recipient shall retain copies of DOTA's Instruments of Service for information only. Said materials shall not be used by Recipient, or transferred to any other party for use in other projects, additions to the current project, or any other purpose for which the material was not intended.

Recipient agrees to make no claim and hereby waives any and all claims against DOTA and agrees to defend, indemnify and hold DOTA harmless from and against any and all claims, injuries, losses, liabilities, expenses, damages, attorney's fees and defense cost arising out of or relating to any modification, re-use and/or any other unauthorized use of DOTA's Instruments of Service by Recipient or any person or entity that acquires or obtains DOTA's Instruments of Service from or through the Recipient.

INSTRUCTIONS FOR CONTRACTOR'S LICENSING

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART 0.B - BIDDING DOCUMENTS TO BE SUBMITTED WITH BID

**PROPOSAL TO THE
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION**

PROJECT: South TSA Checkpoint
Kahului Airport
Kahului, Maui, Hawaii

STATE PROJECT NO.: AM1095-10

AIP PROJECT NO.: 3-15-0006-##

COMPLETION TIME: 580 Calendar days from the date indicated
in the Notice to Proceed from the
Department.

LIQUIDATED DAMAGES: TEN THOUSAND DOLLARS(\$10,000.00) per
calendar day for failure to complete the
contract within the FIVE HUNDRED AND
EIGHTY (580) calendar days from the date
indicated in the Notice to Proceed from the
State

DBE PROJECT GOAL: 8.7%

STATE PROJECT MANAGER: Daryl Yokomizo
Department of Transportation - Airports
Daniel K. Inouye International Airport
400 Rodgers Blvd, Suite 700
Honolulu, HI 96819
Email: daryl.k.yokomizo@hawaii.gov
Phone: 808-838-8825

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.
4. It will not maintain for its employees any segregated facilities at any of its establishments.
5. Does not and will not permit its employees to perform their services at any location under its control, where segregated facilities are maintained.

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 1032D-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. Unless amended by Special Provision, 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: Hawaii Standard Specifications for Road and Bridge Construction, 2005, and/or the General Provisions for Construction Projects for AIR and WATER Transportation Facilities Division dated 2016, as applicable, the Notice to Bidders, Special Provisions, Proposal, Contract, Bond Forms, and 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 on the following page. 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.

The undersigned Bidder asserts that affirmative action has been taken to seek out and consider Disadvantaged Business Enterprises (DBEs) for portions of the work which can be subcontracted, and the affirmative actions of the Bidder are fully documented in its records and are available upon request by the Department. It is also understood that it must meet or exceed the DBE contract goal listed on page P-1 or demonstrate that it made good faith efforts to meet the DBE project goal. The undersigned as Bidder agrees to utilize each participating DBE that it submitted to meet the contract goal of _____ % (percentage to be completed by Bidder) DBE participation if the contract is awarded to it, and shall maintain such DBE participation during the construction of this project.

SUBCONTRACTOR LISTING
(Attach additional sheets if necessary.)

NAME OF FIRM	NATURE OF WORK
SUBCONTRACTOR:	
1. _____	_____
1a ¹ . _____	_____
2. _____	_____
2a. _____	_____
3. _____	_____
3a. _____	_____
4. _____	_____
4a. _____	_____
5. _____	_____
5a. _____	_____
6. _____	_____
6a. _____	_____
7. _____	_____
7a. _____	_____

NOTES:

The Name of Firm and Nature of Work shall be indicated for all listed firms. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Sub- or Joint Contractor.

For each listed firm, the Bidder declares the respective firm is a Sub- or Joint Contractor and subject to evaluation as a Sub- or Joint Contractor.

¹ Second tier subcontractors

JOINT CONTRACTOR LISTING

(Attach additional sheets if necessary.)

NAME OF FIRM	NATURE OF WORK
JOINT CONTRACTOR:	
1. _____	_____
1a ¹ . _____	_____
2. _____	_____
2a. _____	_____
3. _____	_____
3a. _____	_____
4. _____	_____
4a. _____	_____
5. _____	_____
5a. _____	_____
6. _____	_____
6a. _____	_____
7. _____	_____
7a. _____	_____

NOTES:

The Name of Firm and Nature of Work shall be indicated for all listed firms. The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Sub- or Joint Contractor.

For each listed firm, the Bidder declares the respective firm is a Sub- or Joint Contractor and subject to evaluation as a Sub- or Joint Contractor.

¹ Second tier joint contractors

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)

Authorized Signature

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.

SOUTH TSA CHECKPOINT
 KAHULUI AIRPORT
 KAHULUI, MAUI, HAWAII
 STATE PROJECT NO. AM1095-10
 AIP PROJECT NO. 3-15-0006-##

PROPOSAL SCHEDULE

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>I. General Requirements</u>					
01010.1	Relocation of Existing Sculpture		L.S.	\$	_____
01500.1	Installation, Maintenance, Monitoring, and Removal of BMP		L.S.	\$	_____
01561.1	Construction Site Runoff Control Program		L.S.	\$	_____
01570	Traffic Control Work Zone		L.S.	\$	_____
01700	Mobilization (Not to Exceed 6% of sum of all items, excluding this item and all allowances)		L.S.	\$	_____
<u>II. Site Construction</u>					
02070.1	Removal of Structures and Obstructions		L.S.	\$	_____
02080.1	Protection of Existing Utilities		L.S.	\$	_____
02210.1	Excavation and Embankment		L.S.	\$	_____
02210.2	Grading and Compaction		L.S.	\$	_____
02210.3	Borrow Excavated Material		L.S.	\$	_____
02221.1	Trench Excavation and Backfill for Drain Pipe		L.S.	\$	_____
02221.2	Trench Excavation and Backfill for Drain Structures		L.S.	\$	_____
02221.3	Trench Excavation and Backfill for Water System		L.S.	\$	_____
02221.4	Trench Excavation and Backfill for Sewer System		L.S.	\$	_____
02232.1	Aggregate Base Course		L.S.	\$	_____
02232.2	Aggregate Subbase		L.S.	\$	_____
02281	Termite Control		L.S.	\$	_____
02400	Storm Drainage		L.S.	\$	_____
02411.1	Structure Demolition		L.S.	\$	_____
02411.2	Structure Demolition - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>II. Site Construction (Continued)</u>					
02450	Portland Cement Concrete Sidewalks		L.S.	\$ _____	
02513	Asphalt Pavement		L.S.	\$ _____	
02528	Concrete Curbs		L.S.	\$ _____	
02578	Painted Pavement Markings		L.S.	\$ _____	
02713	Water Systems		L.S.	\$ _____	
02722	Sanitary Sewer System		L.S.	\$ _____	
02810	Sprinkler System		L.S.	\$ _____	
02950.1	Landscape Planting		L.S.	\$ _____	
02950.2	Landscape Planting - Operations & Maintenance Service	24	Month	\$ _____	\$ _____
<u>III. Concrete</u>					
03300	Cast-In-Place Concrete		L.S.	\$ _____	
03340	Concrete Floor Finishes		L.S.	\$ _____	
03450	Architectural Precast Concrete		L.S.	\$ _____	
<u>IV. Masonry</u>					
04200	Unit Masonry		L.S.	\$ _____	
<u>V. Metals</u>					
05120.1	Structural Steel		L.S.	\$ _____	
05120.2	Structural Steel - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$ _____	
05210	Steel Joist Framing		L.S.	\$ _____	
05300.1	Metal Deck		L.S.	\$ _____	
05300.2	Metal Deck - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$ _____	
05400.1	Cold Formed Metal Framing		L.S.	\$ _____	
05400.2	Cold Formed Metal Framing - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$ _____	
05500.1	Metal Fabrication		L.S.	\$ _____	
05500.2	Metal Fabrication - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$ _____	
05511	Metal Stair		L.S.	\$ _____	
05521	Pipe and Tube Railings		L.S.	\$ _____	
05581	Column Covers		L.S.	\$ _____	

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>V. Metals (Continued)</u>					
05731	Glazed Decorative Metal Railings		L.S.	\$	_____
05750	Decorative Formed Metal		L.S.	\$	_____
<u>VI. Wood and Plastics</u>					
06105.1	Miscellaneous Rough Carpentry		L.S.	\$	_____
06105.2	Miscellaneous Rough Carpentry- Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
06160.1	Sheathing		L.S.	\$	_____
06160.2	Sheathing - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
06202	Interior Finish Carpentry		L.S.	\$	_____
06402	Interior Architectural Woodwork		L.S.	\$	_____
06640	Plastic Paneling		L.S.	\$	_____
<u>VII. Thermal and Moisture Protection</u>					
07111	Bituminous Dampproofing		L.S.	\$	_____
07210.1	Thermal Insulation		L.S.	\$	_____
07210.2	Thermal Insulation - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07271.1	Modified Bituminous Sheet Air Barriers		L.S.	\$	_____
07271.2	Modified Bituminous Sheet Air Barriers - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07421.1	Aluminum Flat Plate Panels		L.S.	\$	_____
07421.2	Aluminum Flat Plate Panels - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07541.1	Polyvinyl-Chloride (PVC) Roofing		L.S.	\$	_____
07541.2	Polyvinyl-Chloride (PVC) Roofing - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07620.1	Sheet Metal Flashing and Trim		L.S.	\$	_____
07620.2	Sheet Metal Flashing and Trim - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07810	Applied Fireproofing		L.S.	\$	_____
07841.1	Penetration Firestopping		L.S.	\$	_____

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Proposal Schedule
P-10

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>VII. Thermal and Moisture Protection (Continued)</u>					
07841.2	Penetration Firestopping - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07844.1	Joint Firestopping		L.S.	\$	_____
07844.2	Joint Firestopping - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07920.1	Joint Sealants		L.S.	\$	_____
07920.2	Joint Sealants - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
07921	Acoustical Joint Sealants		L.S.	\$	_____
07951	Exterior Expansion Joint Cover Assemblies		L.S.	\$	_____
<u>VIII. Doors and Windows</u>					
08111	Hollow Metal Doors And Frames		L.S.	\$	_____
08311	Access Doors and Frames		L.S.	\$	_____
08332	Overhead Coiling Doors		L.S.	\$	_____
08411.1	Aluminum-Framed Entrances and Storefronts		L.S.	\$	_____
08411.2	Aluminum-Framed Entrances and Storefronts - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
08422.1	Sliding Automatic Entrances		L.S.	\$	_____
08422.2	Sliding Automatic Entrances - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
08422.3	Sliding Automatic Entrances - Operations & Maintenance Service	24	Month	\$	_____
08442	Structural-Sealant-Glazed Curtainwalls		L.S.	\$	_____
08710.1	Door Hardware		L.S.	\$	_____
08710.2	Door Hardware - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
08800.1	Glazing		L.S.	\$	_____
08800.2	Glazing - Existing TSA Checkpoint Work (Phase 2)		L.S.	\$	_____
08911.1	Fixed Louvers		L.S.	\$	_____

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>VIII. Doors and Windows (Continued)</u>					
08911.2	Fixed Louvers - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
<u>IX. Finishes</u>					
09221.1	Non-Structural Metal Framing		L.S.		\$ _____
09221.2	Non-Structural Metal Framing - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
09240.1	Cement Plastering		L.S.		\$ _____
09240.2	Cement Plastering - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
09290.1	Gypsum Board		L.S.		\$ _____
09290.2	Gypsum Board - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
09291	Acoustic Isolation Pads		L.S.		\$ _____
09301	Ceramic Tiling		L.S.		\$ _____
09511	Acoustical Panel Ceilings		L.S.		\$ _____
09542	Linear Metal Ceilings		L.S.		\$ _____
09651	Resilient Base And Accessories		L.S.		\$ _____
09653	Resilient Tile Flooring		L.S.		\$ _____
09681	Tile Carpeting		L.S.		\$ _____
09720	Acoustical Wall Panels		L.S.		\$ _____
09911.1	Exterior Painting		L.S.		\$ _____
09911.2	Exterior Painting - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
09912.1	Interior Paint		L.S.		\$ _____
09912.2	Interior Painting - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
09960	High-Performance Coatings		L.S.		\$ _____
<u>X. Specialties</u>					
10260	Wall and Door Protection		L.S.		\$ _____
10440	Signage		L.S.		\$ _____
10441	Fire Protection Cabinets		L.S.		\$ _____
10442	Fire Extinguisher		L.S.		\$ _____
<u>XII. Furnishings</u>					
12241	Roller Window Shades		L.S.		\$ _____

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>XIII. Special Construction (Not Used)</u>					
<u>XIV. Conveying Systems</u>					
14210.1	Electric Traction Elevators		L.S.		\$ _____
14210.2	Electric Traction Elevators - Operations & Maintenance Service	24	Month	\$ _____	\$ _____
14310.1	Escalators		L.S.		\$ _____
14310.2	Escalators - Operations & Maintenance Service	24	Month	\$ _____	\$ _____
<u>XV. Mechanical</u>					
15400.1	Plumbing		L.S.		\$ _____
15400.2	Plumbing - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
15500.1	Fire Protection Systems		L.S.		\$ _____
15500.2	Fire Protection Systems - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
15600.1	Air Conditioning and Ventilation		L.S.		\$ _____
15600.2	Air Conditioning and Ventilation - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
15600.3	Air Conditioning and Ventilation - Operations & Maintenance Service	24	Month	\$ _____	\$ _____
15910.1	Direct Digital Control System		L.S.		\$ _____
15910.2	Direct Digital Control System - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
<u>XVI. Electrical</u>					
16100.1	Electrical Work		L.S.		\$ _____
16100.2	Electrical Work - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
16208.1	Engine Generator		L.S.		\$ _____
16208.2	Engine Generator – Operations & Maintenance Service	24	Month	\$ _____	\$ _____
16301	Underground Electrical Work		L.S.		\$ _____

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>XVI. Electrical (Continued)</u>					
16510.1	Interior Lighting		L.S.		\$ _____
16510.2	Interior Lighting - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
16722.1	Interior Addressable Fire Alarm System		L.S.		\$ _____
16722.2	Interior Addressable Fire Alarm System - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
16740.1	Building Telecommunication Systems		L.S.		\$ _____
16750.1	Access Control System		L.S.		\$ _____
16750.2	Access Control System - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
16770.1	Public Address System		L.S.		\$ _____
16770.2	Public Address System - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____
16771.1	Public Address Visual Paging System		L.S.		\$ _____
16780.1	Visual Surveillances Systems		L.S.		\$ _____
16780.2	Visual Surveillances Systems - Existing TSA Checkpoint Work (Phase 2)		L.S.		\$ _____

XVII. Allowances

01010.2	Reinstallation of Existing TSA Screening Equipment at The Existing TSA Checkpoint		Allowance		\$300,000
01500.2	Additional Water Pollution, Dust, and Erosion Control		Allowance		\$30,000
01562.1	Management of Contaminated Materials		Allowance		\$530,000
01565	Security Measures		Allowance		\$250,000
02070.2	Unforeseen Site Demolition		Allowance		\$250,000
02080.2	Removal or Relocation of Unknown Utility		Allowance		\$200,000
02210.4	Excavation of Unsuitable Material		Allowance		\$100,000
10900	Procurement and Installation of Automated External Defibrillators (AEDs)		Allowance		\$10,000

Item No.	Description	Quantity	Unit	Unit Price	Total
<u>XVII. Allowances (Continued)</u>					
15910.3	DDC Controls Integration With Existing System		Allowance		\$25,000
16722.3	Interior Addressable Fire Alarm System Integration with Existing Fire Alarm System		Allowance		\$20,000
16740.2	Cost Allowance - State (DOT-A) Tel/Data Connections		Allowance		\$20,000
16740.3	Cost Allowance - Commercial Utility Tel/CATV Service Charges		Allowance		\$20,000
16750.3	Connection of Access Control System to Existing Access Control Systems		Allowance		\$20,000
16770.3	Public Address System Integration with Existing Public Address System		Allowance		\$20,000
16771.2	Public Address Visual Paging System Integration with Existing System		Allowance		\$20,000
16780.3	Connection of Video Surveillance Systems to Existing Systems		Allowance		\$20,000
TOTAL AMOUNT FOR COMPARISON OF BIDS					\$ _____

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.

- Note 1: Bid shall include all Federal, State, County and other applicable taxes.
- Note 2: The TOTAL AMOUNT FOR COMPARISON OF BIDS will be used to determine the lowest responsible bidder.
- Note 3: Bidders shall complete all unit prices and amounts. Failure to do so may be grounds for rejection of bid.
- Note 4: If a discrepancy occurs between the unit price and the total, the unit price shall govern.
- Note 5: The State reserves the right to reject any or all Bids and to waive any defects in said Bids in the best interest of the State.
- Note 6: Submission of a Bid 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 7: The bidders' attention is directed to Section 2.11 – BID SECURITY and Section 2.24 – REQUIREMENTS OF CONTRACT BONDS of the "General Provisions".
- Note 8: Bidders shall be paid for actual work performed as directed by the Engineer for allowance items. Bidder will not be paid overhead and profit for unused allowance funds.
- Note 9: If the lowest TOTAL AMOUNT FOR COMPARISON OF BIDS is less than, or approximately equal to the funds available for this project, an award will be made to the lowest responsible bidder.
- Note 10: If the TOTAL AMOUNT FOR COMPARISON OF BIDS exceeds the funds available for the project, then the State reserves the right to negotiate with the lowest, responsive, responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes, to further reduce the scope of work and award a contract thereafter.
- Note 11: Proposal Sheets P-1 through P-32 shall be submitted at the time of bid. Failure to submit all pages shall result in rejection of bid.
- Note 12: The bidder shall submit the proposal in HlePRO. The proposal shall be UPLOADED to HlePRO 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 HlePRO. Any and all other additional documents explicitly designated and labeled as CONFIDENTIAL OR

PROPRIETARY shall be UPLOADED SEPARATELY to HlePRO. If there is a conflict between this specification and its HlePRO solicitation, the specifications shall govern and control unless otherwise specified.

Note 13: The State reserves the right to terminate any Operations & Maintenance Bid Items, with 30 calendar days notice. The bid item amount deducted from the Contract shall be the number of months remaining times the Unit Price amount indicated in the Proposal Schedule. The Contractor shall not claim that General Conditions and/or other mark-ups are included in the Unit Price, such that the bid item amount deducted from the Contract will be less than the number of months remaining times the Unit Price amount indicated in the Proposal Schedule.

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

BIDDER'S STATEMENT ON PREVIOUS CONTRACTS
SUBJECT TO EEO CLAUSES

The Bidder shall complete the following statement by checking the appropriate blanks:

The Bidder has _____ has not _____ participated in a previous contract subject to the equal opportunity clause prescribed by Executive Order 11246, as amended, of September 24, 1965.

The Bidder has _____ has not _____ submitted all compliance reports in connection with any such contract due under the applicable filing requirements; and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained prior to award of subcontracts.

If the Bidder has participated in a previous contract subject to the equal opportunity clause and has not submitted compliance reports due under applicable filing requirements, the Bidder shall submit a compliance report on Standard Form 100, "Employee Information Report EEO-I" prior to award of the contract (*).

NOTE: Failure to complete the blanks may be grounds for rejecting the bid.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

PROHIBITION OF SEGREGATED FACILITIES

- (a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Employment Opportunity clause in this contract.

- (b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

- (c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

CERTIFICATION REGARDING LOBBYING

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.
4. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror –

1. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);
2. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and
3. has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18 USC § 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR § 30.17, no contract shall be awarded to an Offeror or subcontractor:

1. who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR or
2. whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list or
3. who incorporates in the public works project any product of a foreign country on such USTR list.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly

rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

**CERTIFICATE OF COMPLIANCE WITH FAA BUY AMERICAN
PREFERENCE – EQUIPMENT / BUILDING PROJECTS**

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101, the Bipartisan Infrastructure Law (BIL) Build America, Buy America Act (BABA), and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (✓) or the letter “X”.

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA, and other related Made in America Laws, U.S. statutes, guidance, and policies of the FAA by:
- a) Only installing iron, steel, and manufactured products produced in the United States;
 - b) Only installing construction materials defined as an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall that have been manufactured in the United States;
 - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
 - d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- 1. To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
- 2. To faithfully comply with providing U.S. domestic product.
- 3. To furnish U.S. domestic product for any waiver request that the FAA rejects.
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- 5. To certify that all construction materials used in the project are manufactured in the U.S.

- The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) and BABA but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the bidder or offeror agrees:

1. To submit to the Airport Sponsor or FAA within 15 calendar days of bid opening, a formal waiver request and required documentation that supports the type of waiver being requested.
2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
3. To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
4. To furnish U.S. domestic product for any waiver request that the FAA rejects.
5. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) – The iron, steel, manufactured goods or construction materials are not available in sufficient quantity or quality in the United States. The required documentation for a Type 2 Nonavailability waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire.
- b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
- c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of the item components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the “item”. The required documentation for a Type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
- b) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- d) Percentage of non-domestic component and subcomponent cost as compared to total “item” component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

Type 4 Waiver (Unreasonable Costs) – Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for a Type 4 Unreasonable Costs waiver is:

- a) A completed Content Percentage Worksheet and Final Assembly Questionnaire including;
- b) At minimum, two comparable equal bids and/or offers.
- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005 indicates that no domestic source exists for the project and/or component.
- d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

**CERTIFICATION OF OFFEROR/BIDDER REGARDING TAX DELINQUENCY
AND FELONY CONVICTIONS**

The applicant must complete the following two certification statements. The applicant must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark (✓) in the space following the applicable response. The applicant agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications

The applicant represents that it is () is not () a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

The applicant represents that it is () is not () a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note

If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the Sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government’s interests. The applicant therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, which will then notify the agency’s SDO to facilitate completion of the required considerations before award decisions are made.

Term Definitions

Felony conviction: Felony conviction means a conviction within the preceding twenty-four (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. Code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. § 3559.

Tax Delinquency: A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a “covered transaction”, must verify each lower tier participant of a “covered transaction” under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: <http://www.sam.gov>.
2. Collecting a certification statement similar to the Certification of Offeror /Bidder Regarding Debarment, above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract.

If the Federal Aviation Administration later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

**CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR
PROCUREMENTS**

The Bidder or Offeror certifies by signing and submitting this bid or proposal that, to the greatest extent practicable, the Bidder or Offeror has provided a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including, but not limited to, iron, aluminum, steel, cement, and other manufactured products) in compliance with 2 CFR § 200.322.

Bidder (Company Name)

Signature

Date

Name and Title of Signing Official

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART 0.C - WAGE RATES

Requirements of Chapter 104, HRS Wages and Hours of Employees on Public Works Law

Chapter 104, HRS, applies to every public works construction project over \$2,000, regardless of the method of procurement or financing (purchase order, voucher, bid, contract, lease arrangement, warranty, SPRB).

Rate of Wages for Laborers and Mechanics

- Minimum prevailing wages (basic hourly rate plus fringe benefits), as determined by the Director of Labor and Industrial Relations and published in wage rate schedules, shall be paid to the various classes of laborers and mechanics working on the job site. [§104-2(a), (b), Hawaii Revised Statutes (HRS)]
- If the Director of Labor determines that prevailing wages have increased during the performance of a public works contract, the rate of pay of laborers and mechanics shall be raised accordingly. [§104-2(a) and (b), HRS; §12-22-3(d) Hawaii Administrative Rules (HAR)]

Overtime

- Laborers and mechanics working on a Saturday, Sunday, or a legal holiday of the State or more than eight hours a day on any other day shall be paid overtime compensation at not less than one and one-half times the basic hourly rate plus the cost of fringe benefits for all hours worked. If the Director of Labor determines that a prevailing wage is defined by a collective bargaining agreement, the overtime compensation shall be at the rates set by the applicable collective bargaining agreement [§§104-1, 104-2(c), HRS; §12-22-4.1, HAR]

Weekly Pay

- Laborers and mechanics employed on the job site shall be paid their full wages at least once a week, without deduction or rebate, except for legal deductions, within five working days after the cutoff date. [§104-2(d), HRS]

Posting of Wage Rate Schedules

- Wage rate schedules with the notes for prevailing wages and special overtime rates, shall be posted by the contractor in a prominent and easily accessible place at the job site. A copy of the entire wage rate schedule shall be given to each laborer and mechanic employed under the contract, except when the employee is covered by a collective bargaining agreement. [§104-2(d), HRS]

Withholding of Accrued Payments

- If necessary, the contracting agency may withhold accrued payments to the contractor to pay to laborers and mechanics employed by the contractor or subcontractor on the job site any difference between the wages required by the public works contract or specifications and the wages received. [§104-2(e), HRS]

Certified Weekly Payrolls and Payroll Records

- A certified copy of all payrolls shall be submitted weekly to the contracting agency. [§104-3(a), HRS; §12-22-10, HAR]
- The contractor is responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates listed are not less than the applicable rates contained in the applicable wage rate schedule, and that the classifications for each laborer or mechanic conform with the work the laborer or mechanic performed. [§104-3(a), HRS; §12-22-10, HAR]
- Payroll records shall be maintained by the contractor and subcontractors for three years after completion of construction. The records shall contain: [§104-3(b), HRS; §12-22-10, HAR]
 - the name and home address of each employee
 - the last four digits of social security number
 - a copy of the apprentice's registration with DLIR
 - the employee's correct classification
 - rate of pay (basic hourly rate + fringe benefits)
 - itemized list of fringe benefits paid
 - daily and weekly hours worked
 - weekly straight time and overtime earnings
 - amount and type of deductions
 - total net wages paid
 - date of payment
- Records shall be made available for examination by the contracting agency, the Department of Labor and Industrial Relations (DLIR), or any of its authorized representatives, who may also interview employees during working hours on the job. [§§104-3(c), 104-22(a), HRS; §12-22-10, HAR]

Termination of Work on Failure to Pay Wages

- If the contracting agency finds that any laborer or mechanic employed on the job site by the contractor or any subcontractor has not been paid prevailing wages or overtime, the contracting agency may, by written notice to the contractor, terminate the contractor's or subcontractor's right to proceed with the work or with the part of the work in which the required wages or overtime compensation have not been paid. The contracting agency may complete this work by contract or otherwise, and the contractor or contractor's sureties shall be liable to the contracting agency for any excess costs incurred. [§104-4, HRS]

Apprentices

- Apprentice wage rates apply to contractors who are a party to a bona fide apprenticeship program which has been registered with the DLIR. In order to be paid apprentice rates, apprentices must be parties to an agreement either registered with or recognized as a USDOL nationally approved apprenticeship program by the DLIR, Workforce Development Division, (808) 586-8877, and the apprentice must be individually registered by name with the DLIR. [§12-22-6(1) and (2), HAR]
- The number of apprentices on any public work in relation to the number of journeyworkers in the same craft classification as the apprentices employed by the same employer on the same public work may not exceed the ratio allowed under the apprenticeship standards registered with or recognized by the DLIR. A registered or recognized apprentice receiving the journeyworker rate will not be considered a journeyworker for the purpose of meeting the ratio requirement. [§12-22-6(3), HAR]

Enforcement

- To ensure compliance with the law, DLIR and the contracting agency will conduct investigations of contractors and subcontractors. If a contractor or subcontractor violates the law, the penalties are: [§104-24, HRS]
 - First Violation Equal to 25% of back wages found due or \$250 per offense up to \$2,500, whichever is greater.
 - Second Violation Equal to amount of back wages found due or \$500 for each offense up to \$5,000, whichever is greater.
 - Third Violation Equal to two times the amount of back wages found due or \$1,000 for each offense up to \$10,000, whichever is greater; and
Suspension from doing any new work on any public work of a governmental contracting agency for three years.
- A violation would be deemed a second violation if it occurs within two years of the **first notification of violation**, and a third violation if it occurs within three years of **the second notification of violation**. [§104-24, HRS; §12-22-25(b), HAR]
- **Suspension:** For a first or second violation, the department shall immediately suspend a contractor who fails to pay wages or penalties until all wages and penalties are paid in full. For a third violation, the department shall penalize and suspend the contractor as described above, **except that if the contractor continues to violate the law, then the department shall immediately suspend the contractor for a mandatory three years. The contractor shall remain suspended until all wages and penalties are paid in full.** [§§104-24, 104-25, HRS]
- **Suspension:** Any contractor who fails to make payroll records accessible or provide requested information within 10 days, or fails to keep or falsifies any required record, shall be assessed a penalty including suspension as provided in Section 104-22(b) and 104-25(a)(3), HRS. [§104-3(c), HRS; §12-22-26, HAR]
- If any contractor interferes with or delays any investigation, the contracting agency shall withhold further payments until the delay has ceased. Interference or delay includes failure to provide requested records or information within ten days, failure to allow employees to be interviewed during working hours on the job, and falsification of payroll records. The department shall assess a penalty of \$10,000 per project, and \$1,000 per day thereafter, for interference or delay. [§104-22(b), HRS; §12-22-26, HAR]
- Failure by the contracting agency to include in the provisions of the contract or specifications the requirements of Chapter 104, HRS, relating to coverage and the payment of prevailing wages and overtime, is not a defense of the contractor or subcontractor for noncompliance with the requirements of this chapter. [§104-2(f), HRS]



For additional information, visit the department's website at <http://labor.hawaii.gov/wsd> or contact any of the following DLIR offices:

Oahu (Wage Standards Division).....(808) 586-8777
Hawaii Island.....(808) 974-6464
Maui and Kauai.....(808) 243-5322

**STATE OF HAWAII WAGE RATE SCHEDULE (NOT PHYSICALLY
INCLUDED IN BID DOCUMENTS)**

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Superseded General Decision Number: HI20220001

State: Hawaii

Construction Types: Building, Heavy (Heavy and Dredging), Highway and Residential

Counties: Hawaii Statewide.

BUILDING CONSTRUCTION PROJECTS; RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories); HEAVY AND HIGHWAY CONSTRUCTION PROJECTS AND DREDGING

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/06/2023
1	01/13/2023
2	01/27/2023
3	02/17/2023
4	02/24/2023
5	03/10/2023
6	03/17/2023
7	07/07/2023

ASBE0132-001 06/05/2022

	Rates	Fringes
Asbestos Workers/Insulator Includes application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems. Also the application of firestopping material for wall openings and penetrations in walls, floors, ceilings and curtain walls.....	\$ 42.80	25.85

BOIL0627-005 01/01/2021

	Rates	Fringes
BOILERMAKER.....	\$ 37.25	31.25

BRHI0001-001 09/05/2022

	Rates	Fringes
BRICKLAYER Bricklayers and Stonemasons.	\$ 47.24	31.33
Pointers, Caulkers and Weatherproofers.....	\$ 47.49	31.33

BRHI0001-002 09/05/2022

	Rates	Fringes
Tile, Marble & Terrazzo Worker Terrazzo Base Grinders.....	\$ 43.79	33.10
Terrazzo Floor Grinders and Tenders.....	\$ 42.24	33.10
Tile, Marble and Terrazzo Workers.....	\$ 45.60	33.10

CARP0745-001 10/01/2021

	Rates	Fringes
Carpenters: Carpenters; Hardwood Floor Layers; Patent Scaffold Erectors (14 ft. and over); Piledrivers; Pneumatic Nailers; Wood		

Shinglers and Transit and/or Layout Man.....	\$ 51.25	24.84
Millwrights and Machine Erectors.....	\$ 51.50	24.84
Power Saw Operators (2 h.p. and over).....	\$ 51.40	24.84

 CARP0745-002 10/01/2021

	Rates	Fringes
Drywall and Acoustical Workers and Lathers.....	\$ 51.50	24.84

 ELEC1186-001 08/22/2022

	Rates	Fringes
Electricians:		
Cable Splicers.....	\$ 60.51	30.90
Electricians.....	\$ 53.55	30.69
Telecommunication worker....	\$ 34.94	13.69

 ELEC1186-002 08/22/2022

	Rates	Fringes
Line Construction:		
Cable Splicers.....	\$ 60.51	30.90
Groundmen/Truck Drivers.....	\$ 40.16	25.34
Heavy Equipment Operators...	\$ 48.20	28.43
Linemen.....	\$ 53.55	30.69
Telecommunication worker....	\$ 34.94	13.69

 ELEV0126-001 01/01/2023

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 68.08	37.335+a+b

a. VACATION: Employer contributes 8% of basic hourly rate for 5 years service and 6% of basic hourly rate for 6 months to 5 years service as vacation pay credit.

b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day and Christmas Day.

 ENGI0003-002 09/03/2018

	Rates	Fringes
Diver (Aqua Lung) (Scuba))		
Diver (Aqua Lung) (Scuba) (over a depth of 30 feet)...	\$ 66.00	31.26
Diver (Aqua Lung) (Scuba) (up to a depth of 30 feet)..	\$ 56.63	31.26
Stand-by Diver (Aqua Lung) (Scuba).....	\$ 47.25	31.26
Diver (Other than Aqua Lung)		
Diver (Other than Aqua Lung).....	\$ 66.00	31.26
Diver Tender (Other than Aqua Lung).....	\$ 44.22	31.26

Stand-by Diver (Other than Aqua Lung).....	\$ 47.25	31.26
Helicopter Work		
Airborne Hoist Operator for Helicopter.....	\$ 45.80	31.26
Co-Pilot of Helicopter.....	\$ 45.98	31.26
Pilot of Helicopter.....	\$ 46.11	31.26
Power equipment operator - tunnel work		
GROUP 1.....	\$ 42.24	31.26
GROUP 2.....	\$ 42.35	31.26
GROUP 3.....	\$ 42.52	31.26
GROUP 4.....	\$ 42.79	31.26
GROUP 5.....	\$ 43.10	31.26
GROUP 6.....	\$ 43.75	31.26
GROUP 7.....	\$ 44.07	31.26
GROUP 8.....	\$ 44.18	31.26
GROUP 9.....	\$ 44.29	31.26
GROUP 9A.....	\$ 44.52	31.26
GROUP 10.....	\$ 44.58	31.26
GROUP 10A.....	\$ 44.73	31.26
GROUP 11.....	\$ 44.88	31.26
GROUP 12.....	\$ 45.24	31.26
GROUP 12A.....	\$ 45.60	31.26
Power equipment operators:		
GROUP 1.....	\$ 41.94	31.26
GROUP 2.....	\$ 42.05	31.26
GROUP 3.....	\$ 42.22	31.26
GROUP 4.....	\$ 42.49	31.26
GROUP 5.....	\$ 42.80	31.26
GROUP 6.....	\$ 43.45	31.26
GROUP 7.....	\$ 43.77	31.26
GROUP 8.....	\$ 43.88	31.26
GROUP 9.....	\$ 43.99	31.26
GROUP 9A.....	\$ 44.22	31.26
GROUP 10.....	\$ 44.28	31.26
GROUP 10A.....	\$ 44.43	31.26
GROUP 11.....	\$ 44.58	31.26
GROUP 12.....	\$ 44.94	31.26
GROUP 12A.....	\$ 45.30	31.26
GROUP 13.....	\$ 42.22	31.26
GROUP 13A.....	\$ 42.49	31.26
GROUP 13B.....	\$ 42.80	31.26
GROUP 13C.....	\$ 43.45	31.26
GROUP 13D.....	\$ 43.77	31.26
GROUP 13E.....	\$ 43.88	31.26

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Fork Lift (up to and including 10 tons); Partsman (heavy duty repair shop parts room when needed).

GROUP 2: Conveyor Operator (Handling building material); Hydraulic Monitor; Mixer Box Operator (Concrete Plant).

GROUP 3: Brakeman; Deckhand; Fireman; Oiler; Oiler/Gradechecker; Signaller; Switchman; Highline Cableway Signaller; Bargeman; Bunkerman; Concrete Curing Machine (self-propelled, automatically applied unit on streets, highways, airports and canals); Leveeman; Roller (5 tons and under); Tugger Hoist.

GROUP 4: Boom Truck or dual purpose "A" Frame Truck (5 tons or less); Concrete Placing Boom (Building Construction); Dinky Operator; Elevator Operator; Hoist and/or Winch (one

drum); Straddle Truck (Ross Carrier, Hyster and similar).

GROUP 5: Asphalt Plant Fireman; Compressors, Pumps, Generators and Welding Machines ("Bank" of 9 or more, individually or collectively); Concrete Pumps or Pumpcrete Guns; Lubrication and Service Engineer (Grease Rack); Screedman.

GROUP 6: Boom Truck or Dual Purpose "A" Frame Truck (over 5 tons); Combination Loader/Backhoe (up to and including 3/4 cu. yd.); Concrete Batch Plants (wet or dry); Concrete Cutter, Groover and/or Grinder (self-propelled unit on streets, highways, airports, and canals); Conveyor or Concrete Pump (Truck or Equipment Mounted); Drilling Machinery (not to apply to waterliners, wagon drills or jack hammers); Fork Lift (over 10 tons); Loader (up to and including 3 and 1/2 cu. yds); Lull High Lift (under 40 feet); Lubrication and Service Engineer (Mobile); Maginnis Internal Full Slab Vibrator (on airports, highways, canals and warehouses); Man or Material Hoist; Mechanical Concrete Finisher (Large Clary, Johnson Bidwell, Bridge Deck and similar); Mobile Truck Crane Driver; Portable Shotblast Concrete Cleaning Machine; Portable Boring Machine (under streets, highways, etc.); Portable Crusher; Power Jumbo Operator (setting slip forms, etc., in tunnels); Rollers (over 5 tons); Self-propelled Compactor (single engine); Self-propelled Pavement Breaker; Skidsteer Loader with attachments; Slip Form Pumps (Power driven by hydraulic, electric, air, gas, etc., lifting device for concrete forms); Small Rubber Tired Tractors; Trencher (up to and including 6 feet); Underbridge Personnel Aerial Platform (50 feet of platform or less).

GROUP 7: Crusher Plant Engineer, Dozer (D-4, Case 450, John Deere 450, and similar); Dual Drum Mixer, Extend Lift; Hoist and/or Winch (2 drums); Loader (over 3 and 1/2 cu. yds. up to and including 6 yards.); Mechanical Finisher or Spreader Machine (asphalt), (Barber Greene and similar) (Screedman required); Mine or Shaft Hoist; Mobile Concrete Mixer (over 5 tons); Pipe Bending Machine (pipelines only); Pipe Cleaning Machine (tractor propelled and supported); Pipe Wrapping Machine (tractor propelled and supported); Roller Operator (Asphalt); Self-Propelled Elevating Grade Plane; Slusher Operator; Tractor (with boom) (D-6, or similar); Trencher (over 6 feet and less than 200 h.p.); Water Tanker (pulled by Euclids, T-Pulls, DW-10, 20 or 21, or similar); Winchman (Stern Winch on Dredge).

GROUP 8: Asphalt Plant Operator; Barge Mate (Seagoing); Cast-in-Place Pipe Laying Machine; Concrete Batch Plant (multiple units); Conveyor Operator (tunnel); Deckmate; Dozer (D-6 and similar); Finishing Machine Operator (airports and highways); Gradesetter; Kolman Loader (and similar); Mucking Machine (Crawler-type); Mucking Machine (Conveyor-type); No-Joint Pipe Laying Machine; Portable Crushing and Screening Plant; Power Blade Operator (under 12); Saurman Type Dragline (up to and including 5 yds.); Stationary Pipe Wrapping, Cleaning and Bending Machine; Surface Heater and Planer Operator, Tractor (D-6 and similar); Tri-Batch Paver; Tunnel Badger; Tunnel Mole and/or Boring Machine Operator Underbridge Personnel Aerial Platform (over 50 feet of platform).

GROUP 9: Combination Mixer and Compressor (gunite); Do-Mor Loader and Adams Elegrader; Dozer (D-7 or equal); Wheel

and/or Ladder Trencher (over 6 feet and 200 to 749 h.p.).

GROUP 9A: Dozer (D-8 and similar); Gradesetter (when required by the Contractor to work from drawings, plans or specifications without the direct supervision of a foreman or superintendent); Push Cat; Scrapers (up to and including 20 cu. yds); Self-propelled Compactor with Dozer; Self-Propelled, Rubber-Tired Earthmoving Equipment (up to and including 20 cu. yds) (621 Band and similar); Sheep's Foot; Tractor (D-8 and similar); Tractors with boom (larger than D-6, and similar).

GROUP 10: Chicago Boom; Cold Planers; Heavy Duty Repairman or Welder; Hoist and/or Winch (3 drums); Hydraulic Skooper (Koehring and similar); Loader (over 6 cu. yds. up to and including 12 cu. yds.); Saurman type Dragline (over 5 cu. yds.); Self-propelled, rubber-tired Earthmoving Equipment (over 20 cu. yds. up to and including 31 cu. yds.) (637D and similar); Soil Stabilizer (P & H or equal); Sub-Grader (Gurries or other automatic type); Tractors (D-9 or equivalent, all attachments); Tractor (Tandem Scraper); Watch Engineer.

GROUP 10A: Boat Operator; Cable-operated Crawler Crane (up to and including 25 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (up to and including 1 cu. yd.); Dozer D9-L; Dozer (D-10, HD41 and similar) (all attachments); Gradall (up to and including 1 cu. yd.); Hydraulic Backhoe (over 3/4 cu. yds. up to and including 2 cu. yds.); Mobile Truck Crane Operator (up to and including 25 tons) (Mobile Truck Crane Driver Required); Self-propelled Boom Type Lifting Device (Center Mount) (up to and including 25 tons) (Grove, Drott, P&H, Pettibone and similar); Trencher (over 6 feet and 750 h.p. or more); Watch Engineer (steam or electric).

GROUP 11: Automatic Slip Form Paver (concrete or asphalt); Band Wagon (in conjunction with Wheel Excavator); Cable-operated Crawler Cranes (over 25 tons but less than 50 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (over 1 cu. yd. up to 7 cu. yds.); Gradall (over 1 cu. yds. up to 7 cu. yds.); DW-10, 20, etc. (Tandem); Earthmoving Machines (multiple propulsion power units and 2 or more Scrapers) (up to and including 35 cu. yds., "" struck"" m.r.c.); Highline Cableway; Hydraulic Backhoe (over 2 cu. yds. up to and including 4 cu. yds.); Leverman; Lift Slab Machine; Loader (over 12 cu. yds); Master Boat Operator; Mobile Truck Crane Operator (over 25 tons but less than 50 tons); (Mobile Truck Crane Driver required); Pre-stress Wire Wrapping Machine; Self-propelled Boom-type Lifting Device (Center Mount) (over 25 tons m.r.c); Self-propelled Compactor (with multiple-propulsion power units); Single Engine Rubber Tired Earthmoving Machine (with Tandem Scraper); Tandem Cats; Trencher (pulling attached shield).

GROUP 12: Clamshell or Dipper Operator; Derricks; Drill Rigs; Multi-Propulsion Earthmoving Machines (2 or more Scrapers) (over 35 cu. yds ""struck""m.r.c.); Operators (Derricks, Piledrivers and Cranes); Power Shovels and Draglines (7 cu. yds. m.r.c. and over); Self-propelled rubber-tired Earthmoving equipment (over 31 cu. yds.) (657B and similar); Wheel Excavator (up to and including 750 cu. yds. per hour); Wheel Excavator (over 750 cu. yds. per hour).

GROUP 12A: Dozer (D-11 or similar or larger); Hydraulic Excavators (over 4 cu. yds.); Lifting cranes (50 tons and over); Pioneering Dozer/Backhoe (initial clearing and excavation for the purpose of providing access for other equipment where the terrain worked involves 1-to-1 slopes that are 50 feet in height or depth, the scope of this work does not include normal clearing and grubbing on usual hilly terrain nor the excavation work once the access is provided); Power Blade Operator (Cat 12 or equivalent or over); Straddle Lifts (over 50 tons); Tower Crane, Mobile; Traveling Truss Cranes; Universal, Liebherr, Linden, and similar types of Tower Cranes (in the erection, dismantling, and moving of equipment there shall be an additional Operating Engineer or Heavy Duty Repairman); Yo-Yo Cat or Dozer.

GROUP 13: Truck Driver (Utility, Flatbed, etc.)

GROUP 13A: Dump Truck, 8 cu.yds. and under (water level); Water Truck (up to and including 2,000 gallons).

GROUP 13B: Water Truck (over 2,000 gallons); Tandem Dump Truck, over 8 cu. yds. (water level).

GROUP 13C: Truck Driver (Semi-trailer. Rock Cans, Semi-Dump or Roll-Offs).

GROUP 13D: Truck Driver (Slip-In or Pup).

GROUP 13E: End Dumps, Unlicensed (Euclid, Mack, Caterpillar or similar); Tractor Trailer (Hauling Equipment); Tandem Trucks hooked up to Trailer (Hauling Equipment)

BOOMS AND/OR LEADS (HOURLY PREMIUMS):

The Operator of a crane (under 50 tons) with a boom of 80 feet or more (including jib), or of a crane (under 50 tons) with leads of 100 feet or more, shall receive a per hour premium for each hour worked on said crane (under 50 tons) in accordance with the following schedule:

Booms of 80 feet up to but not including 130 feet or Leads of 100 feet up to but not including 130 feet	0.50
Booms and/or Leads of 130 feet up to but not including 180 feet	0.75
Booms and/or Leads of 180 feet up to and including 250 feet	1.15
Booms and/or Leads over 250 feet	1.50

The Operator of a crane (50 tons and over) with a boom of 180 feet or more (including jib) shall receive a per hour premium for each hour worked on said crane (50 tons and over) in accordance with the following schedule:

Booms of 180 feet up to and including 250 feet	1.25
Booms over 250 feet	1.75

 ENGI0003-004 09/04/2017

Dredging: (Boat Operators)		
Boat Deckhand.....	\$ 41.22	30.93
Boat Operator.....	\$ 43.43	30.93
Master Boat Operator.....	\$ 43.58	30.93
Dredging: (Clamshell or Dipper Dredging)		
GROUP 1.....	\$ 43.94	30.93
GROUP 2.....	\$ 43.28	30.93
GROUP 3.....	\$ 42.88	30.93
GROUP 4.....	\$ 41.22	30.93
Dredging: (Derricks)		
GROUP 1.....	\$ 43.94	30.93
GROUP 2.....	\$ 43.28	30.93
GROUP 3.....	\$ 42.88	30.93
GROUP 4.....	\$ 41.22	30.93
Dredging: (Hydraulic Suction Dredges)		
GROUP 1.....	\$ 43.58	30.93
GROUP 2.....	\$ 43.43	30.93
GROUP 3.....	\$ 43.28	30.93
GROUP 4.....	\$ 43.22	30.93
GROUP 5.....	\$ 37.88	26.76
Group 5.....	\$ 42.88	30.93
GROUP 6.....	\$ 37.77	26.76
Group 6.....	\$ 42.77	30.93
GROUP 7.....	\$ 36.22	26.76
Group 7.....	\$ 41.22	30.93

CLAMSHELL OR DIPPER DREDGING CLASSIFICATIONS

- GROUP 1: Clamshell or Dipper Operator.
- GROUP 2: Mechanic or Welder; Watch Engineer.
- GROUP 3: Barge Mate; Deckmate.
- GROUP 4: Bargeman; Deckhand; Fireman; Oiler.

HYDRAULIC SUCTION DREDGING CLASSIFICATIONS

- GROUP 1: Leverman.
- GROUP 2: Watch Engineer (steam or electric).
- GROUP 3: Mechanic or Welder.
- GROUP 4: Dozer Operator.
- GROUP 5: Deckmate.
- GROUP 6: Winchman (Stern Winch on Dredge)
- GROUP 7: Deckhand (can operate anchor scow under direction of Deckmate); Fireman; Leveeman; Oiler.

DERRICK CLASSIFICATIONS

- GROUP 1: Operators (Derricks, Piledrivers and Cranes).
- GROUP 2: Saurman Type Dragline (over 5 cubic yards).
- GROUP 3: Deckmate; Saurman Type Dragline (up to and including 5 yards).
- GROUP 4: Deckhand, Fireman, Oiler.

 ENGI0003-044 09/03/2018

Rates Fringes

Power Equipment Operators (PAVING)		
Asphalt Concrete Material		
Transfer.....	\$ 42.92	32.08
Asphalt Plant Operator.....	\$ 43.35	32.08

Asphalt Raker.....	\$ 41.96	32.08
Asphalt Spreader Operator...	\$ 43.44	32.08
Cold Planer.....	\$ 43.75	32.08
Combination Loader/Backhoe (over 3/4 cu.yd.).....	\$ 41.96	32.08
Combination Loader/Backhoe (up to 3/4 cu.yd.).....	\$ 40.98	32.08
Concrete Saws and/or Grinder (self-propelled unit on streets, highways, airports and canals).....	\$ 42.92	32.08
Grader.....	\$ 43.75	32.08
Laborer, Hand Roller.....	\$ 41.46	32.08
Loader (2 1/2 cu. yds. and under).....	\$ 42.92	32.08
Loader (over 2 1/2 cu. yds. to and including 5 cu. yds.).....	\$ 43.24	32.08
Roller Operator (five tons and under).....	\$ 41.69	32.08
Roller Operator (over five tons).....	\$ 43.12	32.08
Screed Person.....	\$ 42.92	32.08
Soil Stabilizer.....	\$ 43.75	32.08

IRON0625-001 09/01/2022

	Rates	Fringes
Ironworkers:.....	\$ 45.00	39.00
a. Employees will be paid \$.50 per hour more while working in tunnels and coffer dams; \$1.00 per hour more when required to work under or are covered with water (submerged) and when they are required to work on the summit of Mauna Kea, Mauna Loa or Haleakala.		

LAB00368-001 09/05/2022

	Rates	Fringes
Laborers:		
Driller.....	\$ 41.00	24.25
Final Clean Up.....	\$ 30.45	19.57
Gunite/Shotcrete Operator and High Scaler.....	\$ 40.50	24.25
Laborer I.....	\$ 40.00	24.25
Laborer II.....	\$ 37.40	24.25
Mason Tender/Hod Carrier....	\$ 40.50	24.25
Powderman.....	\$ 41.00	24.25
Window Washer (bosun chair).\$	39.50	24.25

LABORERS CLASSIFICATIONS

Laborer I: Air Blasting run by electric or pneumatic compressor; Asphalt Laborer, Ironer, Raker, Luteman, and Handroller, and all types of Asphalt Spreader Boxes; Asphalt Shoveler; Assembly and Installation of Multiplates, Liner Plates, Rings, Mesh, Mats; Batching Plant (portable and temporary); Boring Machine Operator (under streets and sidewalks); Buggymobile; Burning and Welding; Chainsaw, Faller, Logloader, and Bucker; Compactors (Jackson Jumping Jack and similar); Concrete Bucket Dumpman; Concrete Chipping; Concrete Chuteman/Hoseman (pouring concrete) (the handling of the chute from ready-mix trucks for such jobs as walls, slabs, decks, floors, foundations, footings,

curbs, gutters, and sidewalks); Concrete Core Cutter (Walls, Floors, and Ceiling); Concrete Grinding or Sanding; Concrete: Hooking on, signaling, dumping of concrete for treme work over water on caissons, pilings, abutments, etc.; Concrete: Mixing, handling, conveying, pouring, vibrating, otherwise placing of concrete or aggregates or by any other process; Concrete: Operation of motorized wheelbarrows or buggies or machines of similar character, whether run by gas, diesel, or electric power; Concrete Placement Machine Operator: operation of Somero Hammerhead, Copperheads, or similar machines; Concrete Pump Machine (laying, coupling, uncoupling of all connections and cleaning of equipment); Concrete and/or Asphalt Saw (Walking or Handtype) (cutting walls or flatwork) (scoring old or new concrete and/or asphalt) (cutting for expansion joints) (streets and ways for laying of pipe, cable or conduit for all purposes); Concrete Shovelers/Laborers (Wet or Dry); Concrete Screeding for Rough Strike-Off: Rodding or striking-off, by hand or mechanical means prior to finishing; Concrete Vibrator Operator; Coring Holes: Walls, footings, piers or other obstructions for passage of pipes or conduits for any purpose and the pouring of concrete to secure the hole; Cribbers, Shorer, Lagging, Sheeting, and Trench Jacking and Bracing, Hand-Guided Lagging Hammer Whaling Bracing; Curbing (Concrete and Asphalt); Curing of Concrete (impervious membrane and form oiler) mortar and other materials by any mode or method; Cut Granite Curb Setter (setting, leveling and grouting of all precast concrete or stone curbs); Cutting and Burning Torch (demolition); Dri Pak-It Machine; Environmental Abatement: removal of asbestos, lead, and bio hazardous materials (EPA and/or OSHA certified); Falling, bucking, yarding, loading or burning of all trees or timber on construction site; Forklift (9 ft. and under); Gas, Pneumatic, and Electric tools; Grating and Grill work for drains or other purposes; Green Cutter of concrete or aggregate in any form, by hand, mechanical means, grindstone or air and/or water; Grout: Spreading for any purpose; Guinea Chaser (Grade Checker) for general utility trenches, sitework, and excavation; Headerboard Man (Asphalt or Concrete); Heat Welder of Plastic (Laborers' AGC certified workers) (when work involves waterproofing for waterponds, artificial lakes and reservoir) heat welding for sewer pipes and fusion of HDPE pipes; Heavy Highway Laborer (Rigging, signaling, handling, and installation of pre-cast catch basins, manholes, curbs and gutters); High Pressure Nozzlemans - Hydraulic Monitor (over 100# pressure); Jackhammer Operator; Jacking of slip forms: All semi and unskilled work connected therewithin; Laying of all multi-cell conduit or multi-purpose pipe; Magnesite and Mastic Workers (Wet or Dry)(including mixer operator);Mortar Man; Mortar Mixer (Block, Brick, Masonry, and Plastering); Nozzlemans (Sandblasting and/or Water Blasting): handling, placing and operation of nozzle; Operation, Manual or Hydraulic jacking of shields and the use of such other mechanical equipment as may be necessary; Pavement Breakers; Paving, curbing and surfacing of streets, ways, courts, under and overpasses, bridges, approaches, slope walls, and all other labor connected therewith; Pilecutters; Pipe Accessment in place, bolting and lining up of sectional metal or other pipe including corrugated pipe; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, HDPE, metallic or non-metallic, conduit, and any other

stationary-type of tubular device used for conveying of any substance or element, whether water, sewage, solid, gas, air, or other product whatsoever and without regard to the nature of material from which tubular material is fabricated; No-joint pipe and stripping of same, Pipewrapper, Caulker, Bander, Kettlemen, and men applying asphalt, Laykold, treating Creosote and similar-type materials (6-inch) pipe and over); Piping: resurfacing and paving of all ditches in preparation for laying of all pipes; Pipe laying of lateral sewer pipe from main or side sewer to buildings or structure (except Contactor may direct work be done under proper supervision); Pipe laying, leveling and marking of the joint used for main or side sewers and storm sewers; Laying of all clay, terra cotta, ironstone, vitrified concrete, HDPE or other pipe for drainage; Placing and setting of water mains, gas mains and all pipe including removal of skids; Plaster Mortar Mixer/Pump; Pneumatic Impact Wrench; Portable Sawmill Operation: Choker setters, off bearers, and lumber handlers connected with clearing; Posthole Digger (Hand Held, Gas, Air and Electric); Powderman's Tender; Power Broom Sweepers (Small); Preparation and Compaction of roadbeds for railroad track laying, highway construction, and the preparation of trenches, footings, etc., for cross-country transmission by pipelines, electrical transmission or underground lines or cables (by mechanical means); Raising of structure by manual or hydraulic jacks or other methods and resetting of structure in new locations, including all concrete work; Ramming or compaction; Rigging in connection with Laborers' work (except demolition), Signaling (including the use of walkie talkie) Choke Setting, tag line usage; Tagging and Signaling of building materials into high rise units; Riprap, Stonepaver, and Rock Slinger (includes placement of stacked concrete, wet or dry and loading, unloading, signaling, slinging and setting of other similar materials); Rotary Scarifier (including multiple head concrete chipping Scarifier); Salamander Heater, Drying of plaster, concrete mortar or other aggregate; Scaffold Erector Leadman; Scaffolds: (Swing and hanging) including maintenance thereof; Scaler; Septic Tank/Cesspool and Drain Fields Digger and Installer; Shredder/Chipper (tree branches, brush, etc.); Stripping and Setting Forms; Stripping of Forms: Other than panel forms which are to be re-used in their original form, and stripping of forms on all flat arch work; Tampers (Barko, Wacker, and similar type); Tank Scaler and Cleaners; Tarman; Tree Climbers and Trimmers; Trencher (includes hand-held, Davis T-66 and similar type); Trucks (flatbed up to and including 2 1/2 tons when used in connection with on-site Laborers' work; Trucks (Refuse and Garbage Disposal) (from job site to dump); Vibra-Screed (Bull Float in connection with Laborers' work); Well Points, Installation of or any other dewatering system.

Laborer II: Asphalt Plant Laborer; Boring Machine Tender; Bridge Laborer; Burning of all debris (crates, boxes, packaging waste materials); Chainman, Rodmen, and Grade Markers; Cleaning, clearing, grading and/or removal for streets, highways, roadways, aprons, runways, sidewalks, parking areas, airports, approaches, and other similar installations; Cleaning or reconditioning of streets, ways, sewers and waterlines, all maintenance work and work of an unskilled and semi-skilled nature; Concrete Bucket Tender (Groundman) hooking and unhooking of bucket; Concrete Forms; moving, cleaning, oiling and carrying to the next

point of erection of all forms; Concrete Products Plant Laborers; Conveyor Tender (conveying of building materials); Crushed Stone Yards and Gravel and Sand Pit Laborers and all other similar plants; Demolition, Wrecking and Salvage Laborers: Wrecking and dismantling of buildings and all structures, with use of cutting or wrecking tools, breaking away, cleaning and removal of all fixtures, All hooking, unhooking, signaling of materials for salvage or scrap removed by crane or derrick; Digging under streets, roadways, aprons or other paved surfaces; Driller's Tender; Chuck Tender, Outside Nipper; Dry-packing of concrete (plugging and filling of she-bolt holes); Fence and/or Guardrail Erector: Dismantling and/or re-installation of all fence; Finegrader; Firewatcher; Flagman (Coning, preparing, stablishing and removing portable roadway barricade devices); Signal Men on all construction work defined herein, including Traffic Control Signal Men at construction site; General Excavation; Backfilling, Grading and all other labor connected therewith; Digging of trenches, ditches and manholes and the leveling, grading and other preparation prior to laying pipe or conduit for any purpose; Excavations and foundations for buildings, piers, foundations and holes, and all other construction. Preparation of street ways and bridges; General Laborer: Cleaning and Clearing of all debris and surplus material. Clean-up of right-of-way. Clearing and slashing of brush or trees by hand or mechanical cutting. General Clean up: sweeping, cleaning, wash-down, wiping of construction facility and equipment (other than "Light Clean up (Janitorial) Laborer. Garbage and Debris Handlers and Cleaners. Appliance Handling (job site) (after delivery unloading in storage area); Ground and Soil Treatment Work (Pest Control); Gunite/Shotcrete Operator Tender; Junk Yard Laborers (same as Salvage Yard); Laser Beam "Target Man" in connection with Laborers' work; Layout Person for Plastic (when work involves waterproofing for waterponds, artificial lakes and reservoirs); Limbers, Brush Loaders, and Pilers; Loading, Unloading, carrying, distributing and handling of all rods and material for use in reinforcing concrete construction (except when a derrick or outrigger operated by other than hand power is used); Loading, unloading, sorting, stockpiling, handling and distribution of water mains, gas mains and all pipes; Loading and unloading of all materials, fixtures, furnishings and appliances from point of delivery to stockpile to point of installation; hooking and signaling from truck, conveyance or stockpile; Material Yard Laborers; Pipelayer Tender; Pipewrapper, Caulker, Bander, Kettleman, and men applying asphalt, Laykold, Creosote, and similar-type materials (pipe under 6 inches); Plasterer Laborer; Preparation, construction and maintenance of roadbeds and sub-grade for all paving, including excavation, dumping, and spreading of sub-grade material; Prestressed or precast concrete slabs, walls, or sections: all loading, unloading, stockpiling, hooking on of such slabs, walls or sections; Quarry Laborers; Railroad, Streetcar, and Rail Transit Maintenance and Repair; Roustabout; Rubbish Trucks in connection with Building Construction Projects (excluding clearing, grubbing, and excavating); Salvage Yard: All work connected with cutting, cleaning, storing, stockpiling or handling of materials, all cleanup, removal of debris, burning, back-filling and landscaping of the site; Sandblasting Tender (Pot Tender): Hoses and pots or markers; Scaffolds: Erection, planking and removal of all scaffolds used for support for lathers, plasters, brick layers, masons, and

other construction trades crafts; Scaffolds: (Specially designed by carpenters) laborers shall tend said carpenter on erection and dismantling thereof, preparation for foundation or mudsills, maintenance; Scraping of floors; Screeds: Handling of all screeds to be reused; handling, dismantling and conveyance of screeds; Setting, leveling and securing or bracing of metal or other road forms and expansion joints; Sheeting Piling/trench shoring (handling and placing of skip sheet or wood plank trench shoring); Ship Scalers; Shipwright Tender; Sign Erector (subdivision traffic, regulatory, and street-name signs); Sloper; Slurry Seal Crews (Mixer Operator, Applicator, Squeegee Man, Shuttle Man, Top Man); Snapping of wall ties and removal of tie rods; Soil Test operations of semi and unskilled labor such as filling sand bags; Stripper (Asphalt, Concrete or other Paved Surfaces); Tool Room Attendant (Job Site); Traffic Delineating Device Applicator; Underpinning, lagging, bracing, propping and shoring, loading, signaling, right-of-way clearance along the route of movement, The clearance of new site, excavation of foundation when moving a house or structure from old site to new site; Utilities employees; Water Man; Waterscape/Hardscape Laborers; Wire Mesh Pulling (all concrete pouring operations); Wrecking, stripping, dismantling and handling concrete forms an false work.

 LAB00368-002 09/05/2022

	Rates	Fringes
Landscape & Irrigation Laborers		
GROUP 1.....	\$ 27.25	15.80
GROUP 2.....	\$ 28.25	15.80
GROUP 3.....	\$ 22.15	15.80

LABORERS CLASSIFICATIONS

GROUP 1: Installation of non-potable permanent or temporary irrigation water systems performed for the purposes of Landscaping and Irrigation architectural horticultural work; the installation of drinking fountains and permanent or temporary irrigation systems using potable water for Landscaping and Irrigation architectural horticultural purposes only. This work includes (a) the installation of all heads, risers, valves, valve boxes, vacuum breakers (pressure and non-pressure), low voltage electrical lines and, provided such work involves electrical wiring that will carry 24 volts or less, the installation of sensors, master control panels, display boards, junction boxes, conductors, including all other components for controllers, (b) and metallic (copper, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe including all work incidental thereto, i.e., unloading, handling and distribution of all pipes fittings, tools, materials and equipment, (c) all soldering work in connection with the above whether done by torch, soldering iron, or other means; (d) tie-in to main lines, thrust blocks (both precast and poured in place), pipe hangers and supports incidental to installation of the entire irrigation system, (e) making of pressure tests, start-up testing, flushing, purging, water balancing, placing into operation all irrigation equipment, fixtures and appurtenances installed under this agreement, and (f) the fabrication, replacement,

repair and servicing of landscaping and irrigation systems. Operation of hand-held gas, air, electric, or self-powered tools and equipment used in the performance of Landscape and Irrigation work in connection with architectural horticulture; Choke-setting, signaling, and rigging for equipment operators on job-site in the performance of such Landscaping and Irrigation work; Concrete work (wet or dry) performed in connection with such Landscaping and Irrigation work. This work shall also include the setting of rock, stone, or riprap in connection with such Landscape, Waterscape, Rockscape, and Irrigation work; Grubbing, pick and shovel excavation, and hand rolling or tamping in connection with the performance of such Landscaping and Irrigation work; Sprigging, handseeding, and planting of trees, shrubs, ground covers, and other plantings and the performance of all types of gardening and horticultural work relating to said planting; Operation of flat bed trucks (up to and including 2 1/2 tons):.

GROUP 2. Layout of irrigation and other non-potable irrigation water systems and the layout of drinking fountains and other potable irrigation water systems in connection with such Landscaping and Irrigation work. This includes the layout of all heads, risers, valves, valve boxes, vacuum breakers, low voltage electrical lines, hydraulic and electrical controllers, and metallic (coppers, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe. This work also includes the reading and interpretation of plans and specifications in connection with the layout of Landscaping, Rockscape, Waterscape, and Irrigation work; Operation of Hydro-Mulching machines (sprayman and driver), Drillers, Trenchers (riding type, Davis T-66, and similar) and fork lifts used in connection with the performance of such Landscaping and Irrigation work; Tree climbers and chain saw tree trimmers, Sporadic operation (when used in connection with Landscaping, Rockscape, Waterscape, and Irrigation work) of Skid-Steer Loaders (Bobcat and similar), Cranes (Bantam, Grove, and similar), Hoptos, Backhoes, Loaders, Rollers, and Dozers (Case, John Deere, and similar), Water Trucks, Trucks requiring a State of Hawaii Public Utilities Commission Type 5 and/or type 7 license, sit-down type and ""gang"" mowers, and other self-propelled, sit-down operated machines not listed under Landscape & Irrigation Maintenance Laborer; Chemical spraying using self-propelled power spraying equipment (200 gallon capacity or more).

GROUP 3: Maintenance of trees, shrubs, ground covers, lawns and other planted areas, including the replanting of trees, shrubs, ground covers, and other plantings that did not ""take"" or which are damaged; provided, however, that re-planting that requires the use of equipment, machinery, or power tools shall be paid for at the rate of pay specified under Landscape and Irrigation Laborer, Group 1; Raking, mowing, trimming, and runing, including the use of ""weed eaters"", hedge trimmers, vacuums, blowers, and other hand-held gas, air, electric, or self-powered tools, and the operation of lawn mowers (Note: The operation of sit-down type and ""gang"" mowers shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer, Group 2); Guywiring, staking, propping, and supporting trees; Fertilizing, Chemical spraying using spray equipment with less than 200 gallon capacity, Maintaining irrigation and sprinkler systems, including the staking, clamping, and

adjustment of risers, and the adjustment and/or replacement of sprinkler heads, (Note: the cleaning and gluing of pipe and fittings shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer(Group 1); Watering by hand or sprinkler system and the performance of other types of gardening, yardman, and horticultural-related work.

LAB00368-003 09/05/2022

	Rates	Fringes
Underground Laborer		
GROUP 1.....	\$ 40.60	24.25
GROUP 2.....	\$ 42.10	24.25
GROUP 3.....	\$ 42.60	24.25
GROUP 4.....	\$ 43.60	24.25
GROUP 5.....	\$ 43.95	24.25
GROUP 6.....	\$ 44.20	24.25
GROUP 7.....	\$ 44.65	24.25

GROUP 1: Watchmen; Change House Attendant.

GROUP 2: Swamper; Brakeman; Bull Gang-Muckers, Trackmen; Dumpmen (any method); Concrete Crew (includes rodding and spreading); Grout Crew; Reboundmen

GROUP 3: Chucktenders and Cabletenders; Powderman (Prime House); Vibratorman, Pavement Breakers

GROUP 4: Miners - Tunnel (including top and bottom man on shaft and raise work); Timberman, Retimberman (wood or steel or substitute materials thereof); Blasters, Drillers, Powderman (in heading); Microtunnel Laborer; Headman; Cherry Pickerman (where car is lifted); Nipper; Grout Gunmen; Grout Pumpman & Potman; Gunite, Shotcrete Gunmen & Potmen; Concrete Finisher (in tunnel); Concrete Screed Man; Bit Grinder; Steel Form Raisers & Setters; High Pressure Nozzleman; Nozzleman (on slick line); Sandblaster-Potman (combination work assignment interchangeable); Tugger

GROUP 5: Shaft Work & Raise (below actual or excavated ground level); Diamond Driller; Gunite or Shotcrete Nozzleman; Rodman; Groundman

GROUP 6: Shifter

GROUP 7: Shifter (Shaft Work & Raiser)

* PAIN1791-001 01/01/2023

	Rates	Fringes
Painters:		
Brush.....	\$ 41.25	30.84
Sandblaster; Spray.....	\$ 41.25	30.84

* PAIN1889-001 07/01/2023

	Rates	Fringes
Glaziers.....	\$ 44.00	38.37

PAIN1926-001 03/05/2023

	Rates	Fringes
Soft Floor Layers.....	\$ 39.77	33.80

PAIN1944-001 01/01/2023

	Rates	Fringes
Taper.....	\$ 44.60	33.65

PLAS0630-001 09/05/2022

	Rates	Fringes
PLASTERER.....	\$ 45.00	33.58

PLAS0630-002 08/31/2020

	Rates	Fringes
Cement Masons:		
Cement Masons.....	\$ 42.65	32.29
Trowel Machine Operators....	\$ 42.80	32.29

PLUM0675-001 01/01/2023

	Rates	Fringes
Plumber, Pipefitter, Steamfitter & Sprinkler Fitter...	\$ 50.98	29.30

ROOF0221-001 11/06/2022

	Rates	Fringes
Roofers (Including Built Up, Composition and Single Ply).....	\$ 43.15	21.21

SHEE0293-001 03/05/2023

	Rates	Fringes
Sheet metal worker.....	\$ 47.37	31.71

* SUHI1997-002 09/15/1997

	Rates	Fringes
Drapery Installer.....	\$ 13.60 **	1.20
FENCE ERECTOR (Chain Link Fence).....	\$ 9.33 **	1.65

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher
minimum wage under Executive Order 14026 (\$16.20) or 13658
(\$12.15). Please see the Note at the top of the wage
determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and

non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART 0.D - 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 definition for “Subcontractor” is amended by deleting it and replacing it with the following:

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

The following definitions shall be added:

AASHTO - The American Association of State Highway and Transportation Officials.

Access Road - The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.

Airport Improvement Program (AIP) - A grant-in-aid program, administered by the Federal Aviation Administration (FAA).

Air Operations Area (AOA) - The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.

Apron - Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.

ASTM International (ASTM) - Formerly known as the American Society for Testing and Materials (ASTM).

Building Area - An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.

Certificate of Analysis (COA) - The COA is the manufacturer’s Certificate of Compliance (COC) including all applicable test results required by the specifications.

Certificate of Compliance (COC) - The manufacturer’s certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer’s authorized representative.

Contractors Quality Control (QC) Facilities - The Contractor’s QC facilities in accordance with the Contractor Quality Control Program (CQCP).

Contractor Quality Control Program (CQCP) - Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.

Control Strip - A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.

Drainage System - The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

Extra Work - An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.

FAA - The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.

Federal Specifications - The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.

Force Account – a) Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. b) Owner Force Account - Work performed for the project by the Owner's employees.

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

Intention of Terms - Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

Lighting - A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.

Major and Minor Contract Items - A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.

Modification of Standards (MOS) - Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.

Owner - The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is the State of Hawaii, Department of Transportation, Airports Division.

Passenger Facility Charge (PFC) - Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.

Pavement Structure - The combined surface course, base course(s), and subbase course(s), if

any, considered as a single unit.

Project - The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

Proposal (or Bid) – The offer of a bidder, on the HDOT prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

Quality Assurance (QA) - Owner’s responsibility to assure that construction work completed complies with specifications for payment.

Quality Control - Contractor’s responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.

Quality Assurance (QA) Inspector - An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

Quality Assurance (QA) Laboratory - The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer’s, Owner’s, or QA Laboratory.

Resident Project Representative (RPR) - The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.

Runway - The area on the airport prepared for the landing and takeoff of aircraft.

Runway Safety Area (RSA) - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.

Safety Plan Compliance Document (SPCD) - Details how the Contractor will comply with the CSPP.

Sponsor - A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.

Subgrade - The soil that forms the pavement foundation.

Supplemental Agreement - A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%; (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.

Taxilane - A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.

Taxiway - The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport’s runways, aircraft

parking areas, and terminal areas.

Taxiway/Taxilane Safety Area (TSA) - A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.

2.6 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK; PATENT AMBIGUITIES; REQUESTS FOR CLARIFICATION is amended as follows: The fourth paragraph (line 128 to 135) shall be replaced with the following:

“(c) A written request for clarification shall be submitted to the Department for review at the earliest date possible; but, in any event, such request must be submitted directly via email to the Contact person listed in HiePRO no later than seventeen (17) calendar days before the bid opening date, not including the bid opening date.”

2.7 REQUEST FOR SUBSTITUTION OF SPECIFIED MATERIALS AND EQUIPMENT BEFORE BID 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. Substitution requests shall be submitted directly via email to the Contact person listed in HiePRO for the solicitation. The request must be received 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, Aliiimoku 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 OR 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 fourteen (14) days in advance or as specified in other sections of these specifications. Outages will be restricted to non-peak operational hours between midnight and 5:00 a.m."

5.16 SUBCONTRACTS is amended as follows:

Add the following after the last paragraph:

"(e) The Specialty Items of work listed below are given for information purposes only.

Electrical contractor;

Carpentry framing contractor;

Asphalt paving and resurfacing contractor;
Steel door contractor;
Excavating, grading, and trenching contractor;
Cement concrete contractor;
Sewer and drain line contractor;
Reinforcing steel contractor;
Ventilating and air conditioning contractor;
Ornamental, guardrail, and fencing contractor;

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.”

7.4 WORKING HOURS; NIGHT WORK is amended as follows: Paragraph shall be replaced with the following:

“7.4 Working Hours. Normal working hours shall be as shown on the Plans.”

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.

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."

8.8 LIQUIDATED DAMAGES FOR FAILURE TO COMPLETE THE WORK OR PORTIONS OF THE WORK ON TIME: The General Provisions is hereby amended to include the following:

The schedule of liquidated damages provided in Section 8.8 of the General Provisions in these specifications shall be amended to include the following:

TEN THOUSAND DOLLARS (\$10,000.00) per calendar day for failure to complete the contract within the FIVE HUNDRED AND EIGHTY (580) calendar days from the date indicated in the Notice to Proceed from the State.

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).

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:

"The contractor shall conform with 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 no 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. Daniel K. Inouye International Airport, Kahului Airport and Ellison Onizuka 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 a lighted "X" runway closure marker 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 150/5340-1, Standards for Airport Markings; AC 150/5370-2, 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
AIRPORTS

PART 0.E - REQUIRED FEDERAL AIRPORT IMPROVEMENTS PROGRAM (AIP)
CONTRACT PROVISIONS

**NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO
ENSURE EQUAL EMPLOYMENT OPPORTUNITY**

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables

Goals for minority participation for each trade:	70.4%
Goals for female participation in each trade:	6.9%

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

2. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
3. As used in this notice and in the contract resulting from this solicitation, the "covered area" is Maui, Hawaii.

EQUAL OPPORTUNITY CLAUSE

During the performance of this contract, the Contractor agrees as follows:

4. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identify, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff, or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
5. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
6. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.
7. The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the Contractor's commitments under this section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
8. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
9. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
10. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order

11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

11. The Contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: *Provided*, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

STANDARD FEDERAL EQUAL EMPLOYEMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;
 - c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
 - d. "Minority" includes:
 1. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 2. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);
 3. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 4. American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR part 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to

achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or female sent by the Contractor, or when the Contractor

has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions, including specific review of these items, with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

- m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor union, contractor community, or other similar groups of which the Contractor is a member and participant may be asserted as fulfilling any one or more of its obligations under 7a through 7p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
 9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
 10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, sexual orientation, gender identity, or national origin.
 11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
 12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal

Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR part 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

DISADVANTAGED BUSINESS ENTERPRISE REQUIREMENTS

I. GENERAL

This project is subject to Title 49, Code of Federal Regulations, Part 26, entitled "Participation by Disadvantaged Business Enterprise in Department of Transportation Financial Assistance Programs," hereinafter referred to as the ("DBE Regulations") and is incorporated and made a part of this contract herein by this reference. The following shall be incorporated as part of the contract documents for compliance. If any requirements herein are in conflict with the general provisions or special provisions applicable to this project, the requirements herein shall prevail unless specifically superseded or amended in the special provisions or by addendum.

II. POLICY

It is the policy of the U.S. Department of Transportation ("USDOT") and the State of Hawaii, Department of Transportation and its political subdivisions ("Department") that Disadvantaged Business Enterprises ("DBE"), as defined in the DBE Regulations, have an equal opportunity to receive and participate in federally assisted contracts.

III. DBE ASSURANCES

Each contract signed with a prime contractor (and each subcontract the prime contractor signs with a subcontractor) shall include the following assurance:

"The contractor, sub-recipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate which may include, but is not limited to; 1) withholding monthly progress payments; 2) assessing sanctions; 3) liquidated damages; and/or 4) disqualifying the contractor from future bidding as non-responsible."

The prime contractor agrees to include the above statements in any subsequent contracts that it enters into with other contractors and shall require those contractors to include similar statements in further agreements.

IV. BIDDER/OFFEROR RESPONSIBILITIES

All bidders/offerors are required to register with the Department's OCR, DBE Section, using the Bidder Registration Form, which can be downloaded from the Department's website at <http://hidot.hawaii.gov/administration/ocr/dbe/dbe-program-forms/>. Certified DBEs are considered registered with the Department and are not required to submit a

Bidder Registration Form. All other bidders/offerors are required to complete this form which may be faxed to (808) 831-7944, e-mailed to HDOT-DBE@hawaii.gov, or mailed to the HDOT DBE Section at 200 Rodgers Boulevard, Honolulu, Hawaii, 96819. Registered bidders/offerors are posted on the website listed above.

Bidders/offerors, subcontractors, manufacturers, vendors or suppliers, and trucking companies shall fully inform themselves with respect to the requirements of the DBE Regulations. Particular attention is directed to the following matters:

- A. Bidders/offerors shall take all necessary steps to ensure that DBEs have an opportunity to participate in this contract.
- B. DBEs may participate as a consultant, prime contractor, subcontractor, trucking company, or vendor of materials or supplies. DBEs may also team with other DBEs or non-DBE firms as part of a joint venture or partnership.
- C. Agreements between a bidder/offeror and a DBE in which an DBE promises not to provide subcontracting quotations to other bidders/offerors are strictly prohibited.
- D. A DBE shall be certified by the Department under the appropriate North American Industry Classification System (NAICS) code and work in their registered field of work in order for credit to be allowed.
- E. Information regarding the current certification status of DBEs is available on the internet at <https://hdot.dbesystem.com/>.
- F. Commercially Useful Function (“CUF”). An DBE must perform a CUF. This means that an DBE must be responsible for the execution of a distinct element of the work, must carry out its responsibility by actually performing, managing, and supervising at least 30% of the work involved by using its own employees and equipment, must negotiate price, determine quality and quantity, order and install material (when applicable), and must pay for the material itself.¹

To determine whether an DBE is performing a CUF, the Department must evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing, the DBE credit claimed for performance of the work, and other relevant factors. The prime contractor is responsible to ensure that the DBE performs a CUF.

V. PROPOSAL REQUIREMENTS

- A. DBEs must be certified by the bid opening date.

¹ The use of joint checks payable to an DBE subcontractor and supplier may be allowed to purchase materials and supplies under limited circumstances. See VII USE OF JOINT CHECKS UNDER THE DBE PROGRAM

- B. DBE subcontractors, manufacturers, suppliers, trucking companies, and any second tier subcontractors shall be listed on the respective DBE forms as specified below in order to receive credit.
- C. The following forms are due to the Department's Project Manager or designee **by the close of business, 4:30 P.M. Hawaii Standard Time (HST), five (5) days after bid opening:**²
1. DBE Confirmation and Commitment Agreement. This form must be signed by the bidder/offeror and each DBE subcontractor, manufacturer, supplier, or trucking company. Information to be provided on the form shall include, among other things, the project number, the DBE's NAICS codes, description of work, bid items with corresponding price information, prime contractor name and contact information DBE name and contact information and subcontractor name and contact information if the DBE is a second tier subcontractor.
 2. DBE Contract Goal Verification and Good Faith Efforts (GFE) Documentation for Construction. List the dollar amount of all subcontractors, manufacturers, suppliers, and trucking companies (both DBE and non-DBE firms). Bidder/offeror must also list the DBE project goal on this form (See paragraph D below regarding goal calculation). The bidder/offeror must submit documentation demonstrating how the DBE goal was met or how the bidder/offeror attempted to meet the goal if the goal was not met. This documentation shall include quotations for both DBE and non-DBE subcontractors when a non-DBE is selected over a DBE for the project. **Documentation of good faith efforts is required irrespective of whether the bidder/offeror met the DBE project goal.**
- The above forms must be complete and provide the necessary information to properly evaluate bids/proposals. Failure to provide any of the above shall be cause for bid/proposal rejection.**
- D. Calculation of the DBE contract goal for this project is the proportionate contract dollar value of work performed, materials, and goods to be supplied by DBEs. DBE credit shall not be given for mobilization, force account items and allowance items. This DBE contract goal is applicable to all the contract work performed for this project and is calculated as follows:
1. DBE contract goal percentage = Contract Dollar Value of the work to be performed by DBE subcontractors and manufacturers, plus 60% of the contract dollar value of DBE suppliers, divided by the sum of all contract items (sum of all contract items is the total amount for comparison of bids less mobilization, force account items, and allowance items).

² In computing calendar days, the day from which the period begins to run is not counted, and when the last day of the period is a Saturday, Sunday, or Federal or State holiday, the period extends to the next day that is not a Saturday, Sunday, or holiday.

2. The Department shall adjust the bidder's/offeror's DBE contract goal to the amount of the project goal if it finds that the bidder/offeror met the goal but erroneously calculated a lower percentage. If the amount the bidder/offeror submits as its contract goal exceeds the project goal, the bidder/offeror shall be held to the higher goal.

VI. COUNTING DBE PARTICIPATION TOWARDS CONTRACT GOAL

- A. Count the entire amount of the portion of a contract (or other contract not covered by paragraph B below) that is performed by the DBE's own forces. Include the cost of supplies and materials obtained by the DBE for the work on the contract, including supplies purchased or equipment leased by the DBE (except supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate).
- B. Count the entire amount of fees or commissions charged by an DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a USDOT-assisted contract, toward DBE goals, provided the Department determines the fee to be reasonable and not excessive as compared with fees customarily allowed for similar services.
- C. When an DBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the DBE's subcontractor is itself an DBE. Work that an DBE subcontracts to a non-DBE firm does not count toward DBE goals.
- D. When an DBE performs as a participant in a joint venture, count a portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its own forces toward DBE goals.
- E. Count expenditures to an DBE contractor toward DBE goals only if the DBE is performing a CUF on that contract.
- F. The following is a list of appropriate DBE credit to be allowed for work to be performed by an DBE subcontractor. Count expenditures with DBEs for materials or supplies toward DBE goals as provided in the following:
 1. If the materials or supplies are obtained from an DBE manufacturer, count 100 percent of the cost of the materials or supplies toward DBE goals;
 2. For purposes of determining DBE goal credit, a manufacturer is a firm that operates or maintains a factory or establishment that produces (on the premises) the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications;

3. If the materials or supplies are purchased from an DBE regular dealer, count 60 percent of the cost of the materials or supplies toward DBE goals;
4. For purposes of determining DBE goal credit, a regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business;
5. To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question;
6. A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided in the DBE Regulations, if the person both owns and operates distribution equipment for the products. Any supplementing of a regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis;
7. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers;
8. With respect to materials or supplies purchased from an DBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, toward DBE goals, provided that the Department determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services. Do not count any portion of the cost of the materials and supplies themselves toward DBE goals; however,
9. If a firm is not currently certified as an DBE in accordance with standards of this part at the time of the execution of the contract, do not count the firm's participation toward any DBE goals, except as provided for in §26.87(i);
10. Do not count the dollar value of work performed under a contract with a firm after it has ceased to be certified toward the Department's overall goal; and
11. Do not count the participation of an DBE subcontractor toward a contractor's final compliance with its DBE obligations on a contract until the amount being counted has actually been paid to the DBE.

G. The following factors are used in counting DBE participation for trucking companies:

1. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular

contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals;

2. The DBE must itself own and operate at least one (1) fully licensed, insured, and operational truck used on the contract;
3. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs;
4. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract;
5. The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE that leases trucks equipped with drivers from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE leased trucks equipped with drivers not to exceed the value of transportation services on the contract provided by DBE-owned trucks or leased trucks with DBE employee drivers. Additional participation by non-DBE owned trucks equipped with drivers receives credit only for the fee or commission it receives as a result of the lease arrangement. If a recipient chooses this approach, it must obtain written consent from the appropriate Department operating administration.
EXAMPLE: DBE firm X uses two (2) of its own trucks on a contract, leases two (2) trucks from DBE Firm Y and six (6) trucks from non-DBE Firm Z. DBE credit would be awarded for the total value of transportation services provided by Firm X and Firm Y, and may also be awarded for the total value of transportation services provided by four (4) of the six (6) trucks provided by Firm Z. In all, full credit would be allowed for the participation of eight (8) trucks. With respect to the other two (2) trucks provided by Firm Z, DBE credit could be awarded only for the fees or commissions pertaining to those trucks Firm X receives as a result of the lease with Firm Z;
6. The DBE may lease trucks without drivers from a non-DBE truck leasing company. If the DBE leases trucks from a non-DBE truck leasing company and uses its own employees as drivers, it is entitled to credit for the total value of these hauling services.
EXAMPLE: DBE Firm X uses two (2) of its own trucks on a contract. It leases two (2) additional trucks from non-DBE Firm Z. Firm X uses its own employees to drive the trucks leased from Firm Z. DBE credit would be awarded for the total value of the transportation services provided by all four (4) trucks; and
7. For purposes of determining whether a trucking firm performs a CUF, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

- H. The bidder/offeror may be a joint venture or partnership that has a certified DBE as a partner. A “Joint Venture” means an association between an DBE firm and one (1) or more other firms to carry out a single, for-profit, business enterprise for which the parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the contract, and whose share in the capital contribution, control, management, risks and profits are commensurate with its ownership interest.
- I. Effects of a Summary Suspension of an DBE. When an DBE’s certification is suspended, the DBE may not be considered to meet a contract goal on a new contract and any work it does on a contract received during the suspension shall not be counted towards the overall goal. The DBE may continue to perform work under an existing contract executed before the DBE received a Notice of Suspension and may be counted towards the contract goal during the period of suspension as long as the DBE is performing a CUF under the existing contract.
- J. Effects of Decertification of an DBE. Should an DBE become decertified during the term of the subcontract for reasons beyond the control of and with no fault or negligence on the part of the contractor, the work remaining under the subcontract may be credited towards the contract goal, but are not included in the overall accomplishments.

Should the DBE be decertified after contract award and before notice to proceed, the contractor must still meet the DBE goal by either: a) withdrawing the subcontract from the DBE and expending good faith efforts to replace it with an DBE that is currently certified for that same work; or b) continuing with the subcontract with the decertified firm and expending good faith efforts to find other work not already subcontracted out to DBEs in an amount to meet the DBE goal either by; 1) increasing the participation of other DBEs on the project; 2) documenting good faith efforts; or 3) by a combination of the above.

VII. USE OF JOINT CHECKS UNDER THE DBE PROGRAM

- A. The following guidelines apply to the use of joint checks:
 - 1. The second party (typically the prime contractor) acts solely as a guarantor;
 - 2. The DBE must release the check to the supplier;
 - 3. The use of joint checks is a commonly recognized business practice;
 - 4. The Department must approve the use of joint checks prior to use by contractors and/or DBEs. As part of this approval process the Department will analyze industry practice to confirm that the use of joint checks is commonly employed outside of the DBE program for non-DBE subcontractors on both federal and state funded contracts. Using joint checks shall not be approved if it conflicts with other aspects of the DBE Regulations regarding CUF; and
 - 5. The Department will monitor the use of joint checks closely to avoid abuse.

- B. Contractors and DBEs should review the following general guidelines when determining whether to use joint checks closely to avoid abuse:
1. That standard industry practice applies to all contractors (federal and state contracts);
 2. Use of joint checks must be available to all subcontractors;
 3. Material industry sets the standard industry practice, not prime contractors;
 4. Short term, not to exceed reasonable time (i.e., one (1) year, two (2) years) to establish/increase a credit line with the material supplier;
 5. No exclusive arrangement between one (1) prime and one (1) DBE in the use of joint checks that might bring the independence of the DBE into question;
 6. Non-proportionate ratio of DBE's normal capacity to size of contract and quantity of material to be provided under the contract;
 7. The DBE is normally responsible to install and furnish the work item; and
 8. The DBE must be more than an extra participant in releasing the check to the material supplier.
- C. The Department shall allow the use of joint checks if the following general conditions are met:
1. DBE submits request to the Department for action;
 2. There is a formalized agreement between all parties that specify the conditions under which the arrangement shall be permitted;
 3. There is a full and prompt disclosure of the expected use of joint checks;
 4. The Department will provide prior approval;
 5. DBE remains responsible for all other elements of 49 CFR 26.55(c)(1);
 6. The agreement states clearly and determines that independence is not threatened because the DBE retains final decision making responsibility;
 7. The Department will determine that the request is not an attempt to artificially inflate DBE participation;
 8. Standard industry practice is only one (1) factor;
 9. The Department will monitor and maintain oversight of the arrangement by reviewing cancelled checks and/or certification statement of payment; and
 10. The Department will verify there is no requirement by prime contractor that the DBE is to use a specific supplier nor the prime contractor's negotiated unit price.

VIII. DEMONSTRATION OF GOOD FAITH EFFORTS FOR CONTRACT AWARD

- A. When a project goal is not met, the Department shall conduct the initial review of GFE submitted by the bidder/offeror and shall determine whether the bidder/offeror has performed the quality, quantity, and intensity of efforts that demonstrate a reasonably active and aggressive attempt to meet the contract goal in accordance with 49 CFR Part 26, Appendix A.

- B. The bidder/offeror bears the responsibility of demonstrating that it met the contract goal, or if the contract goal was not met, by documenting the GFE it made in an attempt to meet the goal. It is the sole responsibility of the bidder/offeror to submit any and all documents, logs, correspondence, and any other records or information to the Department that will demonstrate that the bidder/offeror made good faith efforts to meet the DBE goal.
- C. In its good faith evaluation, the Department shall perform the following as part of its evaluation: a) compare the bidder's/offeror's bid against the bids/offers of other bidders/offerors, and compare the DBEs and DBE work areas utilized by the bidder/offeror with the DBEs listed in other bids/offers submitted for this contract (If other bidders obtained DBEs in a particular work area in which the low bidder did not, the Department shall take this into consideration in its evaluation); b) verify contacts by bidders/offerors with DBEs; and c) compare the DBE and the categories of DBE work targeted by the bidder/offeror for participation in the contract, with the total pool of available DBEs ready, willing and able to perform work on each particular subcontract targeted by the bidder/offeror.
- D. Actions on the part of the bidder/offeror that will be considered demonstrative of good faith efforts include, but are not limited to, the following:
1. Whether the bidder/offeror submitted the required information (i.e., DBE name, address, NAICS code, description of work, project name, and number), and dollar amounts for all subcontractors, within five (5) days of bid opening;
 2. Whether the bidder/offeror solicited through all reasonable and available means (e.g., attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform part or all of the work to be included under the contract. The Department will also consider whether the bidder/offeror solicited the participation of potential DBEs as early in the procurement process as practicable, and allowed sufficient time for the DBEs to properly inquire about the project and respond to the solicitation. The Department will also review whether the bidder/offeror took appropriate steps to follow up with interested DBEs in a timely manner to facilitate participation by DBEs in this project;
 3. Whether the bidder/offeror identified and broke up portions of work that can be performed by DBEs in order to increase the likelihood that an DBE will be able to participate, and that the DBE goal could be achieved (e.g., breaking out contract items into economically feasible units to facilitate DBE participation even when the bidder/offeror might otherwise prefer to self-perform these work items with its own forces);
 4. Whether the bidder/offeror made available or provided interested DBEs with adequate information about the plans, specifications, and requirements of the project in a timely manner, and assisted them in responding to the bidder's/offeror's solicitation;

5. Whether the bidder/offeror negotiated in good faith with interested DBEs. Evidence of such negotiations includes documenting: a) the names, addresses and telephone numbers of DBEs that were contacted; b) a description of the information that was provided to DBEs regarding the plans and specifications; and c) detailed explanation for not utilizing individual DBEs on the project;
6. Whether the bidder/offeror solely relied on price in determining whether to use an DBE. The fact that there may be additional or higher costs associated with finding and utilizing DBEs are not, by itself, sufficient reasons for a bidder's/offeror's refusal to utilize an DBE, or the failure to meet the DBE goal, provided that such additional costs are not unreasonable. Also, the ability or desire of a bidder/offeror to perform a portion of the work with its own forces, that could have been undertaken by an available DBE, does not relieve the bidder/offeror of the responsibility to make good faith efforts to meet the DBE goal, and to make available and solicit DBE participation in other areas of the project to meet the DBE goal;
7. Whether the bidder/offeror rejected DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The DBEs standing within the industry, membership in specific groups, organizations or associations, and political or social affiliation are not legitimate basis for the rejection or non-solicitation of bids from particular DBEs;
8. Whether the bidder/offeror made efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance;
9. Whether the bidder/offeror made efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials or related assistance or services;
10. Whether the bidder/offeror effectively used the services of available minority/women community organizations, minority/women business groups, contractors' groups, and local, state and federal minority/women business assistance offices or other organizations to provide assistance in recruitment and placement of DBEs;
11. Whether the bidder/offeror, who selects a non-DBE over an DBE subcontractor, has quotes of each DBE and non-DBE subcontractor submitted to the bidder for work on the contract; and for each DBE that was contacted but not utilized by the bidder/offeror for a contract, the bidder/offeror has a detailed written explanation for each DBE detailing the reasons for the bidder's/offeror's failure or inability to utilize, or to allow the DBE to participate in the contract; and
12. Whether other bidders/offerors met the goal and whether the apparent successful bidder/offeror could have met the goal with additional efforts. The Department may determine that an apparent successful bidder/offeror who fell short of meeting the goal, made good faith efforts when it met or exceeded the average DBE participation obtained by other bidders/offerors.

IX. ADMINISTRATIVE RECONSIDERATION.

If it is determined by the Department that the apparent successful bidder/offeror has failed to meet the provisions of 49 CFR Section 26.53(a), the bidder/offeror may submit a request for administrative reconsideration. If under the provisions of 49 CFR, Section 26.53(d), it is determined by the Department that the apparent successful bidder/offeror has failed to meet the provisions of this subsection, the bidder/offeror may submit a written request for administrative reconsideration.

- A. Within five (5) working days of being informed in writing by the Department that the bidder/offeror has not documented sufficient GFE, a bidder/offeror may request administrative reconsideration. Bidders/offerors should make this request in writing to the following official:

Director of Transportation
Hawaii Department of Transportation
869 Punchbowl Street, Room 509
Honolulu, Hawaii 96813

- B. The reconsideration official, or his or her designee (referred to as “reconsideration official”), shall not have played any role in the original determination that the bidder/offeror failed to meet the goal or make adequate good faith efforts to do so.
- C. As part of this reconsideration, the bidder/offeror will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate GFE to do so. The bidder/offeror will have the opportunity to meet in person with the reconsideration official to discuss the issue of whether it met the goal or made adequate GFE to do so.
- D. In an administrative reconsideration, the reconsideration official will review all previously submitted documents, oral and written arguments, and other evidence presented in the reconsideration, in making the decision.
- E. The Department shall inform the bidder/offeror of the decision within thirty (30) days of the proceeding. The decision will state the Department’s findings, and explain the basis of those findings, with respect to whether or not the bidder/offeror met the contract goal, or whether or not the bidder/offeror made adequate GFE to achieve the contract goal.
- F. The reconsideration decision is not administratively appealable to USDOT but is appealable under HRS 103D-709.

X. AWARD OF CONTRACT

- A. In a sealed bid procurement, the Department reserves the right to reject any or all bids. The award of contract, if it is awarded, will be to the lowest responsive and responsible bidder who meets or exceeds the DBE project goal, or who makes

good faith efforts to meet or exceed the DBE project goal, as determined by the Department.

- B. If the lowest responsible bidder does not meet the DBE project goal and does not demonstrate to the satisfaction of the Department that it made good faith efforts to meet the DBE project goal, such bid shall be rejected as non-responsive. The Department will then consider the next lowest responsive and responsible bidder for award in accordance with paragraph A above.

XI. REPLACEMENT OF AN DBE ON A PROJECT WITH A CONTRACT GOAL

Under this contract, the prime contractor shall utilize the specific DBE listed to perform the work and supply the materials for which each is listed unless the contractor obtains written consent from the Department to replace an DBE. If the Department's consent is not provided, the contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE. The Department reserves the right to request copies of all DBE subcontracts.

The Department will require a contractor to make good faith efforts to replace an DBE that is terminated or has otherwise failed to complete its work on a contract with another certified DBE, to the extent needed to meet the contract goal. A prime contractor's inability to find a replacement DBE at the original price is not sufficient to demonstrate that good faith efforts have been made to replace the original DBE. The fact that the contractor has the ability and/or desire to perform the contract work with its own forces does not relieve the contractor of the obligation to make good faith efforts to find a replacement DBE, and it is not a sound basis for rejecting a prospective replacement DBE's reasonable quote.

The Department will require the prime contractor to promptly provide written notice to the project manager of the DBE's inability or unwillingness to perform and provide reasonable documentation.

The written notice by the contractor must include the following:

1. The date the contractor determined the certified DBE to be unwilling, unable or ineligible to perform work on the contract;
2. The projected date that the contractor shall require a substitution or replacement DBE to commence work if consent is granted by the Department;
3. Documentation of facts that describe and cite specific actions or inactions on the part of the affected DBE that led to the contractor's conclusion that the DBE is unwilling, unable, or ineligible to perform work on the contract;
4. A brief statement of the affected DBE's capacity and ability or inability to perform the work as determined by the contractor;
5. Documentation of contractor's good faith efforts to enable affected DBE to perform the work;
6. The current percentage of work completed on each bid item by the affected DBE;

7. The total dollar amount currently paid per bid item for work performed by the affected DBE;
8. The total dollar amount per bid item remaining to be paid to the DBE for work completed but for which the DBE has not received payment, and with which the contractor has no dispute; and
9. The total dollar amount per bid item remaining to be paid to the DBE for work completed, for which the DBE has not received payment, and with which the contractor and DBE have a dispute.

The prime contractor shall send a copy of the written notice to replace a certified DBE on a contract to the affected DBE. The affected DBE may submit a written response within five (5) calendar days to the Department to explain its position on its performance on the committed work. The Department shall consider both the prime contractor's request and DBE's stated position before approving the termination or substitution request, or determining if any action shall be taken against the contractor.

There shall be no substitution or termination of an DBE subcontractor at any time without the prior written consent of the Department. The Department will provide written consent only if the contractor has good cause, as determined by the Department, to terminate the DBE. Good cause may include, but is not limited to the following circumstances:

1. The DBE subcontractor fails or refuses to execute a written contract;
2. The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards;
3. The listed DBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
4. The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
5. The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1200 or applicable state law;
6. The Department has determined that the listed DBE subcontractor is not a responsible contractor;
7. The listed DBE subcontractor voluntarily withdraws from the project and provides to the Department written notice of its withdrawal;
8. The listed DBE is ineligible to receive DBE credit for the type of work required; and
9. An DBE owner dies or becomes disabled with the result that the listed DBE contractor is unable to complete its work on the contract.

Upon approval from the Department to replace an DBE, the contractor's good faith efforts shall be documented and submitted to the Department within seven (7) calendar days. This time period may be extended for another seven (7) calendar days upon request by the prime contractor.

If an DBE subcontractor is unable to perform work under the contract, and is to be

replaced, the contractor's failure to obtain a substitute certified DBE or to make good faith efforts to obtain such a substitute DBE subcontractor to perform said work, may constitute a breach of this contract for which the Department may terminate the contract or pursue such remedy as deemed appropriate by the Department.

XII. CONTRACT COMPLIANCE

This contract is subject to contract compliance tracking, and the prime contractor and all subcontractors are required to report payments electronically in the HDOT online Certification and Contract Compliance Management System (hereafter referred to as "online tracking system"). The prime contractor shall report the date payment was made by the Department and shall report payment to all subcontractors for the audit period. The prime contractor and all subcontractors are responsible for responding by any noted response date or due date to any instructions or request for information, and to check the online tracking system on a regular basis to manage contact information and contract records.

The prime contractor is responsible for ensuring all subcontractors have completed all requested items and that their contact information is accurate and up-to-date. HDOT may require additional information related to the contract to be provided electronically through the online tracking system at any time before, during, or after contract award. Information related to contractor access of the online tracking system will be provided to designated point of contact with each contractor upon award of the contract. The online tracking system is web-based and can be accessed at the following Internet address: <https://hdot.dbesystem.com/>.

XIII. PAYMENT

- A. The Department will make an estimate in writing each month based on the items of work performed and materials incorporated in the work and the value therefore at the unit prices or lump sum prices set forth in the contract. All progress estimates and payments will be approximate only and shall be subject to correction at any time prior to or in the final estimate and payment. The Department will not withhold any amount from any payment to the contractor, including retainage.
- B. The contractor shall pay all subcontractors within ten (10) calendar days after receipt of any progress payments from the Department. This clause applies to both DBE and non-DBE subcontractors, and all tiers of subcontracts.
- C. The contractor will verify that payment or retainage has been released to the subcontractors or its suppliers within the specified time through entries in the Department's online tracking system during the corresponding monthly audits. Prompt payment will be monitored and enforced through the contractor's reporting of payments to its subcontractors and suppliers in the online tracking system.

Subcontractors, including lower tier subcontractors and/or suppliers will confirm the timeliness and the payment amounts received utilizing the online tracking system. Discrepancies will be investigated by the DBE Program Office and the project engineer. Payments to the subcontractors, including lower tier subcontractors, and including retainage released after the subcontractor or lower tier subcontractor's work has been completed to the Department's satisfaction, will be reported by the Contractor or the subcontractor.

- D. When any subcontractor has satisfactorily completed its work as specified in the subcontract, and there are no bona fide disputes, the contractor shall make prompt and full payment to the subcontractor of all monies due, including retainage, within ten (10) calendar days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented, as required by the Department. The contractor must obtain the prior written approval from the Department before it can continue to withhold retainage from any subcontractor who has completed its portion of the work. This clause applies to both DBE and non-DBE subcontractors, and all tiers of subcontracts.

XIV. RECORDS

The contractor shall maintain and keep all records necessary for the Department to determine compliance with the contractor's DBE obligations. The records shall be available at reasonable times and places for inspection by the Department and appropriate Federal agencies. The records to be kept by the contractor shall include:

1. The names, race/ethnicity, gender, address, phone number, and contact person of all DBE and non-DBE consultants, subcontractors, manufacturers, suppliers, truckers and vendors identified as DBEs;
2. The nature of work of each DBE and non-DBE consultant, subcontractor, manufacturer, supplier, trucker and vendor;
3. The dollar amount contracted with each DBE and non-DBE consultant, subcontractor, manufacturer, supplier, trucker and vendor; and
4. Cumulative dollar amount of all change orders to the subcontract.

XV. FAILURE TO COMPLY WITH DBE REQUIREMENTS

The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT assisted contracts. All contractors, subcontractors, manufacturers and suppliers are hereby advised that failure to carry out all DBE requirements specified herein shall constitute a material breach of contract that may result in termination of the contract or such other remedy as deemed appropriate by the Department including but not limited to: 1) withholding monthly progress payments; 2) assessing sanctions; 3) liquidated damages; and/or 4) disqualifying the contractor from future bidding as non-responsible.

BUY AMERICAN PREFERENCE STATEMENT

The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, the Bipartisan Infrastructure Law (BIL) Build America, Buy America Act (BABA), and other related Made in America Laws¹, U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel, and manufactured goods used in Airport Improvement Program (AIP) funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA, and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference, BABA, and Made in America laws.

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

¹ Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy America" or "Buy American", that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

Appendix X. Buy American Guidance

X-1. General Sponsor Buy American Requirements.

The Buy American Preferences under 49 USC § 50101 require that all steel and manufactured goods used in AIP funded projects be produced in the United States. Under 49 USC § 50101(c), ground transportation demonstration projects in 49 USC § 47127 are excluded. Sponsors must complete one of the three requirements in Table X-1 for the AIP projects (including ineligible or non-AIP funded work included in the same contract).

Table X-1 General Sponsor Buy American Requirements

All sponsors must complete one of the following for AIP funded projects...
(1) Certify, in writing, all products are wholly produced in America and are of 100% U.S. materials.
(2) Certify that all equipment that is being used on the project is on the Nationwide Buy American conformance list.
(3) Request a waiver to use non- U.S. produced products.

X-2. Other Buy American and Buy America Requirements.

There are other Buy American and Buy America preference rules and requirements imposed by other Federal agencies that may differ from the AIP Buy American guidance. That is because there are difference statutory requirements for other Federal agencies and grant programs that do not apply to AIP.

X-3. Changes Orders and Buy American Requirements.

A change order to a project requires a separate Buy American review and may require an ADO determination.

X-4. Buy American Waiver Process and Delegation.

Under 49 USC § 50101(b) and 49 CFR § 1.83(a)(11), the FAA is given the authority to waive these Buy American Preferences if certain market or product conditions exist. Many pieces of equipment are constructed with some non- U.S. produced components or subcomponents. Therefore, it is expected that the sponsor will have to request a waiver on a majority of projects (unless the project is constructed of materials that already have a nationwide waiver). These requirements only apply to manufactured components and subcomponents. Software is not considered a component or subcomponent.

The four types of Buy American waivers that the FAA may be issued are listed in Table X-2. The responsibility for Type I and II waivers, as well as any nationwide waivers remains with

APP-500. The ADOs have been delegated the authority to issue Type III and Type IV waivers to a sponsor on a project level.

Table X-2 Criteria by Buy American Waiver Type

For the following...	The following criteria apply...
Type I Waiver	Per 49 USC § 50101(b)(1), the FAA can issue this type of waiver if the FAA determines that applying the Buy American requirements would be inconsistent with the public interest. Due to the possible national implications of such a waiver, APP-500 is responsible for reviewing and issuing Type I Waivers.
Type II Waiver	Per 49 USC § 50101(b)(2), the FAA can issue this type of waiver for equipment or construction material if the FAA determines that the goods are not produced in a sufficient and reasonably available amount or are not of a satisfactory quality. Type II Waivers can only be issued on the equipment/construction material level and cannot be issued for a system and/or facility that is comprised of various pieces of equipment/construction material. These waivers are issued by APP-500, after the FAA publishes a Federal Register Notice asking manufacturers to advise the FAA if they manufacture the equipment/material that is seeking a waiver and if their product meets the FAA specifications and Buy American requirements. After manufacturers respond to this notice, APP-500 will make a determination if there is insufficient quantity or quality.
Type III Waiver	<p>Per 49 USC § 50101(b)(3), the FAA can issue this type of waiver if the FAA determines that 60% or more of the components and subcomponents in the equipment/facility are of U.S. origin and their final assembly is in the United States. A Type III Waiver cannot be issued at the system level and must be issued for each piece of equipment; however, in the case of facilities a Type III Waiver may be issued for the entire facility if all the construction materials when combined meet the 60% U.S. origin requirement. The ADO may issue these waivers. For block grant state projects, only the FAA (usually the ADO) may issue the waivers. Block grant states are not allowed to issue a waiver. To complete a Type III Waiver request, the following supporting documentation must be submitted by the requester:</p> <ol style="list-style-type: none"> (1) A completed Buy American Content Percentage Calculation Worksheet (or equivalent) (see Appendix B for link). Per 49 USC § 50101(c), labor costs at final assembly must be excluded from this worksheet. This is because the Buy American statute is based on the cost of materials and equipment, not labor. (2) A completed Buy American Product Final Assembly Questionnaire (or equivalent) (see Appendix B for link). Final assembly in the United States must meet the standard defined below under Final Assembly Location. (3) The manufacturer must certify in writing that any major structural steel used in their equipment is of 100% U.S. origin. Small amounts of steel that are used in components and subcomponents, that are not structural steel, may be of foreign origin. This would typically consist of nuts, bolts and clips. For these types of steel, the manufacturer must indicate the use of the steel (nuts, bolts, clips, etc.) and must count this steel as non-U.S. origin when completing the Content Percentage Calculation Form. <p>Per FAA policy, after the ADO reviews the waiver request, the ADO must send a notification to the requester informing them of the approval or disapproval of the</p>

Table X-2 Criteria by Buy American Waiver Type

For the following...	The following criteria apply...
	<p>waiver. The ADO must use the following language in this notification for project specific waivers: <i>I have reviewed the request for Waiver of Buy American Requirement submitted by XXX for the use of XXXXX equipment on the subject project. The information submitted by XXXX satisfies the requirement for waiver of the requirements of 49 USC § 50101 based on XX% of the cost of components and subcomponents to be used in the project being produced in the United States with final assembly being performed in XXXXXXXX. The waiver is hereby approved for use on this AIP grant project.</i></p> <p>The ADO must place a copy of the notifications in the grant file. Following this notification, no further action is required.</p>
Type IV Waiver	<p>Per 49 USC § 50101(b)(4), the FAA can issue this type of waiver if the FAA determines that applying Buy American requirements increases the cost of the overall project by more than 25%. The ADO may issue these waivers. For block grant state projects, only the FAA (usually the ADO) may issue the waivers. Block grant states are not allowed to issue a waiver. In order to issue this type of waiver, the FAA must determine that there is at least one bid from a Buy American compliant supplier to make the 25% cost increase determination.</p> <p>Per FAA policy, after the ADO reviews the waiver request, the ADO must send a notification to the requester informing them of the approval or disapproval of the waiver. The ADO must use the following language in this notification for project specific waivers: <i>I have reviewed the request for Waiver of Buy American Requirement submitted by XXX for the use of XXXXX equipment on the subject project. The information submitted by XXXX satisfies the requirement for waiver of the requirements of 49 USC § 50101 that including domestic material will increase the cost of the overall project by more than 25%. The waiver is hereby approved for use on this AIP grant project.</i></p> <p>The ADO must place a copy of the notifications in the grant file. Following this notification no further action is required.</p>

X-5. National Buy American Waiver.

APP-500 may issue National Waivers for certain equipment/material that is used frequently in AIP funded projects. APP-500 will list these National Waivers on the FAA Office of Airports website under the Buy American Conformance List. Any equipment or materials on the Buy American Conformance List do not need additional waiver materials. All personnel not in APP-500 must direct any manufacturer seeking to be added to this Buy American Conformance List to APP-500.

X-6. Definitions.

To assist in making Buy American Waiver determinations the following definitions apply:

Table X-3 Buy American Specific Definitions

Buy American Waiver specific definitions include...
<p>a. Project. The <i>Project</i> is generally the project that is being bid or procured. The <i>Project</i> does not extend over multiple grants or phases, even though the overall project may be phased or may be built in multiple bid packages.</p>
<p>b. Facility or Equipment. This will be defined differently depending on the project. For a building, the portion of the building that is being funded under the AIP grant is the <i>facility</i> listed in the waiver. For other projects, the bid items as described in the current version of Advisory Circular 150/5370-10, Standards for Specifying Construction of Airports, will generally be the <i>equipment</i> referred to in the waiver except for airfield electrical equipment. For airfield electrical equipment, the L- items listed in the Addendum to the current version of Advisory Circular 150/5345-53, Airport Lighting Equipment Certification Program, will generally be the <i>equipment</i> referred to in the waiver. For a vehicle or single piece of equipment like a snow plow or ARFF vehicle, the single vehicle itself is the <i>equipment</i>.</p>
<p>c. Final Assembly Location. Final assembly is a process whereby assembly is meaningful and complex utilizing a substantial amount of time and resources, a number of different assembly operations, and a high level of skilled labor. The Final Assembly Questionnaire must be completed in order to determine whether final assembly occurs at the recorded site.</p>
<p>d. Nonavailable Items. By FAA policy, the list of items that have been determined nonavailable per 48 CFR § 25.104 are excluded from the Buy American preference requirements for AIP funded projects. This list includes petroleum products; therefore, asphalt is a nonavailable item per this list. In addition, the FAA has determined that cement and concrete are also nonavailable items excluded from the Buy American preference requirements (although the steel used for reinforcement, ties, stirrups, etc. must meet Buy American).</p>

U.S.C. TITLE 49, SUBTITLE VII, PART E, CHAPTER 501
BUY AMERICAN PREFERENCES

49 U.S.C.

United States Code, 2009 Edition
Title 49 - TRANSPORTATION
SUBTITLE VII - AVIATION PROGRAMS
PART E - MISCELLANEOUS
CHAPTER 501 - BUY-AMERICAN PREFERENCES
Sec. 50101 - Buying goods produced in the United States
From the U.S. Government Publishing Office, www.gpo.gov

§50101. Buying goods produced in the United States

(a) **PREFERENCE.**—The Secretary of Transportation may obligate an amount that may be appropriated to carry out section 106(k), 44502(a)(2), or 44509, subchapter I of chapter 471 (except section 47127), or chapter 481 (except sections 48102(e), 48106, 48107, and 48110) of this title for a project only if steel and manufactured goods used in the project are produced in the United States.

(b) **WAIVER.**—The Secretary may waive subsection (a) of this section if the Secretary finds that—

- (1) applying subsection (a) would be inconsistent with the public interest;
- (2) the steel and goods produced in the United States are not produced in a sufficient and reasonably available amount or are not of a satisfactory quality;
- (3) when procuring a facility or equipment under section 44502(a)(2) or 44509, subchapter I of chapter 471 (except section 47127), or chapter 481 (except sections 48102(e), 48106, 48107, and 48110) of this title—

(A) the cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components of the facility or equipment; and

(B) final assembly of the facility or equipment has occurred in the United States; or

(4) including domestic material will increase the cost of the overall project by more than 25 percent.

(c) **LABOR COSTS.**—In this section, labor costs involved in final assembly are not included in calculating the cost of components.

(Pub. L. 103–272, §1(e), July 5, 1994, 108 Stat. 1298, §49101; renumbered §50101 and amended Pub. L. 104–287, §5(88)(D), (89), Oct. 11, 1996, 110 Stat. 3398.)

HISTORICAL AND REVISION NOTES
PUB. L. 103–272

<i>Revised Section</i>	<i>Source (U.S. Code)</i>	<i>Source (Statutes at Large)</i>
49101(a)	49 App.:2226a(a).	Nov. 5, 1990, Pub. L. 101–508, §9129, 104 Stat. 1388–371.
49101(b)	49 App.:2226a(b).	
49101(c)	49 App.:2226a(c).	

In this chapter, the word “goods” is substituted for “product” and “products” for consistency.

In subsection (a), the words “Notwithstanding any other provision of law” are omitted as surplus. The words “after November 5, 1990” are omitted as obsolete.

In subsection (b), before clause (1), the words “The Secretary may waive” are substituted for “shall not apply” for consistency. In clause (2), the words “steel and goods” are substituted for “materials and products” for consistency. In clause (4), the word “contract” is omitted as surplus.

PUB. L. 104–287, §5(89)

This makes a clarifying amendment to 49:50101(a) and (b)(3), 50102, 50104(b)(1), and 50105, as redesignated by clause (88)(D) of this section, because 49:47106(d) was struck by section 108(1) of the

Federal Aviation Administration Authorization Act of 1994 (Public Law 103–305, 108 Stat. 1573).

AMENDMENTS

1996—Pub. L. 104–287, §5(88)(D), renumbered section 49101 of this title as this section.

Subsecs. (a), (b)(3). Pub. L. 104–287, §5(89), substituted “section 47127” for “sections 47106(d) and 47127”.

USE OF DOMESTIC PRODUCTS

Pub. L. 103–305, title III, §305, Aug. 23, 1994, 108 Stat. 1592, provided that:

“(a) PROHIBITION AGAINST FRAUDULENT USE OF ‘MADE IN AMERICA’ LABELS.—(1) A person shall not intentionally affix a label bearing the inscription of ‘Made in America’, or any inscription with that meaning, to any product sold in or shipped to the United States, if that product is not a domestic product.

“(2) A person who violates paragraph (1) shall not be eligible for any contract for a procurement carried out with amounts authorized under this title [enacting section 47509 of this title, amending sections 44505 and 48102 of this title, and enacting provisions set out as notes under this section and section 40101 of this title], including any subcontract under such a contract pursuant to the debarment, suspension, and ineligibility procedures in subpart 9.4 of chapter 1 of title 48, Code of Federal Regulations, or any successor procedures thereto.

“(b) COMPLIANCE WITH BUY AMERICAN ACT.—(1) Except as provided in paragraph (2), the head of each office within the Federal Aviation Administration that conducts procurements shall ensure that such procurements are conducted in compliance with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a through 10c [41 U.S.C. 10a—10b–1], popularly known as the ‘Buy American Act’).

“(2) This subsection shall apply only to procurements made for which—

“(A) amounts are authorized by this title to be made available; and

“(B) solicitations for bids are issued after the date of the enactment of this Act [Aug. 23, 1994].

“(3) The Secretary, before January 1, 1995, shall report to the Congress on procurements covered under this subsection of products that are not domestic products.

“(c) DEFINITIONS.—For the purposes of this section, the term ‘domestic product’ means a product—

“(1) that is manufactured or produced in the United States; and

“(2) at least 50 percent of the cost of the articles, materials, or supplies of which are mined, produced, or manufactured in the United States.”

Similar provisions were contained in the following prior authorization act: Pub. L. 102–581, title III, §305, Oct. 31, 1992, 106 Stat. 4896.

PURCHASE OF AMERICAN MADE EQUIPMENT AND PRODUCTS

Pub. L. 103–305, title III, §306, Aug. 23, 1994, 108 Stat. 1593, provided that:

“(a) SENSE OF CONGRESS.—It is the sense of Congress that any recipient of a grant under this title [enacting section 47509 of this title, amending sections 44505 and 48102 of this title, and enacting provisions set out as notes under this section and section 40101 of this title], or under any amendment made by this title, should purchase, when available and cost-effective, American made equipment and products when expending grant monies.

“(b) NOTICE TO RECIPIENTS OF ASSISTANCE.—In allocating grants under this title, or under any amendment made by this title, the Secretary shall provide to each recipient a notice describing the statement made in subsection (a) by the Congress.”

TYPE I, II, III EQUIPMENT / BUILDING, AND IV BUY AMERICAN WAIVERS
ISSUED (AS OF 7/11/2023)

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Type I, II, III Equipment / Building and IV
Buy American Waivers Issued (As of 7/11/2023)



**FAA
Office of Airports**

**Type I, II, III Equipment / Building, and IV Buy American Waivers Issued
(As of 7/11/2023)**

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

NOTICE: L-823 Connectors do not have independent utility needed to consider it as a component that warrants a Buy American waiver. For purposes of Buy American Preferences, the FAA considers these products as sub-components of the larger airfield lighting equipment being installed.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate Americas, LLC	L-830, Isolation Transformers, 60Hz Model 1STXXX66601001	7/8/2023
Type III Equipment/Building	Crown USA Incorporated	F-AB-297 TT-P-1952F Type II Black Marking Paint	7/8/2023
Type III Equipment/Building	Crown USA Incorporated	F-AG-355 TT-P-1952F Type II Bicycle Green Marking Paint	7/8/2023
Type III Equipment/Building	Crown USA Incorporated	F-AL-397 TT-P-1952F Type II Blue Marking Paint	7/8/2023
Type III Equipment/Building	Crown USA Incorporated	F-LFY-295 TT-P-1952F Type II L.F. Yellow Marking Paint	7/8/2023
Type III Equipment/Building	Crown USA Incorporated	F-AR-399 TT-P-1952F Type II Red Marking Paint	7/8/2023
Type III Equipment/Building	Crown USA Incorporated	F-AR-D-399 TT-P-1952F Type II Dark Red Marking Paint	7/8/2023
Type III Equipment/Building	Crown USA Incorporated	F-AW-292 TT-P-1952F Type II White Marking Paint	7/8/2023
Type III Equipment/Building	Hillcrest Industries, Inc.	Reflective Media TTB 1325D Type 1A – Glass Beads	7/8/2023
Type III Equipment/Building	E-One, Inc.	Ecologic Test Cart	7/1/2023
Type III Equipment/Building	NoFoam Systems	NoFoam Tester (Model C) w kits	7/1/2023
Type III Equipment/Building	NoFoam Systems	NoFoam Tester Model P w kits	7/1/2023

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852T LED (L) Omni-directional In-pavement Taxiway Edge Light RSTEX1XP3NXNXXXX2	3/25/2023
Type III Equipment/Building	SPX Aids for Aviation	L-863 Portable Runway and Taxiway Lighting AV-70-863-B-SW-CP	3/25/2023
Type III Equipment/Building	SPX Aids to Aviation	L-863 Portable Runway and Taxiway Lighting AC-70-863-B-RF-SW-CP	3/25/2023
Type III Equipment/Building	All Weather Incorporated	Automated Weather Observation System AWOS II	3/6/2023
Type III Equipment/Building	All Weather Incorporated	Automated Weather Observation System III P/T	2/25/2023
Type III Equipment/Building	All Weather Incorporated	Automated Weather Observation System III-P	2/25/2023
Type III Equipment/Building	All Weather Incorporated	Automated Weather Observation System AWOS I	2/25/2023
Type III Equipment/Building	All Weather Incorporated	Automated Weather Observation System Altimeter/Visibility (AV)	2/25/2023
Type III Equipment/Building	All Weather Incorporated	Automated Weather Observation System III	2/25/2023
Type III Equipment/Building	Potters Industries (Flex-O-Lite)	Reflective Media TTB 13215D Type IA (Flex-O-Lite) Glass Beads	8/27/2022
Type III Equipment/Building	GBA Components, LLC	Inpavement Light EB-83A Coated Bolts	8/7/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-850D(L) RSRT212XXXXFXXXX1 Inpavement Runway Threshold Light	7/30/2022

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852A (LED) Model RSTA21XXXXXXX2X1 Inpavement Taxiway Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852B (LED) Model RSTB21XXXXXXX2X1 Inpavement Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852C (LED) Model RSTC21XXXXXXX2X1 Inpavement Taxiway Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852D (LED) Model RSTD21XXXXXXX2X1 Inpavement Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852J (LED) Model RSTJ21XXXXXXX2X1 Inpavement Taxiway Centerline Light	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852K(LED) Inpavement Taxiway Centerline Light Model RSTK21XXXXXXX2X1	7/17/2022
Type III Equipment/Building	ADB Safegate Americas, LLC	L-852S (LED) Model RSSB21XXXXNRNXX2X1 Inpavement Stop Bar Light	7/17/2022
Type III Equipment/Building	Flash Technology	L-880 (LED) Precision Approach Path Indicator	7/17/2022
Type III Equipment/Building	Flash Technology	Flash Technology L-881 (LED) Precision Approach Path Indicator	7/17/2022
Type III Equipment/Building	Potters Industries (Flex-O-Lite)	Reflective Media TT-B 1325D Type III (Flex-O-Lite) Glass Beads, 1.9 Index of Refraction	7/17/2022
Type III Equipment/Building	ADB Safegate	L-850A(L) RSRC11XXXXXXX1 Inpavement Runway Centerline Light	6/18/2022

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-850B(L) RSRZ11XX1XWNXXX1 Inpavement Touchdown Zone Light	6/18/2022
Type III Equipment/Building	ADB Safegate	L-850C (L) RSRE11XXXCXXXXX1 Inpavement Runway Edge Light	6/18/2022
Type III Equipment/Building	ADB Safegate	L-850D(L) RSRN212XXXXRXXXXX1 Inpavement Runway End Light	6/18/2022
Type III Equipment/Building	ADB Safegate	L-850T(L) RRSR21XX1NRNRXX1 Runway Status Light	6/18/2022
Type III Equipment/Building	Airport Lighting Company	L-821 Airport Lighting Control Panel	2/26/2022
Type III Equipment/Building	Airport Lighting Company	L-880 LED Precision Approach Path Indicator	2/26/2022
Type III Equipment/Building	Airport Lighting Company	L-881 LED Abbreviated Precision Approach Path Indicator	2/26/2022
Type III Equipment/Building	ADB Safegate	High Intensity Runway Edge L-862(L) ERES2YW33S00002	11/27/2021
Type III Equipment/Building	ADB Safegate	High Intensity Runway Edge Light L-862(L) ERES2GR13SF0002	11/27/2021
Type III Equipment/Building	ADB Safegate	High Intensity Runway Edge Light L-862(L) ERES2WY33S00002	11/27/2021
Type III Equipment/Building	Webasto Charging Systems Incorporated	Posicharge DVS 300 Electric Vehicle Charger	11/27/2021
Type III Equipment/Building	Multi-Electric Manufacturing	LED E Runway Elevated Threshold End Light	9/18/2021

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Multi-Electric Manufacturing	LED Runway Elevated Edge - L-862 (L)	9/18/2021
Type III Equipment/Building	Airport Lighting Company	L-890 Lighting Control & Monitoring System	7/17/2021
Type III Equipment/Building	Airport Lighting Company	High Intensity Runway Edge Light, L-862 LED	5/8/2021
Type III Equipment/Building	Airport Lighting Company	L-861SE LED Medium Intensity Runway & Taxiway Edge Light	5/8/2021
Type III Equipment/Building	Airport Lighting Company	L-862 E LED High Intensity Runway Threshold Light	5/8/2021
Type III Equipment/Building	Hali-Brite Incorporated	L-801 A (LED) Medium Intensity Beacon	4/24/2021
Type III Equipment/Building	Hali-Brite Incorporated	L-802 A (LED) High Intensity Beacon	4/24/2021
Type III Equipment/Building	Musco Lighting	TLC for LED® Light-Structure System™ Apron Flood Lighting	4/11/2021
Type III Equipment/Building	Flight Light Inc.	L-810 Obstruction Light Single Head LED	4/3/2021
Type III Equipment/Building	Flight Light Inc.	L-810 Obstruction Light Double Head LED	4/3/2021
Type III Equipment/Building	Airport Lighting Company	L-847 Switch, Circuit Selector	3/20/2021
Type III Equipment/Building	ADB Safegate	L-849 -L Runway End Identification Lights - E1101012	8/8/2020
Type III Equipment/Building	Hali-Brite Incorporated	L-893, Lighted Visual Aid to Indicate Temporary Runway Closure LED RCM-D L-893 (L)	4/26/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Hali-Brite incorporated	L-893, Lighted Visual Aid to Indicate Temporary Runway Closure, LED RCM-D	4/26/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG01S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG01S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG01SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG02S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG0ASL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG0BSL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2NG0CSL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG01S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG01SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG02S00000	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG02S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03S000000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG03SF0100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG04SF0100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG05S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG05SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG05SC0100	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG06SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG07S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG07SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG07SF0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG09S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG0BSM0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG0CSL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN09SL0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG01S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR01S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR03S00100	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY02S00100	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6WY09S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RG05SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RN05SC0000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RR05S00000	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG28SF0002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RN01S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR03S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR35S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR38S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY28S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY31S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY33S00002	4/11/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY33S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RY35S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW31S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW31S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW33S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2WW33S00102	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2YG31S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR03S00002	4/11/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN05MI0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN05SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN05SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN09MI0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN09MI002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN15SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR08SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR11MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR13MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR13SM0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR15MF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR15SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR19SF0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR25MF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR25SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR29SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GW31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GY33SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GY35SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG21SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG25SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG25SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG21MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG21SF0102	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG23MF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG25SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG29SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RN01M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RN05S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RN09M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR01S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR03S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR15S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR25S00002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RR35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RW31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY23S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RY35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WG31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WR31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW31S00002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW31S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW33M00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW33S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW33S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW35M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW35S01102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW39M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY31S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY33M00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY33S00102	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY39M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY39S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YG33SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YG35SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR13S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR31M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR39M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YR39S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW31S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW33M00102	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW33S00102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW35M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW39M00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW39S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN05SI0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN13SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GN18SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR05SI0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR11SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR11SF0102	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR12SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR15SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GR18SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY31SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY33SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY33SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2GY35SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG21SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG23SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2NG28SF0002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG21SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG22SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG23SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG23SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG25SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RN05S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RR01S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862(L) High Intensity Runway Edge Light EREL2GN13SF0102	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG21SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WW35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2WY35S00002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2YW35S00002	4/4/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity ERES2RG21SF0002	4/4/2020
Type III Equipment/Building	ADB safegate	L-862 Lights, Runway Edge, High Intensity EREL2RG25SF0002	4/4/2020
Type III Equipment/Building	ADB Safegate	L-826 L L-862 Lights, Runway Edge, High Intensity EREL 24 IN N/G W/ARC 1.5 CPLG 12 FAA	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 14 IN G/N N/ARC 2 CPLG 11.5	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 14 IN G/N W/ARC 2 CPLG 11.5	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 14 IN G/R W/ARC 2 CPLG 11.5 FAA	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 24 IN G/N W/ARC 1.5 CPLG 12	3/15/2020
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL 24 IN G/Y W/ARC 1.5 CPLG 12 FAA	3/15/2020
Type III Equipment/Building	Diamond Vogel	Marking - 7503 Blue Waterborne Traffic Paint	2/17/2020

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Diamond Vogel	Marking - UC 1509 White Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Diamond Vogel	Marking - UC 3584 Yellow Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Diamond Vogel	Marking - UC 5503 Red Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Diamond Vogel	Marking - UC 9507 Black Waterborne Traffic Paint	2/17/2020
Type III Equipment/Building	Avlite Systems	L-880 LED Precision Approach Path Indicator	1/24/2020
Type III Equipment/Building	Avlite Systems	L-881 LED Abbreviated Precision Approach Path Indicator	1/24/2020
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG07S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR03S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR07S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW02S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW02S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW05S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW05S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW06S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW07S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW09SL0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW09SM0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0ASL0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0ASM0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0BSL0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0BSM0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0CSL0000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WW0CSM0000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY02S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY02S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY05S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY05S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY06S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY07S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WY09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG02S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YG04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YN03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR01S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YR04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY01S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY01S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY03S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY03S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY04S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2YY04S00100	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6NG09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6NR09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6RG09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS6WW09S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8RR05S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8WW05S00000	12/7/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS8WY05S00000	12/7/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RG09SM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN09SM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0ASL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0ASM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0BSL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0BSM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0CSL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RN0CSM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR01S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR02S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR03S00000	11/23/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR03S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR04S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR04S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR07S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RR09S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW09SL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW09SM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0ASL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0ASM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0BSL0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0BSM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0CSL0000	11/23/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2RW0CSCM0000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG01S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG01S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG03S00000	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WG03S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861 Lights, Runway & Taxiway Edge, Medium Intensity EMIS2WR04S00100	11/23/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG03S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG03S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG03SF0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG04S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG04S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG07S00000	11/16/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG09SL0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NG09SM0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR01S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR01S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR03S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR03S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR04S00000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2NR04S00100	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0ASL0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0ASM0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0BSL0000	11/16/2019
Type III Equipment/Building	ADB Safegate	L-861(L) Medium Intensity Runway Edge Light EMIS2RG0CSM0000	11/16/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Astronics DME	L-852S Inpavement Taxiway Lights L-R-1-0	10/26/2019
Type III Equipment/Building	Astronics DME	L-852T-L 1 G2 Inpavement Taxiway Lights	10/26/2019
Type III Equipment/Building	Astronics DME	L-852X Inpavement Taxiway Lights L-G2	10/26/2019
Type III Equipment/Building	Astronics DME	L-852X-L G2 Inpavement Taxiway Lights	10/26/2019
Type III Equipment/Building	Astronics DME	L-862L High Intensity runway Edge Lights	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Black Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Green Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Red Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 White Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Franklin Paint Company	P-620 Yellow Waterborne Traffic Paint	10/26/2019
Type III Equipment/Building	Millerbernd Manufacturing Company	L-867 Light Base, Non-Load Bearing	10/26/2019
Type III Equipment/Building	Millerbernd Manufacturing Company	L-868 Light Base, Load Bearing	10/26/2019
Type III Equipment/Building	Millerbernd Manufacturing Company	L-894 Elevated Light Cover 12"	10/26/2019
Type III Equipment/Building	Millerbernd Manufacturing Company	L-894 Elevated Light Cover 16"	10/26/2019
Type III Equipment/Building	Wix Support Equipment	Electric Vehicle Charging Station Cable Mangement System	10/26/2019
Type III Equipment/Building	ADB Safegate	L-862 (L) High Intensity Runway Edge Light EREL2GN13SF0102	10/19/2019

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN13SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN15SF0002	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GN15SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GR15SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2GY33SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-862 Lights, Runway Edge, High Intensity EREL2NG23SF0102	10/19/2019
Type III Equipment/Building	ADB Safegate	L-861 L Runway & Taxiway Edge Medium Intensity Lights	10/1/2019
Type III Equipment/Building	ADB Safegate	L-862 E L Runway Edge High Intensity Lights ERES2WW35S00002	10/1/2019
Type III Equipment/Building	ADB Safegate	L-862 Runway Edge High Intensity Lights EREL2RG21SF0002	10/1/2019
Type III Equipment/Building	ADB Safegate	L-862 Runway Edge High Intensity Lights EREL2WW35S00002	10/1/2019
Type III Equipment/Building	Minit charger, LLC	ALT22-480-1 Altus 22kW Dual Port Charger with BIW Cables	10/1/2019
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 E LED Inpavement Taxiway Light	10/22/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 F LED Inpavement Taxiway Light	10/22/2018

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 S LED Inpavement Taxiway Light	10/22/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 T LED Inpavement Taxiway Light	10/22/2018
Type III Equipment/Building	Astronics DME Corporation	L-804 V Holding Poission Edge Light	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-829 Monitored Constant Current Regulator	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-849 I LED Runway End Indentification Lights	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-850 A LED Runway Inpavement Lights	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-850 B LED Runway Inpavement Lights	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-850 T Runway Inpavement Light	8/27/2018
Type III Equipment/Building	Astronics DME Corporation	L-858 Runway and Taxiway Signs	8/27/2018
Type III Equipment/Building	Kodiack America, LLC	Snow Removal Equipment - Dual Engine Chassis w/ Rwy Broom & Air Blast	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 A LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 B LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 C LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 D LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 E LED Inpavement Runway Light	8/27/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-850 T LED Inpavement Runway Light	8/27/2018

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Ennis-Flint Company	P-620 AirMark Preformed Thermoplastic Pavement Markings	8/4/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 A LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 B LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 C LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 D LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 J LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Multi-Electric Mfg., Inc.	L-852 K LED Inpavement Taxiway Light	7/29/2018
Type III Equipment/Building	Airport Lighting Company	L-828 Constant Current Regulator	7/24/2018
Type III Equipment/Building	Airport Lighting Company	L-829 Monitored Constant Current Regulator	7/24/2018
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 G LED Inpavement Taxiway Light	7/22/2018
Type III Equipment/Building	Hughey & Phillips	L-810 Low Intensity LED , Double, VAC	1/21/2017
Type III Equipment/Building	Hughey & Phillips	L-810 Low Intensity LED, Single, VAC	1/21/2017
Type III Equipment/Building	Astronics DME Corporation	L-858 B LED Runway Runway & Taxiway Signs	10/17/2016
Type III Equipment/Building	Astronics DME Corporation	L-858 L LED Runway & Taxiway Signs	10/17/2016
Type III Equipment/Building	Astronics DME Corporation	L-858 R LED Runway & Taxiway Signs	10/17/2016
Type III Equipment/Building	Eaton Crouse-Hinds	L-850 C Runway Inpavement Lights	10/10/2016
Type III Equipment/Building	Vaisala	AW20, AWOS III	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS A	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS AV	8/1/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS I	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS II	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS III	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IIIP	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IIIPT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IIIT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-SPLIT, AWOS IV Z	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS A	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS AV	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS II	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IIIP	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IIIPT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IIIT	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWOS IV Z	8/1/2016
Type III Equipment/Building	Vaisala	AW20-STA, AWS I	8/1/2016
Type III Equipment/Building	Jaquith Industries	L-894 12" Elevated Light Cover Baseplate	5/17/2016
Type III Equipment/Building	Jaquith Industries	L-894 16" Elevated Light Cover Baseplate	5/17/2016
Type III Equipment/Building	Jaquith Industries	L-895 Light Mounting Stake	5/17/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, 1952, TT-P-Hotline Waterborne Durable Type III - White Marking Paint TM2452	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, 1952, TT-P-Hotline Waterborne Durable Type III - Yellow Marking Paint TM2453	5/14/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P- 1952, Hotline Waterborne Type I/II - Yellow Marking Paint TM2259	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952 Hotline Waterborne Type I/II w Algaecide, Fungicide, & Rust Inhibitor - Red Marking Paint TM2544	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952 Hotline Waterborne Type I/II - White Marking Paint TM2152	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952 Hotline Waterborne Type III w Algaecide, Fungicide, & Rust Inhibitor - White Marking Paint TM2564	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Black Marking Paint TM2140	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Blue Marking Paint TM2142	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Green Marking Paint TM2143	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Durable Type III - Red Marking Paint TM2141	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Black Marking Paint TM2221	5/14/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Blue Marking Paint TM2224	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Green Marking Paint TM2226	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Red Marking Paint TM2222	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II - Yellow Marking Paint TM2153	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type I/II w Algaecide, Fungicide, & Rust Inhibitor - Black Marking Paint TM2543	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type III w Algaecide, Fungicide, & Rust Inhibitor - Blue Marking Paint TM2545	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne Type III w Algaecide, Fungicide, & Rust Inhibitor - Yellow Marking Paint TM2565	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Hotline Waterborne, Type I/II - White Marking Paint TM2248	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Type III w Algaecide & Rust Inhibitor - Black Marking Paint TM2540	5/14/2016

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Type III w Algaecide, Fungicide & Rust Inhibitor - White Marking Paint TM2538	5/14/2016
Type III Equipment/Building	The Sherwin-Williams Company	P-620, TT-P-1952, Type III w Algaecide, Fungicide, & Rust Inhibitor - Yellow Marking Paint TM2539	5/14/2016
Type III Equipment/Building	Boshchung America, LLC	Airport Winter Safety and Operations, RWIS	1/2/2016
Type III Equipment/Building	Astronics DME Corporation	L-804 Holding Position Edge Light	8/4/2015
Type III Equipment/Building	ADB Safegate	L-806 LED, Wind Cones-Frangible	5/15/2015
Type III Equipment/Building	ADB Safegate	L-806 Wind Cones - Frangible	5/15/2015
Type III Equipment/Building	ADB Safegate	L-850 D, Incandescent Inpavement Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-850 E, Incandescent Inpavement Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-850 F, Incandescent Inpavement Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-861 E, LED Runway Edge, Medium Intensity Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-861 LED, Medium Intensity Runway Edge Lights	5/15/2015
Type III Equipment/Building	ADB Safegate	L-804 LED, Holding Position Edge Light	5/5/2015
Type III Equipment/Building	ADB Safegate	L-810 LED, Obstruction Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-849 C, LED, Runway End Identification Lights	5/5/2015

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-849 E, LED, Runway End Identification Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 A, Q/I, Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 B, Q/I Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 C LED, Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 C, Q/I Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-850 D, LED Runway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 A, LED, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 A, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 B, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 B, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 C, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 C, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 D, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 D, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 E, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 G, LED, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 G, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 J, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 S, Q, Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-852 T, LED Taxiway, Inpavement Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-858, LED, Runway and Taxiway Signs	5/5/2015

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	ADB Safegate	L-861 SE, Q, Runway Edge, Medium Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-861 T, LED Taxiway Edge, Medium Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-861, Q, Runway Edge, Medium Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-861E, Q, Runway Edge, Medium Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-862 E, Q, Runway Edge, High Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-862, Q, Runway Edge, High Intensity Lights	5/5/2015
Type III Equipment/Building	ADB Safegate	L-880 LED, Precision Approach Path Indicator	5/5/2015
Type III Equipment/Building	ADB Safegate	L-881 LED, Abbreviated Precision Approach Path Indicator	5/5/2015
Type III Equipment/Building	Atg Airports, Ltd.	L-850 B Runway Inpavement Lights	2/2/2015
Type III Equipment/Building	Atg Airports, Ltd.	L-850 A Runway Inpavement Lights	1/20/2015
Type III Equipment/Building	Atg Airports, Ltd.	L-850 C Runway Inpavement Lights	1/17/2015
Type III Equipment/Building	Astronics DME Corporation	L-849 A LED Runway End Identification Lights	10/27/2014
Type III Equipment/Building	Rheinmetall Defence	DEBRA FOD	10/21/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Black Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Blue Runway Marking Paint	8/16/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Red Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B White Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	A-A-2886B Yellow Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Black Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Black Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Blue Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Blue Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Green Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Green Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Red Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Red Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E White Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E White Type III Runway Marking Paint	8/16/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Yellow Type I/II Fast Dry Runway Marking Paint	8/16/2014
Type III Equipment/Building	Ennis-Flint Company	TT-P-1952E Yellow Type III Runway Marking Paint	8/16/2014
Type III Equipment/Building	Manairco	L-861 T LED Runway & Taxiway Edge, Medium Intensity Lights	6/27/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-850 A LED Runway Inpavement Lights	6/16/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-850 B LED Runway Inpavement Lights	6/16/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 10,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 12,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 15,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 2,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 20,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 25,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 30,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 10 - 35,000 Gallon DWT Fuel Storage Tank	5/13/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Containment Solutions	CSI Tank 4 - 1,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 4 - 600 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 4,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 2,500 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 3,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 5,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 6 - 6,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 - 12,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 - 8,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 -15,000 Gallon Tank DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Containment Solutions	CSI Tank 8 -5,000 Gallon DWT Fuel Storage Tank	5/13/2014
Type III Equipment/Building	Service Wire Company	L-824, Underground Electrical Cables for Airfield Circuits	5/4/2014

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Airport Lighting Company	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	3/29/2014
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Black Runway Marking Paint (5385)	3/24/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 A LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 B LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 C LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 D LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 J LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Eaton Crouse-Hinds	L-852 K LED Taxiway Inpavement Lights	2/25/2014
Type III Equipment/Building	Astronics DME Corporation	L-852 B LED Taxiway, Inpavement Lights	11/16/2013
Type III Equipment/Building	Astronics DME Corporation	L-852 C LED Taxiway, Inpavement Lights	11/16/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 E LED Runway & Taxiway Edge, Medium Intensity Lights	11/16/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 SE LED Runway & Taxiway Edge, Medium Intensity Lights	11/16/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Black Runway Marking Paint (5383)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Blue Runway Marking Paint (5274)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Blue Runway Marking Paint (5344)	10/19/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Blue Runway Marking Paint (5384)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Green Runway Marking Paint (5376)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Green Runway Marking Paint (5386)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Red Runway Marking Paint (5345)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Red Runway Marking Paint (5375)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B White Runway Marking Paint (5281)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Yellow Runway Marking Paint (5342)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Yellow Runway Marking Paint (5372)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	A-A-2886B Yellow Runway Marking Paint (5382)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	IL SPEC Red Runway Marking Paint (5408)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	IL SPEC Yellow Runway Marking Paint (4636)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Blue Runway Marking Paint (4834)	10/19/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Green Runway Marking Paint (5192)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Red Runway Marking Paint (4836)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Yellow Runway Marking Paint (4477)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Yellow Runway Marking Paint (8511)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type II Yellow Runway Marking Paint (9511)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Blue Runway Marking Paint (5433)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Green Runway Marking Paint (5435)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Red Runway Marking Paint (5434)	10/19/2013
Type III Equipment/Building	Davies Imperial Coatings, Inc.	TT-P-1952E Type III Yellow Runway Marking Paint (5431)	10/19/2013
Type III Equipment/Building	Airport Lighting Company	L-804, Holding Position Edge Light	9/21/2013
Type III Equipment/Building	Honeywell Airport Systems	L-828 F20 Constant Current Regulator	9/21/2013
Type III Equipment/Building	Honeywell Airport Systems	L-828 W10 Constant Current Regulator	9/21/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829 S04 Constant Current Regulator with Monitor	9/21/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Honeywell Airport Systems	L-829-F04, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-F30, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-F70, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-S30, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Honeywell Airport Systems	L-829-S70, Constant Current Regulator	9/9/2013
Type III Equipment/Building	Amerace - Thomas & Betts Corporation	L-830-16 Isolation Transformer, 60Hz, 10/15 Watts, 6.6/6.6 Amperes	7/9/2013
Type III Equipment/Building	Amerace - Thomas & Betts Corporation	L-830-17 Isolation Transformer, 60Hz, 20/25 Watts, 6.6A/6.6A Amperes	7/9/2013
Type III Equipment/Building	Astronics DME Corporation	L-852 D LED Taxiway, Inpavement Lights	7/7/2013
Type III Equipment/Building	Astronics DME Corporation	L-852 A LED Taxiway, Inpavement Lights	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 E Halogen Edge Light	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 Halogen Lights	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Astronics DME Corporation	L-861 T - Halogen Taxiway Light	3/26/2013

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Astronics DME Corporation	L-861 T LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Point Light Corporation	L-861 E LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Point Light Corporation	L-861 SE LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Point Light Corporation	L-861 T LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Point Light Corporation	L-862 E LED Runway & Taxiway Edge, Medium Intensity Lights	3/26/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 10" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 4" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 6" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	Advanced Drainage Systems (ADS)	D-705 8" Pipe Underdrain w/sock	3/10/2013
Type III Equipment/Building	DME (Astronics)	L-852T-L-X LED, Inpavement, OMNI	3/9/2013
Type III Equipment/Building	Vaisala	AWOS II	1/6/2013
Type III Equipment/Building	Vaisala	AWOS III, III-T, III-P, III-PT, III-PTZ	1/6/2013
Type III Equipment/Building	Kodiack America, LLC	Snow Blower & Runway Broom Equipment	10/10/2012
Type III Equipment/Building	ADB Safegate	L-830, Isolation Transformer, 60Hz	7/28/2012

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	TREX Aviation Systems	FOD Finder XM-Mobile	5/25/2012
Type III Equipment/Building	Stratech Systems Limited	iFerret TM FOD System	5/5/2012
Type III Equipment/Building	ADB Safegate	L-849 A, LED Runway End Identification Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-850 A, LED Runway Inpavement Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-850 B, LED Runway Inpavement Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-852 K, LED Taxiway Inpavement Lights	5/4/2012
Type III Equipment/Building	ADB Safegate	L-852 S, LED Taxiway Inpavement Lights	5/4/2012
Type III Equipment/Building	Precision Control Systems	L-890, Lighting Control & Monitoring System	4/3/2012
Type III Equipment/Building	All Weather, Inc.	AWOS I - 900 Series	11/27/2011
Type III Equipment/Building	All Weather, Inc.	AWOS II - 900 Series	11/27/2011
Type III Equipment/Building	All Weather, Inc.	AWOS III - 3000 Series	11/27/2011
Type III Equipment/Building	All Weather, Inc.	AWOS III - 900 Series	11/27/2011
Type III Equipment/Building	FlexStake, Inc.	L-853, Retro reflective Markers	9/11/2011
Type III Equipment/Building	QinetiQ	Tarsier FOD System	9/11/2011
Type III Equipment/Building	TREX Aviation Systems	FOD Finder XF - Fixed	9/11/2011
Type III Equipment/Building	X-Sight	FODetect Systems	7/26/2011
Type III Equipment/Building	Flash Technology	L-856, High Intensity Obstruction Lights	3/28/2011
Type III Equipment/Building	Flash Technology	L-864, Red Obstruction Lights	3/28/2011
Type III Equipment/Building	Sherwin Industries, Inc.	L-893, Lighted Visual Aid for Runway Closure	3/28/2011
Type III Equipment/Building	ADB Safegate	L-854, Radio Controls	2/1/2011
Type III Equipment/Building	ADB Safegate	L-860, Low Intensity Runway Edge Lights	2/1/2011

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Flight Light	L-810, Lights-Obstruction (Various Types)*	1/18/2011
Type III Equipment/Building	Flight Light	L-828, Constant Current Regulators (Various Types)*	1/18/2011
Type III Equipment/Building	Flight Light	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	1/18/2011
Type III Equipment/Building	Southwire Company	L-824, Underground Electrical Cables for Airfield Circuits	1/16/2011
Type III Equipment/Building	Nehring Electrical Works	L-824, Underground Electrical Cables for Airfield Circuits	11/23/2010
Type III Equipment/Building	Point Light Corporation	L-806, Wind Cones-Fragible	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-807, Wind Cones-Rigid	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-810, Lights-Obstruction	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-862, Runway Edge-Threshold-Stop Bar Lights	11/20/2010
Type III Equipment/Building	Point Light Corporation	L-864, Red Obstruction Lights	11/20/2010
Type III Equipment/Building	Amerace - Thomas & Betts Corporation	L-830-1, Isolation Transformer, 60Hz 30/45 Watts, 6.6/6.6A	9/19/2010
Type III Equipment/Building	Tenco Industries Inc.	202 LMM Snow Blower	8/27/2010
Type III Equipment/Building	Flash Technology	L-865, White Obstruction Lights	8/17/2010
Type III Equipment/Building	Rural Electric	L-854, Radio Controls	8/17/2010
Type III Equipment/Building	ADB Safegate	L-821, Airport Lighting Control Panel	8/7/2010

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Flash Technology	L-849, Runway End Identification Lights	6/21/2010
Type III Equipment/Building	Flash Technology	L-859, Flashing Omnidirectional Lights	6/21/2010
Type III Equipment/Building	Airport Lighting Company	L-880, Precision Approach Path Indicator	4/27/2010
Type III Equipment/Building	Airport Lighting Company	L-881, Abbreviated Precision Approach Path Indicator	4/27/2010
Type III Equipment/Building	Neubert Aero Corp	Dynamic Friction Decelerometer	4/27/2010
Type III Equipment/Building	Neubert Aero Corp	Dynamic Friction Tester	4/27/2010
Type III Equipment/Building	Rural Electric	L-821, Airport Lighting Control Panel	4/27/2010
Type III Equipment/Building	Rural Electric	L-890, Lighting Control & Monitoring System	4/27/2010
Type III Equipment/Building	Safe-Hit	L-853, Retroreflective Markers	3/20/2010
Type III Equipment/Building	Daimler	Freightliner M2 Carrier Vehicle	1/12/2010
Type III Equipment/Building	Millard Towers Limited	L-891 - Low Impact Resistant Structures	12/22/2009
Type III Equipment/Building	Millard Towers Limited	L-892 - Frangible Support Structure	12/22/2009
Type II - Insufficient Quantity and/or Quality	OCEM	L-852 S LED Taxiway Inpavement Lights	12/1/2009
Type III Equipment/Building	Prysmian Cables and Systems, Inc.	L-824, Underground Electrical Cables for Airfield Circuits	10/4/2009
Type III Equipment/Building	Airport Lighting Company	L-861 Runway & Taxiway Edge, Medium Intensity Lights	9/13/2009
Type III Equipment/Building	Airport Lighting Company	L-862, Runway Edge-Threshold-Stop Bar Lights	9/13/2009
Type III Equipment/Building	Strobe Approach Lighting Technology, LLC	L-849, Runway End Identification Lights	8/25/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Strobe Approach Lighting Technology, LLC	L-859, Flashing Omnidirectional Lights	8/25/2009
Type III Equipment/Building	LoneStar	P-632, Bituminous Pavement Rejuvenator	8/17/2009
Type III Equipment/Building	Pavement Rejuvenation International, LP	P-632, Bituminous Pavement Rejuvenator	8/16/2009
Type III Equipment/Building	Soundproof Windows	Single Hung 36 X 72 Window	8/14/2009
Type III Equipment/Building	ADB Safegate	L-828, Constant Current Regulators	7/28/2009
Type III Equipment/Building	ADB Safegate	L-829, Monitored Constant Current Regulators	7/28/2009
Type III Equipment/Building	ADB Safegate	L-890, Lighting Control & Monitoring System	7/28/2009
Type III Equipment/Building	Airfield Guidance Sign Manufacturers, Inc.	L-858, Runway & Taxiway Signs	7/28/2009
Type III Equipment/Building	Rural Electric	L-867, Non-Load Bearing Light Box	7/24/2009
Type III Equipment/Building	Rural Electric	L-868, Load Bearing Light Box	7/24/2009
Type III Equipment/Building	ADB Safegate	L-890, Lighting Control & Monitoring System	7/20/2009
Type III Equipment/Building	Olson Industries	L-867, Non-Load Bearing Light Box	7/19/2009
Type III Equipment/Building	Olson Industries	L-868, Load Bearing Light Box	7/19/2009
Type III Equipment/Building	Standard Signs, Inc.	L-858, Runway & Taxiway Signs	7/10/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-890, Lighting Control & Monitoring System	6/30/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Airport Lighting Equipment	L-867, Non-Load Bearing Light Box	6/29/2009
Type III Equipment/Building	Airport Lighting Equipment	L-868, Load Bearing Light Box	6/29/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-801, Beacons-Medium Intensity	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-802, Beacons-High Intensity	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-804 Holding Position Edge Light	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-806, Wind Cones-Fragible	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-807, Wind Cones-Rigid	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-823, Primary Connector Kits	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-828, Constant Current Regulators	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-829, Regulators, Constant Current with Monitor	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-830, Isolation Transformers, 60Hz	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-847, Circuit Selector Switch	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-852, Taxiway Inpavement Lights	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-858, Runway & Taxiway Signs	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-862, Runway Edge-Threshold-Stop Bar Lights	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-880, Precision Approach Path Indicator	6/28/2009
Type III Equipment/Building	Eaton Crouse-Hinds	L-881, Abbreviated Precision Approach Path Indicator	6/28/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Eaton Crouse-Hinds	L-884, Power & Control Unit	6/28/2009
Type III Equipment/Building	ADB Safegate	L-804, Holding Position Edge Light	6/26/2009
Type III Equipment/Building	ADB Safegate	L-807, Wind Cones-Rigid	6/26/2009
Type III Equipment/Building	ADB Safegate	L-810, Lights-Obstruction	6/26/2009
Type III Equipment/Building	ADB Safegate	L-827, Monitors-Regulator	6/26/2009
Type III Equipment/Building	ADB Safegate	L-828, Constant Current Regulators	6/26/2009
Type III Equipment/Building	ADB Safegate	L-829, Monitored Constant Current Regulators	6/26/2009
Type III Equipment/Building	ADB Safegate	L-847, Circuit Selector Switch	6/26/2009
Type III Equipment/Building	ADB Safegate	L-853, Retroreflective Markers	6/26/2009
Type III Equipment/Building	ADB Safegate	L-858, Runway & Taxiway Signs	6/26/2009
Type III Equipment/Building	ADB Safegate	L-861 Runway & Taxiway Edge, Medium Intensity Lights	6/26/2009
Type III Equipment/Building	ADB Safegate	L-862, Runway Edge-Threshold-Stop Bar Lights	6/26/2009
Type III Equipment/Building	ADB Safegate	L-880, Precision Approach Path Indicator	6/26/2009
Type III Equipment/Building	ADB Safegate	L-881, Abbreviated Precision Approach Path Indicator	6/26/2009
Type III Equipment/Building	ADB Safegate	L-884, Power & Control Unit	6/26/2009
Type III Equipment/Building	Halibrite	L-801, Beacons-Medium Intensity	6/23/2009
Type III Equipment/Building	Halibrite	L-802, Beacons-High Intensity	6/23/2009
Type III Equipment/Building	Halibrite	L-806, Wind Cones-Fragible	6/23/2009
Type III Equipment/Building	Halibrite	L-807, Wind Cones-Rigid	6/23/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

Waiver Type	Manufacturer	Product	Effective Date
Type III Equipment/Building	Halibrute	L-893, Lighted Visual Aid for Runway Closure	6/23/2009
Type III Equipment/Building	Manairco	L-801, Beacons-Medium Intensity	6/23/2009
Type III Equipment/Building	Manairco	L-828, Constant Current Regulators	6/23/2009
Type III Equipment/Building	Manairco	L-861 Runway & Taxiway Edge, Medium Intensity Lights	6/23/2009
Type III Equipment/Building	Multi-Electric	L-804, Holding Position Edge Light	6/23/2009
Type III Equipment/Building	Multi-Electric	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	6/23/2009
Type III Equipment/Building	Multi-Electric	L-862, Runway Edge-Threshold-Stop Bar Lights	6/23/2009
Type III Equipment/Building	Multi-Electric	L-880, Precision Approach Path Indicator	6/23/2009
Type III Equipment/Building	Multi-Electric	L-881, Abbreviated Precision Approach Path Indicator	6/23/2009
Type III Equipment/Building	DME	L-861 LED Runway & Taxiway Edge, Medium Intensity Lights	6/21/2009
Type III Equipment/Building	DME	L-862, Runway Edge-Threshold-Stop Bar Lights	6/21/2009
Type III Equipment/Building	Integro	L-830, Isolation Transformers, 60Hz	6/21/2009
Type III Equipment/Building	Jaquith Industries	L-867, Non-Load Bearing Light Box	6/21/2009
Type III Equipment/Building	Jaquith Industries	L-868, Load Bearing Light Box	6/21/2009
Type III Equipment/Building	Jaquith Industries	L-891 - Low Impact Resistant Structures	6/21/2009
Type III Equipment/Building	Jaquith Industries	L-892 - Frangible Support Structure	6/21/2009

Type I, II, III Equipment / Building, and IV Buy American Waivers Issued (As of 7/11/2023)

The following manufacturer's equipment was issued a Buy American Waiver under 49 U.S.C. 50101(b) and can be used on AIP Funded Projects.

The following components or subcomponents are steel or manufactured goods that have an FAA specification number and have been determined to be 1) 100% United States product and 2) produced in the United States.

Waiver Type	Manufacturer	Product	Effective Date
100% US and US Final Assembly	Integro MCB	L-823 Plug and Receptacle, Cable Connectors	6/10/2009
100% US and US Final Assembly	Industries MCB	EB-83 bolts	1/31/2011
100% US and US Final Assembly	Industries MCB	2-part washers (used with 3/8" x 16 by various length bolts)	10/14/2015
100% US and US Final Assembly	Industries	18-8 fasteners (various length bolts)	12/27/2016

GENERAL CIVIL RIGHTS PROVISIONS

In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

This provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the Contract.

CIVIL RIGHTS – TITLE VI ASSURANCES

Title VI Solicitation Notice

The State of Hawaii, Department of Transportation, Airports, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and no businesses will be discriminated against on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in consideration for an award.

Title VI List of Pertinent Nondiscrimination Acts and Authorities

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 USC § 2000d *et seq.*, 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973 (29 USC § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);
- The Age Discrimination Act of 1975, as amended (42 USC § 6101 *et seq.*) (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982 (49 USC § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987 (PL 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990 (42 USC § 12101, *et seq*) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;

- The Federal Aviation Administration’s Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations);
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs [70 Fed. Reg. 74087 (2005)];
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC § 1681, et seq).

Title VI Clauses for Compliance with Nondiscrimination Requirements

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”), agrees as follows:

1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.
3. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the contractor’s obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.
4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination

Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
 - a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or
 - b. Cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

CONTRACT WORK HOURS AND SAFETY STANDARDS ACT
REQUIREMENTS

1. Overtime Requirements.

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of \$29 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration (FAA) or the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this clause.

4. Subcontractors.

The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this clause.

DAVIS-BACON REQUIREMENTS

1. Minimum Wages.

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided* that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

- (ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination;
 - (2) The classification is utilized in the area by the construction industry; and
 - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting

officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers, or mechanics to be employed in the classification, or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program: *Provided* that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding.

The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the Contractor, Sponsor, Applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and Basic Records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and

social security number of each such worker; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid.

Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR § 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/agencies/whd/government-contracts/construction/payroll-certification> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (1) That the payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5 (a)(3)(i), and that such information is correct and complete;
- (2) That each laborer and mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly

wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;

- (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.
- (D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.
- (iii) The Contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, Sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR § 5.12.

4. Apprentices and Trainees.

- (i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in

accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (ii) Trainees. Except as provided in 29 CFR § 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination that provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) Equal Employment Opportunity. The utilization of apprentices, trainees, and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act Requirements.

The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

6. Subcontracts.

The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR §§ 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR § 5.5.

7. Contract Termination: Debarment.

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR § 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements.

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes Concerning Labor Standards.

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of Eligibility.

- (i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR § 5.12(a)(1).
- (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR § 5.12(a)(1).
- (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 USC § 1001.

COPELAND “ANTI-KICKBACK” ACT

Contractor must comply with the requirements of the Copeland “Anti-Kickback” Act (18 USC § 874 and 40 USC § 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled. The Contractor and each Subcontractor must submit to the Owner, a weekly statement on the wages paid to each employee performing on covered work during the prior week. Owner must report any violations of the Act to the Federal Aviation Administration.

ENERGY CONSERVATION REQUIREMENTS

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 USC 6201*et seq.*).

PROCUREMENT OF RECOVERED MATERIALS

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

1. The contract requires procurement of \$10,000 or more of a designated item during the fiscal year; or
2. The contractor has procured \$10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products.

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

- a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
- b) Fails to meet reasonable contract performance requirements; or
- c) Is only available at an unreasonable price.

RIGHTS TO INVENTIONS

Contracts or agreements that include the performance of experimental, developmental, or research work must provide for the rights of the Federal Government and the Owner in any resulting invention as established by 37 CFR part 401, Rights to Inventions Made by Non-profit Organizations and Small Business Firms under Government Grants, Contracts, and Cooperative Agreements. This contract incorporates by reference the patent and inventions rights as specified within 37 CFR §401.14. Contractor must include this requirement in all sub-tier contracts involving experimental, developmental, or research work.

VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 USC § 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

DISTRACTED DRIVING

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving", (10/1/2009) and DOT Order 3902.10, "Text Messaging While Driving", (12/30/2009), the Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or subgrant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$10,000 that involve driving a motor vehicle in performance of work activities associated with the project.

CLEAN AIR AND WATER POLLUTION CONTROL

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 USC §§ 7401-7671q) and the Federal Water Pollution Control Act as amended (33 USC §§ 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

Contractor must include this requirement in all subcontracts that exceed \$150,000.

**PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO
SURVEILLANCE SERVICES OR EQUIPMENT**

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to use and procurement of certain telecommunications and video surveillance services or equipment in compliance with the National Defense Authorization Act [Public Law 115-232 § 889(f)(1)].

SEISMIC SAFETY

The Contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART 0.F - DBE FORMS



Disadvantaged Business Enterprise (DBE) Contract Goal Verification and Good Faith Efforts (GFE) Documentation For Construction

Project #:	County:
DBE Project Goal:	Prime Contractor:

As required by the specifications “Disadvantaged Business Enterprise Requirements,” the dollar amount of each subcontract (both DBE and non-DBE firms) for all subcontractors, manufacturers, suppliers, and trucking companies is due by the close of business, 4:30 P.M. Hawaii Standard Time (HST) five (5) days after bid opening. **Failure to provide required information sufficient to evaluate the bid/proposal shall be cause for bid/proposal rejection.**

Calculation of the DBE contract goal for this project is the proportionate contract dollar value of work performed, materials, and goods to be supplied by DBEs. DBE credit shall not be given for mobilization, force account items, and allowance items. This DBE contract goal is applicable to all the contract work performed for this project and is calculated as follows:

1. DBE contract goal percentage = $\frac{\text{Contract Dollar Value of the work to be performed by DBE subcontractors and manufacturers, plus 60\% of the contract dollar value of DBE suppliers}}{\text{sum of all contract items (sum of all contract items is the total amount for comparison of bids less mobilization, force account items, and allowance items)}}$
2. The Department shall adjust the bidder’s/offeror’s DBE contract goal to the amount of the project goal if it finds that the bidder/offeror met the goal but erroneously calculated a lower percentage. If the amount the bidder/offeror submits as its contract goal exceeds the project goal, the bidder/offeror shall be held to the higher goal.

Name of Subcontractor, Supplier, Manufacturer, and Trucking Company	DBE (Y/N)	Bid Item Number and Description	Approx. Quantity/Hours	Unit	Unit Price/Rate	Dollar Amount

A. Dollar amount of the work to be performed by DBE subcontractors, manufacturers, and trucking companies, plus 60% of the dollar amount of DBE suppliers	
B. Sum of all work items less mobilization, force account items, allowance items	
A/B = DBE contract goal	

NAME and SIGNATURE of AUTHORIZED REPRESENTATIVE of PRIME CONTRACTOR: _____ DATE: _____

Summary of Good Faith Efforts (GFE)

As required by the specifications “*Disadvantaged Business Enterprise Requirements*,” documentation of GFE shall be submitted by the close of business, 4:30 P.M. HST five (5) days of bid opening. **The bidder/offeror shall respond to the following questions and describe efforts to obtain DBE participation whether or not the DBE project goal is met.** Responses must be sufficient to properly evaluate the bidder’s/offeror’s good faith efforts. Copies of correspondence return receipts, telephone logs, or other documentation will be required to support GFE. Attach additional sheets, if necessary. Based on responses given, HDOT shall make a determination of the bidders’ GFE. **Failure to provide required information sufficient to evaluate the bid/proposal shall be cause for bid/proposal rejection.**

1. Did you submit the required information by the close of business, 4:30 P.M. HST, five (5) days after bid opening (i.e. DBE name, address, NAICS code, description of work, project name, and number)?
2. Explain your GFE if any, to solicit through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform part or all of the work to be included under the contract.
 - a. Explain your GFE if any, to solicit the participation of potential DBEs as early in the procurement process as practicable.
 - b. Explain your GFE if any, to allow sufficient time for the DBEs to properly inquire about the project and respond to the solicitation.
 - c. Explain your GFE if any, to take appropriate steps to follow up with interested DBEs in a timely manner to facilitate participation by DBEs in this project.
3. Explain your GFE if any, to identify and break up portions of work that can be performed by DBEs in order to increase the likelihood that a DBE will be able to participate, and that the DBE goal could be achieved (e.g. breaking out contract items into economically feasible units to facilitate DBE participation even when you might otherwise prefer to self-perform these work items).
4. Explain your GFE if any, to make available or provide interested DBEs with adequate information about the plans, specifications, and requirements of the project in a timely manner, and assist them in responding to your solicitation.
5. Explain your GFE if any, to negotiate in good faith with interested DBEs. Evidence of such negotiations includes documenting:
 - a) the names, addresses and telephone numbers of DBEs that were contacted; b) a description of the information that was provided to DBEs regarding the plans and specifications; and c) detailed explanation for not utilizing individual DBEs on the project.
6. Did you solely rely on price in determining whether to use a DBE? If yes please explain. The fact that there may be additional or higher costs associated with finding and utilizing DBEs are not, by themselves, sufficient reasons for your refusal to utilize a DBE or

NAME and SIGNATURE of AUTHORIZED REPRESENTATIVE of PRIME CONTRACTOR:

DATE:

failure to meet the DBE goal, provided that such additional costs are not unreasonable. Also, the ability or desire to perform a portion of the work with your own forces, that could have been undertaken by an available DBE, does not relieve you of the responsibility to make good faith efforts to meet the DBE goal, and to make available and solicit DBE participation in other areas of the project to meet the DBE goal.

7. Did you reject DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities? If yes, please explain. The DBEs standing within the industry, membership in specific groups, organizations or associates, and political or social affiliation are not legitimate basis for the rejection or non-solicitation of bids from particular DBEs.
8. Explain your GFE to assist interested DBEs in obtaining bonding, lines of credit, or insurance.
9. Explain your GFE if any, to assist interested DBEs in obtaining necessary equipment, supplies, materials or related assistance or services.
10. If you selected a non-DBE over a DBE subcontractor, please provide the quotes of each DBE and non-DBE subcontractor submitted to you for work on the contract; and for each DBE that was contacted but not utilized for a contract, provide a detailed written explanation for each DBE detailing the reasons for not utilizing or allowing the DBE to participate in the contract.
11. Explain your GFE if any, to effectively use the services of available minority/women community organizations, minority/women business groups, contractors' groups, and local, state and federal minority/women business assistance offices or other organizations to provide assistance in recruitment and placement of DBEs.

NAME and SIGNATURE of AUTHORIZED REPRESENTATIVE of PRIME CONTRACTOR:

DATE:



**Disadvantaged Business Enterprise (DBE)
Contract Goal Verification and Good Faith Efforts (GFE)
Documentation For Construction
INSTRUCTIONS**

Project #	Self-explanatory
County	County where project is located
DBE Project Goal	Indicate DBE goal listed in the proposal on P-1
Prime Contractor	Name of prime contractor
Name of Subcontractor, Supplier, Manufacturer, and Trucking Company	Company name of subcontractor, supplier, manufacturer, or trucking firm
DBE (Y/N)	Y for yes and N for no
Bid Item Number and Description	Pay item and description
Approx. Quantity/ Hours	Self-explanatory
Unit	Unit of measure
Unit Price/ Rate	Self-explanatory
Dollar Amount	Total dollar amount committed to subcontractor, supplier, manufacturer, or trucking firm
A. Dollar amount of the work to be performed by DBE subcontractors, manufacturers, and trucking companies, plus 60% of the dollar amount of DBE suppliers	Total amount of DBE participation
B. Sum of all work items less mobilization, force account items, allowance items	List total of work items minus mobilization, force accounts and allowances. DBE credit shall not be given for mobilization, force account items, and allowance items.
A/B = DBE contract goal	Self-explanatory
Name and Signature of Authorized Representative of Prime Contractor	Self-explanatory (Note: bidder must sign and date every page of form.)
Date	Date form is signed
Summary of Good Faith Efforts (GFE)	Complete by answering questions in detail and providing documentation to support how bidder demonstrated good faith efforts to meet the goal, irrespective of whether or not the goal was met.



Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement Trucking Company

This commitment is subject to the award and receipt of a signed contract from the Hawaii Department of Transportation (HDOT) for the subject project. DBEs must be certified by the bid opening date.

Project #:	County:
NAICS CODE/DESCRIPTION OF WORK:	SECONDARY NAICS CODE:

*All quantities and units should match the bid tab item whenever possible.

The prime contractor shall inform HDOT the dates when the trucking firm starts and completes all work under the subcontract.

Estimated Beginning Date (Month/Year):	Estimated Completion Date (Month/Year):
---	--

TRUCKING COMPANY:	Item No.	Item Description	Unit	Unit Price / Rate	Amount
				\$	\$
				\$	\$
				\$	\$
TOTAL COMMITMENT AMOUNT					\$

1. Number of hours contracted or quantities to be hauled: _____
2. Number of fully operational trucks to be used: _____ Tractor/trailers: _____ Dump trucks: _____
3. Number of fully operational trucks owned by DBE: _____ Dump trucks: _____ Tractors/trailers: _____
4. If Owner Operators or additional trucking companies are to be used answer the following:

Name of Trucking Company	DBE Y/N	Estimated Dollar Amount to be Contracted	Number and Type of Trucks (specify)
		\$	
		\$	

The prime contractor certifies by signature on this agreement to utilize the DBE trucking company as listed on the agreement form. If a DBE trucking company is unable to perform the work as listed on this agreement form, the prime contractor will follow the substitution/replacement approval process as outlined in the contract DBE requirements. **IMPORTANT! The signatures of the DBE, prime contractor, and subcontractor (only if the DBE will be a second tier sub) confirms that all information on this Agreement is true and correct. Parties should sign Agreement in the order in which they are listed.**

DBE NAME:	Name/Title (please print):
Address:	Signature:
Phone: Fax:	
Email:	
Prime Contractor:	Name/Title (please print):
Address:	Signature:
Phone: Fax:	
Email:	
Subcontractor (only if the DBE will be a second tier sub):	Name/Title (please print):
Address:	Signature:
Phone: Fax:	
Email:	

HDOT retains the information collected through this form. With few exceptions, you are entitled on request to be informed about the information that we collect about you.



**Disadvantaged Business Enterprise (DBE)
Confirmation and Commitment Agreement
Trucking Company
INSTRUCTIONS**

The purpose of this agreement is to secure the commitment of the bidder/offeror to utilize the listed DBE trucking company, and the DBE's confirmation that it will perform work for the bidder/offeror on this project. The information on this form shall be provided by the DBE.

Project #	Self-explanatory
County	County where project is located
NAICS Code/Description of Work	Primary North American Industry Classification System code under which DBE is certified to perform and description of work to be done
Secondary NAICS Code	List other NAICS codes firm is certified to perform
Estimated Beginning Date (Month/Year)	Date DBE shall begin work on the project
Estimated Completion Date (Month/Year)	Date DBE's work will be completed
Trucking Company	Name of DBE trucking company
Item No.	List pay item number
Item Description	Description of item
Unit	Unit of measure – e.g. weight or hours
Unit Price/Rate	Cost per unit or hourly rate
Amount	Total amount per pay item
Total Commitment Amount	Sum of all pay items and total commitment of bidder/offeror to DBE
Number of hours contracted or quantities to be hauled	Approximate number of hours or tonnage to be hauled
Number of fully operational trucks to be used:	Total number of trucks to be used for the project
Tractor/Trailers	Number of tractor trailers to be used
Dump Trucks	Number of dump trucks to be used
Number of fully operational trucks owned by DBE	Number of listed DBE's trucks to be used on this project
Name of Trucking Company	If other trucking companies (DBE or non-DBE) are to be leased, list name and information about type of trucks in this section
Estimated Dollar Amount to be Contracted	Provide information about estimated cost to lease trucks
Number of Dump Trucks, Tractor/Trailer	Self-explanatory
DBE NAME	DBE Company name
Name/Title	Name and title of DBE's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of DBE's representative
Date	Date agreement is signed
Prime Contractor	Company name

Name/Title	Name and title of prime contractor's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of prime contractor's representative
Date	Date agreement is signed
Subcontractor (only if the DBE will be a second tier sub):	Name of subcontractor only if the listed DBE trucking company will be performing work under this subcontractor
Name/Title	Name and title of the subcontractor's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of subcontractor
Date	Date agreement is signed



Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement Subcontractor, Manufacturer, or Supplier

This commitment is subject to the award and receipt of a signed contract from the Hawaii Department of Transportation (HDOT) for the subject project. DBEs must be certified by the bid opening date.

Project #:	County:
NAICS CODE/DESCRIPTION OF WORK:	SECONDARY NAICS CODE:

*All quantities and units should match the bid tab item whenever possible.

The prime contractor shall inform HDOT of the dates when the subcontractor starts and completes all work under the subcontract.

Estimated Beginning Date (Month/Year):	Estimated Completion Date (Month/Year):
---	--

SUBCONTRACTOR:	Item No.	Item	Approx. Quantity	Unit	Unit Price	Amount
					\$	\$
					\$	\$
					\$	\$
					\$	\$
TOTAL COMMITMENT AMOUNT						\$

MANUFACTURER:	Item No.	Item	Approx. Quantity	Unit	Unit Price	Amount
					\$	\$
					\$	\$
TOTAL COMMITMENT AMOUNT						\$

SUPPLIER:	Item No.	Item	Approx. Quantity	Unit	Unit Price	Amount
					\$	\$
					\$	\$
TOTAL COMMITMENT AMOUNT						\$

The prime contractor certifies by signature on this agreement that subcontracts will be executed between the prime contractor and the DBE subcontractors as listed on the agreement form. If a DBE subcontractor is unable to perform the work as listed on this agreement form, the prime contractor will follow the substitution/replacement approval process as outlined in the contract DBE requirements. **IMPORTANT! The signatures of the DBE, prime contractor, and subcontractor (only if the DBE will be a second tier sub) confirms that all information on this Agreement is true and correct. Parties should sign Agreement in the order in which they are listed.**

DBE NAME:	Name/Title (please print):
Address:	Signature:
Phone: Fax:	
Email:	Date:
Prime Contractor:	Name/Title (please print):
Address:	Signature:
Phone: Fax:	
Email:	Date:
Subcontractor (only if the DBE will be a second tier sub):	Name/Title (please print):
Address:	Signature:
Phone: Fax:	
Email:	Date:

HDOT retains the information collected through this form. With few exceptions, you are entitled on request to be informed about the information that we collect about you.



Disadvantaged Business Enterprise (DBE) Confirmation and Commitment Agreement Subcontractor, Manufacturer, or Supplier INSTRUCTIONS

The purpose of this agreement is to secure the commitment of the bidder/offeror to utilize the listed DBE, and the DBE's confirmation that it will perform work for the bidder/offeror on this project. The information on this form shall be provided by the DBE.

Project #	Self-explanatory
County	County where project is located
NAICS Code/Description of Work	Primary North American Industry Classification System code under which DBE is certified to perform and description of work to be done
Secondary NAICS Code	List other NAICS codes firm is certified to perform
Estimated Beginning Date (Month/Year)	Date DBE shall begin work on the project
Estimated Completion Date (Month/Year)	Date DBE's work will be completed
Subcontractor	Name of DBE subcontractor (company name)
Item No.	List pay item number
Item	Description of item
Approx. Quantity	Self-explanatory
Unit	List unit of measure
Unit Price	Cost per unit
Amount	Total amount per pay item
Total Commitment Amount	Sum of all pay items and total commitment of bidder/offeror to DBE
Manufacturer	Name of DBE manufacturer
Supplier	Name of DBE supplier (aka regular dealer)
DBE NAME	DBE Company name
Name/Title	Name and title of DBE's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of DBE's representative
Date	Date agreement is signed
Prime Contractor	Company name
Name/Title	Name and title of prime contractor's representative
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of prime contractor's representative
Date	Date agreement is signed
Subcontractor (only if the DBE will be a second tier sub):	Name of subcontractor only if the listed DBE will be performing work under this subcontractor as a second tier subcontractor/supplier/manufacturer

Name/Title	Name and title of the subcontractor's representative that the listed DBE will work under as a second tier subcontractor/supplier/manufacture
Address	Self-explanatory
Phone	Self-explanatory
Fax	Self-explanatory
Email	Self-explanatory
Signature	Signature of subcontractor's representative
Date	Date agreement is signed

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART 0.G - SAMPLE FORMS

CONTRACT

THIS AGREEMENT, made this day _____, by and between the STATE OF HAWAII, by its Director of Transportation, hereinafter referred to as "STATE", and «CONTRACTOR», «STATE OF INCORPORATION», whose business/post office address is «ADDRESS» hereinafter referred to as "CONTRACTOR",

WITNESSETH: That for and in consideration of the payments hereinafter mentioned, the CONTRACTOR hereby covenants and agrees with the STATE to complete in place, furnish and pay for all labor and materials necessary for «PROJECT NAME AND NO».

or such a part thereof as shall be required by the STATE, the total amount of which labor, materials and construction shall be computed at the unit and/or lump sum prices set forth in the attached proposal schedule and shall be the sum of «BASIC»----- DOLLARS (\$«BASIC_NUMERIC») as follows:

TOTAL AMOUNT FOR COMPARISON OF BIDS.....\$«BASIC_NUMERIC»

K-1

which shall be provided from the following funds:

Federal Funds.....
State Funds.....
TOTAL AMOUNT.....

all in accordance with the specifications, the special provisions, if any, the notice to bidders, the instructions to bidders, the proposal and plans for «PROJECT NO ONLY», and any supplements thereto, on file in the office of the Director of Transportation. These documents, together with all alterations, amendments, and additions thereto and deductions therefrom, are attached hereto or incorporated herein by reference and made a part of this contract.

The CONTRACTOR hereby covenants and agrees to complete such construction within «WORKING DAYS», from the date indicated in the notice to proceed from the STATE, subject, however, to such extensions as may be provided for under the specifications.

For and in consideration of the covenants, undertakings and agreements of the CONTRACTOR herein set forth and upon the full and faithful performance thereof by the CONTRACTOR, the STATE hereby agrees to pay the CONTRACTOR the sum of «BASIC»-----DOLLARS (\$«BASIC NUMERIC») in lawful money, but not more than such part of the same as is actually earned according to the STATE's determination of the actual quantities of work performed and materials furnished by the CONTRACTOR at the unit or lump sum prices set forth in the attached proposal schedule. Such payment, including any extras, shall be made, subject to such additions or deductions hereto or hereafter made in the manner and at the time prescribed in the specifications and this contract.

An additional sum of «EXTRAS»-----DOLLARS (\$«EXTRA NUMERIC») is hereby provided for extra work and shall be provided from the following funds:

Federal Funds.....
 State Funds.....
 Total.....

Where Federal funds are involved, it is covenanted and agreed by and between the parties hereto that the sum of ----«FEDERAL BASIC»----DOLLARS (\$«FEDERAL BASIC NUMERIC») and ----«FEDERAL EXTRAS»----DOLLARS (\$«FEDERAL EXTRAS NUMERIC»), a portion of the contract price and extras, respectively, shall be paid out of the applicable Federal funds, and that this contract shall be construed to be an agreement to pay said sums to the Contractor only out of the aforesaid Federal funds if and when such Federal funds shall be received from the Federal Government, and that this contract shall not be construed to be a general agreement to pay said portions at all events out of any funds other than those which may be so received from the Federal Government; provided, that if the Federal share of the cost of the project is not immediately forthcoming from the Federal Government, the STATE may advance the CONTRACTOR the anticipated Federal reimbursement of the cost of the completed portions of the work from funds which have been appropriated by the STATE for its pro rata share.

All words used herein in the singular shall extend to and include the plural. All words used in the plural shall extend to and include the singular. The use of any gender shall extend to and include all genders.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed the day and year first above written.

STATE OF HAWAII

Director of Transportation

«CONTRACTOR»

Signature

Print name

Print Title

Date

PERFORMANCE BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

(Name and Street Address of Bonding Company)

as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____ DOLLARS (\$ _____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed a Contract with Obligee on _____, for the following project: _____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that:

If the Principal shall promptly and faithfully perform, and fully complete the Contract in strict accordance with the terms of the Contract as said Contract may be modified or amended from time to time; then this obligation shall be void; otherwise to remain in full force and effect.

Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

In the event of Default by the Principal, of the obligations under the Contract, then after written Notice of Default from the Obligees 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 Obligees 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 _____;

r11/17/98

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Performance Bond
Page-1

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

r11/17/98

LABOR AND MATERIAL PAYMENT BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

(Name and Street Address of Bonding Company)

as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____ Dollars (\$_____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed Contract with the Obligee on _____
_____ for the following project: _____

_____ hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to any Claimant, as hereinafter defined, for all labor and materials supplied to the Principal for use in the performance of the Contract, then this obligation shall be void; otherwise to remain in full force and effect.

1. Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

2. A "Claimant" shall be defined herein as any person who has furnished labor or materials to the Principal for the work provided in the Contract.

Every Claimant who has not been paid amounts due for labor and materials furnished for work provided in the Contract may institute an action against the Principal and its Surety on this bond at the time and in the manner prescribed in Section 103D-324, Hawaii Revised Statutes, and have the rights and claims adjudicated in the action, and judgment rendered thereon; subject to the Obligee's priority on this bond. If the full amount of the liability of the Surety on this bond is insufficient to pay the full amount of the claims, then after paying the full amount due the Obligee, the remainder shall be distributed pro rata among the claimants.

Signed this _____ day of _____, _____.

(Seal) _____

Name of Principal (Contractor)

* _____

Signature

Title

(Seal) _____

Name of Surety

* _____

Signature

Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND

KNOW 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 Obligeo 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 Obligeo, 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 Obligeo, 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

NOTARY CERTIFICATION

Subscribed and sworn before me this

Doc. Date: _____ # Pages: __

_____ day of _____

Notary Name: _____

Doc. Description: _____

Notary Public, _____ Judicial Circuit

State of Hawaii

My Commission Expires: _____

Notary Signature: _____

Date: _____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART I - GENERAL PROVISIONS FOR CONSTRUCTION PROJECT

(NOT PHYSICALLY INCLUDED)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PART II - TECHNICAL PROVISIONS

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010 - DESCRIPTION OF WORK

PART I - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Location of the work
2. Hours of work
3. Safety
4. Operation of airport facilities during construction
5. Disposal of excess soil materials
6. Construction stakes, lines and grades
7. Special project requirements

1.03 VEHICLE PARKING

Subject to availability of space and approval by the Airport Manager, parking may be made available at a designated parking structure for vehicle parking. The General Contractor shall submit the parking request to the Airport Manager through the State Engineer for review. The State Engineer will verify the list against the General Contractor's approved subcontractor list and forward it to Airport Manager for approval. Upon approval by the Airport Manager, two (2) temporary parking passes per subcontractor and 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.

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.

Additional parking passes beyond the temporary parking passes may be purchased at a monthly rate of \$100.00. These passes are subject to approval by the Airport Manager and availability of parking spaces. All costs associated with obtaining parking passes shall be the responsibility of the Contractor.

1.04 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

- A. Pending the availability of space on airport property, the State will issue Revocable Permit(s) to the Contractor for the use of the space, assessed at a monthly fee of \$25 for each Revocable Permit issued. The space(s) may be used for a field office, staging of materials and equipment, vehicle parking or other uses subject to the approval of the State. All spaces shall be subject to the requirements of Section 01561 - CONSTRUCTION SITE RUNOFF CONTROL PROGRAM.
- B. Since space on airport property is extremely limited, the State does not guarantee that space(s) provided to the Contractor will be in close proximity to the project site. 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.
- C. The Contractor shall be responsible to provide a minimum of two field office trailers. Each trailer shall be at a minimum twelve feet wide and forty feet long. One trailer shall be for the exclusive use of the Contractor with the second trailer for the exclusive use of the Construction Manager and the State Engineer. The Contractor shall provide each trailer with necessary utilities (electricity, air conditioning, phone and internet) and furniture (minimum three desks with chairs, two eight foot folding tables with ten chairs, and three-four drawer filing cabinets) as required for proper execution of the project. Computers, printers and associated hardware shall be provided by the Contractor for the Contractor trailer only. The Construction Manager shall be responsible for providing computers and printers for the use of the Construction Manager; however the Contractor will provide a high speed internet connection for the use of the Construction Manager

1.05 LOCATION OF THE WORK

- A. The work to be performed under this contract is located at Kahului Airport, Maui, Hawaii.
- B. Conditions:
 - 1. The Main Terminal and airport roadways shall remain operational at all times. Any damages to existing areas caused by the Contractor shall be repaired by the Contractor at no cost to the State.
 - 2. Upon award of the contract, the Contractor, at their cost, shall obtain all permits required for this project.

1.06 HOURS OF WORK

- A. Work can be performed at the construction site at any time over a 24-hour period without considerable disruption to airport operations or other adjacent

tenants. Noise, including demolition work, shall occur from 12:00 a.m. to 5:00 a.m., and water proofing shall be done from 1:30 p.m. to 10:00 p.m. Contractor shall coordinate other work activities with the State Engineer for the hours between 5:00 a.m. to 12:00 a.m. The Contractor shall discuss their work with Airport Operations prior to finalizing the schedule to determine the scope that needs to be done after hours. Submit a proposed construction schedule to State Engineer for review and approval within 14 calendar days prior to start of work. Work in progress can be rescheduled for after hours if it is deemed disruptive to Airport Operations. Odors, crane operations, concrete pours and concrete pumping operations, hazardous material testing and handling can also be considered disruptive and may require after hours work. The Contractor shall coordinate their schedule with the State 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 construction management consultant as authorized by the State shall be the Contractor's obligation to pay in accordance with Section 7.6 – "Overtime and Night Payment for State Inspection Services" of the General Provisions of Construction Projects (2016).

- B. Contractor shall clean work areas at the end of each working shift. Rubbish, loose materials, etc. shall be disposed of daily. **Tools and equipment shall not be left unattended during work hours.** This includes tools left in unlocked vehicles, in the bed of pickup trucks, or in unlocked job sites. TSA citations may result in fines in excess of \$13,000 per violation and the confiscation of AOA badges. Materials shall be safely secured and stored in an area designated by the Airport Manager.

1.07 SAFETY

- A. The Contractor shall take the necessary precautions to protect his workers and 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. Barricades and warning signs shall be erected by the Contractor in the work area to properly protect all personnel in the area.
- C. During the progress of the work debris, empty crates, waste, material drippings, etc., shall be removed by the Contractor at the end of each work day, and the work area shall be left clean and orderly.

1.08 OPERATION OF AIRPORT FACILITIES DURING CONSTRUCTION

- A. The Contractor shall coordinate the phases of work under this contract with the State 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 State Engineer. Damages to the existing utility facilities by the Contractor will be repaired at the Contractors expense.

- C. Outages for water, power, communications, air conditioning 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 5:00 a.m. The Contractor shall submit written requests to the State 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.

1.09 DISPOSAL OF EXCESS SOIL MATERIALS

- A. At the State Engineer' discretion, excess usable soil materials may be disposed of by filling areas within the Airport.
- B. Off-Site Disposal of Excess Soil Material

Any excess soil material and rubbish disposed of outside the Airport property shall be the responsibility of the Contractor. The Contractor shall make all arrangements and bear all costs involved therewith.

1.10 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. Existing horizontal and vertical survey control points for the project are shown on the plans. The Contractor shall verify the location of all control points prior to the start of construction.
- C. The Department will not be responsible for delays in setting stakes and marks.
- D. All control points and stakes or marks which the State Engineer may set shall be preserved by the Contractor. If such control points, stakes or marks are destroyed or disturbed by the Contractor, the cost of replacing such stakes or marks will be charged against the Contractor and deducted from payments due the Contractor.
- E. The Contractor shall be responsible for the placement and preservation of adequate ties to all control points whether established by the Contractor or by the State Engineer.

- F. All original, additional or replacement stakes, marks, references and batter-boards which may be required for the construction operations, shall be furnished, set and properly referenced by the Contractor. The Contractor shall be solely and completely responsible for the accuracy of the line and grade of all features of the work. Any errors or apparent discrepancies found in previous surveys, the plans and specifications shall be called to the State Engineer's attention by the Contractor for correction or interpretation prior to proceeding with the work.
- G. Before construction is started on any structure which is referenced to an existing structure or topographical feature, the Contractor shall check the pertinent locations and grades of the existing structures or topographical features to determine whether the locations and grades shown on the plans are correct.
- H. 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 State Engineer.
- I. All stakes and markers used for control staking shall be of the same quality as used by the Department for this purpose. For slope limits, pavement edges, gutter lines, et cetera, where so called "working" stakes are commonly used, stakes of different quality may be acceptable.
- J. 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.
- K. The Contractor shall furnish all necessary personnel, engineering equipment and supplies, materials, and transportation incidental to the accurate and satisfactory completion of this work.

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.

1.11 SPECIAL PROJECT REQUIREMENTS

- A. Upon receipt of the Contract, the Contractor shall process and return the Contract to the State's Contract Office within five (5) calendar days.
- B. The State intends to issue the Notice to Proceed immediately after execution of

the contract.

1.12 RELOCATION OF EXISTING SCULPTURE

- A. An existing bronze sculpture, located in the Central Courtyard, shall be relocated to the new building site. The work includes the Phase 1 relocation of the sculpture and related bronze plaque with stand. The existing stone-clad concrete base shall be demolished, existing concrete pavement shall be patched and repaired as required, and a new stone-clad concrete base shall be constructed at the new location. The relocation shall be performed at night to avoid disruption to the airport.

1.13 REINSTALLATION OF EXISTING TSA SCREENING EQUIPMENT AT THE EXISTING TSA CHECKPOINT

- A. The work at the existing checkpoint requires the TSA screening equipment to be removed and stored for the duration of the Phase 2 work at the existing TSA checkpoint. The removal and storage of existing screening equipment shall be part of contractor's bid price. After the Phase 2 work is completed, the reinstallation work of existing TSA equipment must be performed by qualified installer approved by the TSA and this work will be paid for by the allowance item.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section, except for Relocation of Existing Sculpture and Reinstallation of Existing TSA Screening Equipment at the Existing Checkpoint 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.

Work for relocation of existing sculpture will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for Reinstallation of Existing TSA Screening Equipment at the Existing Checkpoint required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall be allowed to include overhead, profit, insurances and/or any other mark-ups, as stipulated in Section 9.5 of the General Provisions.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
01010.1	Relocation of Existing Sculpture	Lump Sum
01010.2	Reinstallation of Existing TSA Screening Equipment at the ExistingTSA Checkpoint	Allowance

The allowance is an estimate, and the amount shall not exceed the maximum amount shown in the proposal schedule.

END OF SECTION

SECTION 01014 – WORK SEQUENCE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 TENANTS ADJACENT TO CONSTRUCTION AREA

- A. The User Agencies and their operations will be adjacent to the construction area throughout the construction period. The Contractor shall minimize inconvenience to them and their clientele and shall continue to provide the following for these occupants:
1. Continuity of utility services.
 2. Means of ingress and egress.
 3. All measures to ensure their safety and health.
 4. All measures to ensure the required security in the secure areas.
- B. Official communications and coordination with the User Agencies and operations shall be made through the State Engineer.

1.03 SEQUENCE OF WORK

- A. Work under the entire project shall be completed within specified calendar days from the date indicated in the Notice to Proceed from the State.
- B. Work shall proceed in tasks of construction to facilitate and ensure the continued operations and functions of the existing terminal facilities. Work to be accomplished within each task of construction is described and the areas affected are shown on drawings.

Each task of the work shall be completed within the specified number of calendar days. Specific language relating to the sequence of work is defined below.

1. **Scheduled Start Day:** The day designated as the beginning of a particular task; the number listed is the number of calendar days from which work for that particular task is to be completed.
2. **Completion Day:** The day designated as the end of a given task with completion and acceptance of work as assigned and shown in the drawings.
3. The total number of calendar days for all stages of work shall equal the number of calendar days established for the entire project.

- C. The work shall be performed in phases in the following order, with each phase substantially complete prior to commencement of the next phase. See the Drawings for more information.
1. Phase 1: Construction of the South TSA Checkpoint. The Work includes installation of site barricades and shifting of the SIDA line fence to make the greater portion of the work area "landside". Site clearing follows, along with the installation and relocation of site utilities. As site utilities are completed and connected, the existing utilities under the building can be demolished. Utilities must be kept operational during the construction to serve the airport. Foundation work starts and the steel frame is erected. Work shall start along the west and move east. As the work edges closer to the east towards the existing holdroom building, at least one lane of the access road (the portion located parallel to the holdroom building) must be kept operational. Flagmen shall be used to allow safe access for airport/airline staff through the work area at this access road. Work outside the construction barriers shall be performed off-hours unless approved in advance by the State Engineer. Work on the building enclosure starts. As the work progresses, the construction barricades shall shrink along the east to allow full use of the access road (two lanes) under the building. When both lanes of the access road are available, then the flagmen are no longer required. Work continues inside the building with systems and finishes being installed. Commissioning and training of the systems are completed, and the building is turned over to the Airport / TSA. TSA will train on the new equipment. After this training period is completed, Phase 2 can commence.
 2. Phase 2: Construction on the existing TSA Checkpoint. This checkpoint can only be closed for use after the South Checkpoint is operational. Barricades are installed. The existing security equipment is inventoried and moved off-site to the Contractor's secure location by the Contractor. Selective demolition of the existing checkpoint can begin, and the mechanical systems and new building enclosure (storefront system) are installed. Contractor shall phase the roofing demolition to minimize the time the building is without a roof. Contractor shall protect the existing structure with tarps, etc. during the time the building is without the roof. Work outside the construction barriers shall be performed off-hours unless approved in advance by the State Engineer. After the mechanical system is commissioned, then the security equipment can be brought back in and reconnected.
- D. Prior to commencement of the work for each phase, the Contractor shall submit a schedule detailing the sequence, commencement and completion dates for all phases of the work. The Contractor shall provide requested dates for Airport personnel and tenant personnel, including security forces to vacate facilities to be removed for all phases of the work within the submitted schedule. The Contractor shall provide the dates when completed facilities will be ready for occupancy by the Airport for all phases of the work within the submitted schedule.

1.04 OPERATION OF AIRPORT FACILITIES DURING CONSTRUCTION

- A. The Contractor shall coordinate all tasks of work under this contract with the Engineer to permit the continuing operation of existing airport facilities.
- B. The Contractor shall take precaution to protect people and property from injury and damage. Construction, including barricades as specified in Section 01533 - BARRICADES shall be sequenced to minimize the duration of disruption and appropriate signing be provided to aid the public and airport pedestrian and vehicular traffic around his work areas.
- C. The Contractor shall limit the delivery of materials and equipment and hauling of debris material during non-peak Airport operational hours. Contractor shall obtain prior approval of planned schedule of delivery of material and hauling of debris from the State Engineer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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 01210 - ALLOWANCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 GENERAL REQUIREMENTS

- A. This Section includes administrative and procedural requirements governing allowances. Certain materials, equipment, and services are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials, equipment, and services to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include contingency allowances.
- C. Related Sections include Divisions 1 through 16 Sections for items of Work covered by allowances.

1.03 SUBMITTALS

Submit in accordance with Section 01300 - SUBMITTALS.

- 1. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- 2. Submit invoices or delivery slips to show actual quantities of materials and equipment delivered to the site for use in fulfillment of each allowance.
- 3. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.04 COORDINATION

Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.05 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by State Engineer for State's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products, equipment, and services ordered by the State under the contingency allowance are included in

- the allowance and are not part of the Contract Lump Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
 - D. At Project closeout, credit unused amounts remaining in the contingency allowance to State by Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES

See Proposal Schedule for list of allowance and its respective specification sections.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 PROJECT DOCUMENTATION

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

At the discretion of the Project Manager, the number of copies to be submitted may differ from that specified in this Section.

1.03 DETAILED CONSTRUCTION SCHEDULE

- A. The Contractor shall submit a detailed construction schedule to the State Engineer for review, no later than 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 State Engineer on a weekly basis. The Contractor shall promptly inform the State Engineer of any proposed change in the schedule and shall furnish the State Engineer with a revised schedule and cash flow diagram within 15 calendar days after approval of such change.

The schedule shall be kept up to date, taking into account the actual progress of work and shall be updated, if necessary, every 30 calendar days. The updated schedule shall, as determined by the State 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.

Upon commencing work, the Contractor shall submit at the start of each week to the State Engineer for review, a detailed three (3) week construction schedule.

- C. If at any time during the progress of the Work, the Contractor's actual progress appears to the State Engineer to be inadequate to meet the requirements of the contract, the State 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 State 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 State Engineer nor the State Engineer'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 State 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.
- D. The Contractor shall submit to the State 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 State Engineer for review, no later than 30 calendar days after award of the Contract.
- B. Format and Content: Use Proposal Schedule and/or 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:

- A. Name, residence phone number, addresses and scope of authority for the

following persons:

1. Superintendent
 2. Contractor's authorized representative to sign documents
 3. Two (2) additional persons who can be contacted during non-working hours for emergencies.
 4. Field Office location and phone numbers (cellular, pager, fax, etc.)
- B. Name of Safety Officer
- C. Notice of Materials to be furnished
- D. Three (3) copies each of Certificates of Insurance. The State of Hawaii, Department of Transportation, Airports Division shall be named as additionally insured. The project number and project title shall be referenced in the Description of Operations/Locations/Vehicles. If canceled, 30 days written notice to the State of Hawaii must be given. If certificates are not correct, work cannot proceed.
- E. Three (3) copies each Insurance and Tax Rates.
- F. 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.
- G. List of equipment to be used on the job. Designate maximum working height and capacity of equipment involved and their respective rental rates.
- H. 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 State 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 State Engineer.
- B. The Contractor shall submit for review to the State Engineer, or to a representative designated by the State 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."

Items are to be reviewed prior to commencing fabrication or delivery of material to the job site.

- C. Each copy of the drawings, certificates, catalog cuts, and lists reviewed by the State Engineer will be stamped "REVIEW ACTION" with the appropriate action noted therein. The review of the State 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 State 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.

1.07 MAINTENANCE DATA AND OPERATING INSTRUCTIONS

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.

The Contractor shall submit a draft to the State Engineer for review prior to the submission of the final copies.

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.

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.

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.

All information shall be arranged in a logical, orderly sequence. Manuals submitted by the manufacturer will not be accepted.

1.08 TEST REPORTS

Six copies of test reports for any material used in this Contract shall be submitted when specified or required by the State 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:

B. _____
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 State 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

As-built drawings shall conform to the requirements of Section 5.8 - "Coordination Between the Contractor and the State" of the General Provisions for Construction Projects (2016), and the following requirements:

The Contractor shall maintain on the job site a 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. (Section 5.8 (a) Drawings and Special Provisions of the General Provisions for Construction Projects.)

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.

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.

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

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 State Engineer and shall be subject to approval before acceptance.

1.11 GUARANTEES

Guarantee periods shall start at time of acceptance in writing by the State.

All guarantees and warranties shall be made out to the "State of Hawaii." Supplier and subcontractor guarantees shall be co-signed by the Contractor.

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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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 01301 – CONTRACTOR'S CONSTRUCTION SCHEDULE AND REPORTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. It is expressly understood and agreed that the rate of progress and the time of completion of the Work are of the essence for this Contract. The Work shall be executed with such progress as required to prevent any delay to this contract and to other Contractors working on other contracts at the site. This includes the Contract milestone dates and constraints and the general completion of the Work of the Contract.
- B. The Work specified in this section includes the preparation and submittal of a Construction Progress Schedule and schedule updates and revisions to the Construction Progress Schedule.
- C. The Contractor shall prepare and submit a Baseline Construction Progress Schedule in accordance with the requirements of this section. By preparing and submitting the Baseline Construction Schedule and monthly Schedule Updates, the Contractor represents that it can and intends to safely execute the contracted Work and all portions thereof including all activities of Subcontractors, equipment vendors, and suppliers and including submittals and re-submittals within the specified times and constraints. The Contractor also represents that the Bid price covers all costs associated with the execution of the Work in accordance with the Construction Schedule and Contract Documents.

1.03 PURPOSE OF THE SCHEDULE

- A. This section specifies requirements and procedures for the Contractor to prepare construction schedules, cost loaded schedule, resource loaded scheduled, cash flow projections, manpower projection, and cost and schedule reports. The purpose of the schedules and reports shall be to:
 - 1. Ensure adequate planning and timely execution of the work by the Contractor;
 - 2. Establish a baseline Contract schedule which subsequent monthly schedule updates will be compared against to determine overall progress and performance towards satisfactory completion of the Project.
 - 3. Facilitate coordination and interfacing of the Contractor's work with others as needed;
 - 4. Assist the State Engineer in monitoring progress;

5. Establish the amount of the monthly progress payment to be made to the Contractor;
 6. Establish the amount of daily manpower required to complete the Project within the Contract duration;
 7. Evaluate proposed changes to the Contract and subsequent impacts to the construction schedule;
 8. Effectively determine impacts of time extensions and change order costs of this Contract to overall Project completion.
- B. The Contractor shall be required to provide and maintain at a minimum the following:
1. Monthly Requirement:
 - a. Construction schedule
 - b. Schedule of values for progress payment application
 - c. Cash flow projection
 - d. Manpower projection
 - e. Monthly status report (Narrative)

1.04 DEFINITIONS

- C. **Baseline Construction Progress Schedule:** The accepted baseline schedule for the construction Contract, demonstrating the planned activities, activity costs, resources and activity durations as the Project was bid.
- D. **Cash Flow:** For construction costs, reflects scheduled expenditures based on activity cost loading. This is the anticipated Contractor billings (gross) before the withholding of retention and is estimated by the Contractor.
- E. **Cost Loaded Schedule:** Allocating bid estimate cost to each schedule activity which forms the basis for anticipated Contractor billings (gross) before the withholding of retention and is estimated by the Contractor.
- F. **Early Finish:** The earliest a schedule activity is expected to finish, based on its relationship (logic) to other activities in the project.
- G. **Early Start:** The earliest a schedule activity is expected to start, based on its relationship (logic) to other activities in the project.
- H. **Late Finish:** The latest a schedule activity can finish, based on its relationship (logic) to other activities on the project, and still permit the project to be completed on time.
- I. **Late Start:** The latest a schedule activity can start, based on its relationship (logic) to other activities on the project, and still permit the project to be completed on time.

- J. Resource Loaded Schedule: A report that identifies by activity all direct field labor to perform the Work.
- K. Original Duration: The amount of time, in calendar days, an activity is expected to take to complete at the beginning of a project.
- L. Total Float: The number of days by which a part of the Work in the construction schedule may be delayed from its early start/finish dates without necessarily extending the contract completion date.
- M. Work Activity: An activity which requires time and resources to complete and should be performed before the Contract is considered complete.
- N. Critical Path: A continuous sequence of schedule network activities with the least amount of total float ending at a contract milestone.
- O. Longest Critical Path: A continuous sequence of schedule network activities that begins with notice to proceed milestone and ends at the project completion milestone.
- P. Milestone: A significant schedule event identified in the contract as a "milestone".
- Q. Critical Path Method (CPM): Schedule development that starts with a proper plan sequenced from beginning to end, followed by time driven forward and backward passes to establish (1) Critical Path and (2) Float for all other paths.

1.05 SUBMITTALS

- A. Work Breakdown Structure [WBS] and Activity Coding Plan
- B. Baseline Construction Progress Schedule
- C. Cost and Resource Loaded Schedule
- D. Monthly Updated Schedule Reports, including Narrative

1.06 QUALIFICATIONS

The Contractor shall employ or retain the services of a Project Scheduler who shall have a minimum of ten (10) years verifiable experience in construction work sequencing, productivity, and scheduling as well as preparing and maintaining detailed construction schedules using the most current version of Primavera P6. Within seven (7) calendar days after Administrative Notice to Proceed, the Contractor shall submit the Project Scheduler's resume to the State Engineer. The State Engineer reserves the right to reject the proposed scheduler based on the lack of qualifications. The Contractor's scheduler shall attend all meetings pertaining to scheduling of the Work. This person, along with the Contractor's management team, is expected to work closely with the State Engineer to deliver

acceptable products outlined in this section and comply with the Reports requirements of this section.

1.07 BASELINE CONSTRUCTION PROGRESS SCHEDULE REQUIREMENTS

- A. The Critical Path Method (CPM) type construction schedule will be used to monitor job progress. The Contractor shall be responsible for providing all information concerning the sequencing, logic, and duration of all activities as well as providing the initial CPM logic network (in electronic and paper form) diagram and tabular report data.
- B. The Contractor shall use Primavera P6 latest version, and a hardware system commensurate with the size of the project. The system shall be capable of handling, processing, printing, and plotting all data required to satisfy the requirements of this section. All electronic files submitted to the State Engineer shall be compatible with Primavera P6 latest version.
- C. Within fourteen (14) days after Administrative Notice to Proceed, the State Engineer shall schedule and conduct a preconstruction scheduling conference to commence development of the required construction schedule. At the meeting, the requirements of this section will be reviewed with the Contractor, the Contractor shall present their proposed methodology for the Construction Progress Schedule, sequence of operations, and resource and quantity loading methodology. The Contractor shall submit to the State Engineer a written copy of its proposed WBS and coding system or activity identification system for labeling all Work activities. The WBS and activity coding/identification scheme shall be acceptable to the State Engineer. The State Engineer shall review and accept the WBS, the coding structure, and activity identification system within fourteen (14) days after submission by the Contractor. The Contractor shall make all modifications to the proposed WBS, the coding structure, and activity identification system that are requested by the State Engineer and shall employ that coding, structure, and system in its Baseline Construction Progress Schedule submission. The WBS shall be correlated with the Contractor's Schedule of Values and the cost loaded schedule. Develop other activity codes and values needed to comply with the reporting requirements listed herewith, subject to acceptance by the State Engineer.
- D. The activities contained within the schedules shall be cost loaded to equal the Contract Total Price with Sub-Totals that match the Schedule of Values. Overhead and profit shall be prorated on all activities for the entire project length. The Contractor shall not unbalance the activity cost loading. Together, the Cost Loaded Schedule and the Schedule of Values shall form the basis for the Pay Application Report and all monthly payment requests.
- E. The Contractor shall collect data and information from subcontractors, suppliers, and equipment manufacturers for incorporation into the Baseline Construction Progress Schedule. The baseline schedule submittal shall include certification in the form of signatures from subcontractors, suppliers and equipment manufacturers validating data collected for schedule development.

- F. Within thirty (30) days after Administrative Notice to Proceed the Contractor shall submit the Baseline Construction Progress Schedule to the State Engineer including a written narrative to further explain the plan as set forth in its CPM logic network and schedule.
- G. The Work activities comprising the Baseline Construction Progress Schedule shall be of sufficient detail to assure adequate planning and execution of the Work such that, in the judgment of the State Engineer, it provides an appropriate basis for forecasting, monitoring, and evaluating the progress of the Work. Work activities shall conform to the following requirements:
1. Describe Work activities using consistent terminology such that the Work is readily identifiable for assessment of completion.
 2. Subdivide the Work into activities of duration no longer than fourteen (14) calendar days each, except as to non-construction activities (such as procurement of materials, delivery of materials, delivery of equipment, and concrete curing) and any other activities for which the State Engineer may approve a longer duration.
 3. The construction time as determined by the schedule from early start to late finish for any subphase, phase, or the entire project shall not exceed the Contract times specified or shown in the Contract Documents. One day shall be the smallest time unit shown unless otherwise directed by the State Engineer.
 4. Activities labeled "start," "continue," or "completion" will not be allowed. Logic relationships between activities shall be limited to finish to start type relationships. The use of durations between activities, or lags, shall not be permitted.
 5. Show the following information for each Work activity:
 - a. WBS and activity identification number consistent with the coding accepted by the State Engineer. The WBS and activity identification shall be cross-referenced with the Contractor's Schedule of Values.
 - b. Performance responsibility, subcontractor, trade code (GEN, MECH, ELEC, CARP, PLAST, etc.), and separate General Contractor identification.
 - c. Duration (in calendar days).
 - d. Work location code and description of the physical plant area involved.
 - e. Cost data as described herein.
- H. The Baseline Construction Progress Schedule shall contain the following standard milestones:
1. Notice to Proceed
 2. Mobilization
 3. Construction Start
 4. Contract Milestones and constraints in specification 01014 - Work Sequence for each phase of work.
 5. Substantial Completion

6. Final Completion
- I. The Baseline Construction Progress Schedule shall begin with the date of issuance of the Notice to Proceed and not exceed the maximum contract days provided by the Contract. It shall include, but not be limited to, the following items as appropriate to this Contract:
 1. Resource activity loading showing, at a minimum, the composite crew, the classification (e.g., foreman, journeyman, etc.) of the individual craftsman comprising the crew, materials, and equipment associated with each activity shown on the schedule, plus any other information required by State Engineer.
 2. Quantity loading for unit price bid items showing, at a minimum, estimated quantities to be installed or removed as indicated by the contract drawings, or as determined by the Contractor in preparation of its Bid, associated with major activities shown on the schedule, plus any other information required by State Engineer.
 3. Type of work to be performed, sequences, and labor trades involved, including performance responsibility and trade code.
 4. All purchases, submittals, submittal reviews, fabrication, deliveries, manufacturer factory tests, field tests, readiness tests, and installation activities for all materials and equipment for which the Contractor intends to seek payment, including stored materials.
 5. Delivery, installation, check-out/testing, startup, and commissioning of Owner-furnished equipment and/or materials in accordance with the schedule dates set forth in the Specifications or furnished by the Owner.
 6. State Engineer review, and approval of shop drawings and material samples showing a thirty (30) calendar day minimum time specified for the State Engineer's review of submittals, unless the submittal is of the type requiring a longer period of time. Twenty one (21) calendar days duration shall be allocated for the State Engineer's review of Contractor resubmittals.
 7. Approvals required by regulatory agencies or other third parties.
 8. Identification of all subcontract work and assignments of responsibility for performing specific activities.
 9. Access to and availability of work areas including all anticipated outages, flow diversions, or bypass pumping.
 10. Connection to all existing plant systems and equipment.
 11. All temporary utilities and construction.
 12. Interruption and shut down requests of facilities or utilities to allow for new connections.
 13. All start up, testing, training, and assistance required under the Specifications.
 14. Timing of the phased or total takeover by Owner.
 15. Identification of any manpower, material, or equipment restrictions, as well as any activity requiring unusual shift work, such as two (2) shifts, six (6) day weeks, overtime, or work at times other than regular days or hours, shall be clearly identified in the Construction Progress Schedule.
 16. Contractor activities that will be coordinated with Owner on-going activities.
 17. Contractor-obtained permits.

18. Material and Equipment Installation
 - a. Installation
 - b. Check out
 - c. Operations and Maintenance manuals submittal/approval
 - d. Training lesson plans submittal/approval
 - e. Training of Owner staff
19. Preparation of coordination and layout drawings.
20. Clearly identify all non-work days in the schedule, such as, holidays, or other non-work periods.
21. Specific Work activities, including but not limited to, site work, underground piping and electrical duct banks, structural excavation, soil testing, backfill, placement of sheeting, foundations, formwork erection, rebar placement, placing of concrete, stripping forms, concrete curing, installation of process piping, electrical conduits and wiring, instrumentation and controls conduits and wiring, terminations, other materials and equipment, and cleanup.
22. Time Allowance for Inclement Weather:
 - a. Normal weather conditions shall be considered and included in the planning and scheduling of all weather sensitive schedule activities. Thirteen (13) inclement weather days per calendar year shall be included in the baseline schedule.
 - b. Schedule activity duration(s) shall be formulated with allowance for normal weather conditions. Any activity which could be impacted by normally anticipated inclement weather (precipitation, temperature, wind, etc.), due to the time period which the Contractor has scheduled the work, shall include an adjustment to include the anticipated weather impact from normal weather conditions. "Inclement weather" is a lost workday, caused by inclement weather conditions, and is defined as a day in which the Contractor's workforce cannot work fifty (50) percent or more of the day thereby resulting in a delay to the critical path.
 - c. The total number of inclement weather days identified in paragraph 22. a. shall be reflected in a schedule activity titled "Inclement Weather". The duration for this activity shall be the total number of inclement weather days for the total contract time. The inclement weather activity's successor shall be the Project completion milestone. The predecessor activities shall be the last project activities that occur before Project completion. The Contractor shall notify the State Engineer in writing when a lost workday has occurred due to inclement weather in accordance with the Baseline Construction Schedule update requirements. As inclement weather days occur, are recognized and approved by the State Engineer as an inclement weather day, the inclement weather activity duration will be reduced to account for the approval of an inclement weather day. If the number of

actual inclement weather delay days exceeds the number of inclement weather delay days in paragraph 22. a., the Contractor shall notify the State Engineer in writing. Such delays shall not entitle the Contractor to any additional compensation. The sole remedy of the Contractor shall be to seek a non-compensable extension of time.

23. Punchlists.
 24. Final cleanup.
 25. Specific information required by the State Engineer.
 26. Required inspections by the Authority Having Jurisdiction and the State Engineer.
- J. The Contractor shall submit copies of detailed CPM network diagram of each of the following:
1. Predecessors/Successor Report showing the predecessor activities and successor activities for each activity in the Baseline Construction Progress Schedule, sorted by Early Start. This report shall flag any activity that has been constrained.
 2. Electronic file(s) containing all data related to the Baseline Construction Progress Schedule including PDF and XER format.
 3. Lists of planned submittals and procurement activities.
- K. The Baseline Construction Progress Schedule shall demonstrate the final level of detail for each activity and shall contain the required relationships completely identified and the durations of each activity correctly depicted. The Baseline Construction Progress Schedule shall be developed as follows:
1. The Baseline Construction Progress Schedule shall contain no Contract changes or delays which may have been incurred during the interim schedule development period. These changes will be entered at the first update after the Baseline Construction Progress Schedule has been accepted and a change to the Contract time or duration was made via an approved Change Order.
 2. The Baseline Construction Progress Schedule submitted for review and approval by the State Engineer shall be un-statused and the data date shall be the contract notice to proceed date.
 3. The Baseline Construction Progress Schedule shall clearly indicate the longest critical path of activities from Notice to Proceed to the Contract completion date.
 4. The Baseline Construction Progress Schedule will contain all cost information assigned each of the specific activities at the final level of detail. Each activity shall be cost loaded to permit initial generation of a cash flow curve and resource curve.
 5. The Contractor shall submit certification that the approved construction schedule has been reviewed and discussed with all subcontractors, suppliers and vendors as it relates to their work prior to commencement of their work.

6. Once the Baseline Construction Progress Schedule is accepted it becomes the schedule of record and the basis for future schedule updates.
 7. After the acceptance of the Baseline Construction Progress Schedule, no changes shall be made therein without approval of the State Engineer.
- L. Initial Baseline Construction Progress Schedule. Contractor's first (1st) payment application will be processed if the initial Baseline Construction Progress Schedule has been submitted by the Contractor and approved by the State Engineer. If the initial Baseline Construction Schedule has been submitted and is not approved at the time of the Contractor's first payment application, only mobilization costs as allowed pursuant to the General Conditions, and to the extent otherwise supported by the Contractor as due and owing, shall be paid by State Engineer.
- M. Monthly Updates to the Baseline Construction Progress Schedule. Contractor's monthly payment applications shall not be accepted and processed for payment by the State Engineer without Baseline Progress Schedule updates submitted in the time and manner required by this specification which accurately reflect the allowable costs due under the Contract Documents, and are accepted by the State Engineer.

1.08 RESOURCE LOADED SCHEDULE

- A. Contractor shall provide a Resource Loaded Schedule detailing the number of work force employees needed on a work day basis to complete the work within the contract duration.
- B. Any proposed changes to the Resource Loaded Schedule may only be made with the acceptance of the State Engineer.
- C. Manpower resources shall be listed in the Resource Library of the Primavera Software and the Contractor shall assign manpower resource loading by trade for each work activity of the schedule.

1.09 FLOAT OWNERSHIP AND EARLY COMPLETION

- A. Project float, total float, slack time, or contingency within the Construction Progress Schedule (i.e., the difference in time between the projected early completion date and the required Contract completion date), and free float or critical path float within the overall Construction Progress Schedule is not for the exclusive use of either State Engineer or the Contractor but is jointly owned by both and is an expiring resource available to and shared by both as needed to meet Contract milestones and the Contract completion date. Pursuant to the float sharing requirements of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times, or imposed dates shall be cause for rejection of the Construction Progress Schedule and any revisions or updates. The use of float time shall be shared as directed by the State Engineer.

- B. State Engineer-initiated changes that extend or shorten the Contract Times shall be the sole basis to adjust the Contract completion date. Delays in the critical path not associated with proper requests for time extensions in accordance with the General Conditions and General Requirements shall be deemed to be the responsibility of the Contractor.
- C. Any delays to the Contractor's early completion date shall be non-compensable and is considered Project Float which is not for the exclusive use of the Contractor or State Engineer. The interface and coordination with other contractors and stakeholders preclude acceptance of a zero float early finish schedule.
- D. The only allowable constraint for use in the construction schedule will be for contract milestone dates using a "Finish no later than" constraint, unless approved by the State Engineer.

1.10 PROGRESS OF THE WORK

Monthly Schedule Updates:

1. Once the Baseline Construction Progress Schedule is accepted by the State Engineer, the Contractor shall be responsible for preparing and submitting update information on logic, physical percent complete, cost percent complete, actual start and finish dates, duration changes, and related reports, diagrams, and schedules based on the Progress Payment cycle.
2. On a date determined by the State Engineer, the Contractor shall meet with the State Engineer to review the monthly progress schedule update. The Contractor and the State Engineer will review the updated construction schedule and discuss the content of the narrative report. The State Engineer shall be allowed seven (7) calendar days after the meeting to review and accept or reject the construction schedule update. Rejected construction schedule updates shall be resubmitted to the State Engineer within seven (7) days, at which time a new seven (7) day review period by the State Engineer will begin. Submittal at the monthly construction schedule update to the State Engineer shall be a condition precedent to the making of any payments, which are due or may become due under the terms of the Contract.
3. All subsequent monthly schedule updates shall be compared to the Baseline Construction Progress Schedule. In addition, each current monthly update shall be compared to the last month's update. Each update shall be labeled by period with data date and report date identified on the hard copy and electronic file.
4. The monthly update of the Baseline Construction Progress Schedule shall include the following:
 - a. One (1) electronic copy (PDF and XER) of the schedule, with data date and monthly period clearly marked.

- b. Four (4) copies and PDF of the CPM computer printout and arrow diagram which shall:
 - (1) Compare baseline schedule activities against current update activities.
 - (2) Clearly identify longest critical path and near critical path activities with less than thirty (30) days of total float.
 - c. Four (4) copies and PDF of the cash flow projections by month with early and late forecast schedule dates and actual partial payment amounts by CONTRACTOR and total project.
 - d. Four (4) copies and PDF of successor/predecessor, total float, and ninety (90) day look ahead reports.
 - e. Four (4) copies and PDF of the monthly summary cost activity report, oriented to the monthly payment requisition level of detail.
 - f. Four (4) copies of the narrative report.
5. Schedule Updates shall be provided monthly with the request for progress payment.
 6. Default progress data provided from the scheduling system shall not be allowed. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual start and finish dates in the Construction Progress Schedule database shall match those dates provided from the Contractor Daily Reports. Failure of the Contractor to document the actual start and finish dates on the Contractor Daily Report for every in-progress or completed activity and to ensure that the data contained on the Contractor Daily Reports is the sole basis for schedule updating shall result in the disapproval of the Contractor 's schedule and the inability of the State Engineer to evaluate the Contractor's progress for payment purposes.
 7. Activities that have reported progress without predecessor activities being completed, Finish Start Relationship (FS) (Out-of-Sequence Progress) will not be allowed except on a case-by-case basis with the approval from State Engineer. A written explanation of each activity shall be included in the monthly submittal. The State Engineer may direct that changes in schedule logic be made to correct any or all out-of-sequence Work.
 8. The Contractor shall identify each month any changes to the schedule, such as: new activities, constraint changes, deleted activities, activity duration changes, activity description changes, and changes in logic relationships between activities. Logic changes shall be described with an explanation of the rationale for the change provided in the report.
 9. The Contractor shall not constrain the schedule with artificial logic ties and/or constraint dates and/or any other scheduling techniques that may distort the activity float and total float associated with the critical path activities and the schedule in general.
 10. The Contractor shall provide a schedule report defining the times at which schedule work activity submittals are required. This submittal schedule shall be tied to early start/early finish and late start/late finish work activity dates to ensure that time has been allowed for review and return.

11. The updated construction progress schedule, as approved by the State Engineer, shall determine the amount of Progress Payment to the Contractor on a monthly basis. Change order work shall be identified in the schedule as a new activity inserted into the affected schedule logic. The schedule activity shall be cost loaded once the change order is approved for payment by State Engineer.

1.11 NARRATIVE PROGRESS REPORT

- A. Prepare a narrative progress report to be submitted with the monthly schedule update that summarizes cost and schedule status as outlined below.
- B. Prepare and submit a summary cost activity report with each progress payment. The cost information shall be updated by activity and summarized for each month. The sum of all monthly costs shall be equal to the contract amount plus approved change orders.
- C. The costs shall be summarized for each pay application and the sum of all pay applications shall be shown as costs to-date, along with the remaining contract balance.
- D. The Narrative Report shall include and be in the following format:
 1. The Contractor 's transmittal letter.
 2. Schedule report indicating each activity on the CPM Schedule that has been:
 - a. Completed during this reporting period;
 - b. In progress during this reporting period;
 - c. Scheduled for the next reporting period.
 3. Analysis, by critical path, of each negative path describing:
 - a. The nature of the critical path;
 - b. Impact on other activities, milestones, and completion dates;
 - c. Recommendations for recovery of the delays.
 4. Current and anticipated delays.
 - a. Cause of the delay;
 - b. Corrective action and schedule adjustments to correct the delay;
 - c. Impact of the delay on other activities, milestones, and completion dates.
 5. Change in construction sequence, logic changes, relationship changes, or duration changes and the rationale associated with each change.
 6. Pending issues and status of other items:
 - a. Permits;
 - b. Contract modifications;

- c. Time extension requests;
- d. Long-lead procurement items.

7. Tabular schedule reports tabulated by:

- a. Contractor /early start;
- b. Total float/early start;
- c. Area/early start;
- d. Activity number.

8. Added/deleted activities.

9. Out of Sequence Report describing the necessity of each activity relationship shown therein.

10. Illogical Progress/Restraint Reports (if any).

11. Contract complete date status.

12. Ahead of schedule and number of days.

13. Behind schedule and number of days.

14. Summary of project status including cumulative information to date, variance, and forecast at completion.

15. Other project or scheduling concerns.

16. Review and update of CPM Schedule.

17. Safety Reports and any code violations or warnings.

18. Computer disk containing the latest CPM schedule update file.

19. Provide a report of STATE ENGINEER activities such as; e.q. owner supplied equipment, shutdowns, permits, inspections, approvals, start-up and training activities, etc.

1.12 THREE (3) WEEK LOOK AHEAD

The Contractor shall provide a three (3) week look ahead schedule from the current Construction Progress Schedule, in Primavera report format which shall include the week in which the schedule is presented, plus the two (2) successive weeks thereafter. The three week (3) look ahead shall be submitted to the State Engineer no later than twenty four (24) hours prior to the weekly project progress meeting.

1.13 TIME EXTENSION REQUESTS

- A. Requests for time extensions shall be submitted in the time and manner specified in the General Conditions.
- B. Request for time extension shall be submitted within seven (7) calendar days of the event that created the extension of time.
- C. Time Impact Analysis (TIA):
 - 1. The Contractor shall submit a *Fragnet of the* TIA to the State Engineer with each request for an adjustment in contract time or when the Contractor or

the State Engineer consider an approved or anticipated change that may impact the critical path or contract progress.

2. The Contractor shall submit a TIA within seven (7) calendar days of receiving a request from the State Engineer.
3. The TIA shall illustrate the impact of each change or delay on the current scheduled completion date (or internal milestone) and utilize the baseline schedule as modified by change order(s) and a data date closest to and prior to the event being analyzed.
4. The TIA shall include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impacted schedule shows that incorporating the event modifies the critical path and the scheduled completion date of the accepted schedule, the difference between the scheduled completion dates of the two schedules shall be equal to the adjustment of contract time.
5. The Contractor shall allow the State Engineer seven (7) calendar days after receipt of a TIA to approve or reject the submitted TIA.
6. All approved TIA schedule changes shall be shown on the next schedule update schedule.
7. When a TIA is rejected by the State Engineer the Contractor shall meet with the State Engineer to discuss to discuss and resolve the issues. If an agreement is not reached, the Contractor shall be allowed within seven (7) calendar days after the meeting to submit a Notice of Claim. The Contractor shall not show any activities related to the TIA in any schedule updates until and if such time the TIA and or claim is approved by the State Engineer.
8. Changes that affect the controlling operation on the critical path will be considered by the State Engineer in decreasing time or granting an extension or deletion of time for completion of the contract. Time extensions will only be granted if the total float is absorbed and the scheduled completion date is delayed one or more days because of the ordered change.
9. Changes that do not affect the controlling operation on the critical path will not be considered as a basis for time adjustment.

1.14 REMEDIAL MEASURES AND RECOVERY SCHEDULE

- A. If at any time during the Project, the Contractor fails to complete a critical or near critical activity by its latest completion date, thereby causing potential delay to the contract completion date, the Contractor will be required, within seven (7) days, to submit to the State Engineer a written statement as to how and when it plans to recover the schedule delay. The recovery plan and schedule changes shall be reflected during the next schedule update period.
- B. Delays to Critical Path: Whenever it becomes apparent from the current monthly update that delays to the critical path have resulted and that these delays are through no fault of the State Engineer and hence, that the Contract completion date will not be met, or when so directed by the State Engineer, the Contractor shall submit to the State Engineer for review a written statement of the steps it

intends to take to remove or arrest the delay to the schedule. The Contractor shall promptly provide such level of effort to bring the Work back on schedule.

- C. Under no circumstances will the addition of equipment or construction forces, increasing the working hours or any other method, manner, or procedure to recover delays to the CPM Schedule be considered justification for contract modification or extra Work.
- D. The State Engineer may require the Contractor, at any time during the Project, to develop a more detailed schedule/fragnet than depicted in the detailed schedule to provide a clearer understanding of the effort needed to complete a specific area or task.

1.15 FINAL SCHEDULE UPDATE

- A. As a condition precedent to any release of retention, the last update to the Construction Progress Schedule submitted shall be identified by the Contractor as the As-Built Construction Schedule. The As-Built Construction Schedule shall reflect the exact manner in which the project or portion thereof was actually constructed including start and completion dates, activities, sequences, and logic ties.
- B. This schedule submission shall be accompanied by a certification, signed by an officer of the company and the Contractor's Project Manager and Project Scheduler, stating "To the best of our knowledge, the enclosed final update of the Construction Progress Schedule accurately reflects the actual start and completion dates and logical relationships of all activities contained herein and represents an accurate depiction of the way in which the project was constructed."

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 REQUIRED REPORTS

<u>Report No.</u>	<u>Report Description and Frequency</u>
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- | | |
|----|---|
| 1. | THE BASELINE CONSTRUCTION PROGRESS SCHEDULE CPM LOGIC DIAGRAMS shall be plotter drawn CPM logic diagrams and submitted on sheets 30 inches by 42 inches or as otherwise directed by the STATE ENGINEER. The activity box shall include, at a minimum, the following: activity number, activity description, original durations, total float, and activity constraints. The logic diagram shall be submitted until the Baseline Construction Progress Schedules are accepted. All CPM logic diagrams shall clearly identify all contract milestones and the projects longest critical path to project completion. |
|----|---|

2. **ACTIVITY LISTING SCHEDULE REPORT** sorted by Total Float (TF) and Early Start Date (ES): As part of Baseline Construction Progress Schedule Submittal and Monthly Schedule Updates
3. **CRITICAL PATH SCHEDULE REPORT** sorted by Total Float (TF) with logic ties shown: As part of Baseline Construction Progress Schedule Submittal and Monthly Schedule Updates
4. **THREE WEEK LOOK AHEAD SCHEDULE REPORT** sorted by Total Float (TF) with one week of history and three week look ahead: As part of Baseline Construction Progress Schedule Submittal and Monthly Schedule Updates
5. **RESOURCE LOADED SCHEDULE AND LISTING OF ALL LABOR RESOURCES**
As part of Baseline Construction Progress Schedule Submittal
6. **ACTIVITY LISTING** of all activities with all predecessor and successor activities shown: As part of Baseline Construction Progress Schedule Submittal and Monthly Schedule Updates
7. **PURE LOGIC DIAGRAM** network plot of all activities in predecessor diagram format: As part of Baseline Construction Progress Schedule Submittal
8. **COST LOADED ACTIVITY REPORT** without progress: As part of Baseline Construction Progress Schedule Submittal
9. **UPDATED COST LOADED REPORT WITH PROGRESS** and cost values shown: As part of Baseline Construction Progress Schedule Submittal and Monthly Schedule Updates
10. **COST CURVE (CASH FLOW CURVE)** sorted by early start and early finish dates: As part of Baseline Construction Progress Schedule Submittal and Monthly Schedule Updates
11. **RESOURCE HISTOGRAM**, per period and cumulative resource curves: As part of Baseline Construction Progress Schedule Submittal
12. **CONTRACTORS DAILY REPORTS**, submitted daily identifying the start and finish dates of schedule work activities and total number of men on the project per day and project weather condition and description of work performed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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 01352 – LEED REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This project has been designed to achieve LEED Silver Certification (minimum 50 points). This section includes general requirements and procedures for compliance with LEED Prerequisites and credits based on the LEED v4 Building Design and Construction rating system for New Construction and Major Renovation (LEED v4 for BD+C: NC).
- B. Compliance with requirements needed to obtain LEED Prerequisites and credits will be used as one criterion to evaluate substitution requests.
- C. Contractor shall be familiar with the relevant LEED requirements and provide the necessary information and instruction to all subcontractors and installers.
- D. This section summarizes the LEED credits requiring direct participation of the Contractor and subcontractors to achieve LEED certification.
 - 1. Some credits are dependent on proper performance by Contractor and subcontractors.
 - 2. Other credits involve quantifying percentages by weight and cost; these require careful recordkeeping and reporting by the Contractor.
- E. Related work specified in other sections. Sections that include requirements intended to achieve LEED credits include, but are limited to, the following:
 - 1. Section 01524 – CONSTRUCTION WASTE MANAGEMENT
 - 2. Section 01810 – COMMISSIONING REQUIREMENTS
 - 3. Divisions 2 through 16 - Materials Requirements - Product Information for LEED Submittals (multiple sections)
 - 4. LEED Checklist dated May 24, 2023. See Attachments.
 - 5. MR Credit Building Product Disclosure and Optimization - Environmental Product Declarations, MR Credit Building Product Disclosure and Optimization -Sourcing of Raw Materials, and MR Credit Building Product Disclosure and Optimization - Material Ingredients Forms

1.03 DEFINITIONS

- A. Definitions as written below are supplementary to all laws, statutes, and regulations effective in Alberta. Where definitions conflict, laws, statutes, and regulations take precedent over the definitions below.
- B. CFC: Chlorofluorocarbon. CFCs are halogenated substances that have a significant impact on the Earth's atmosphere as they are ozone depleting and contribute to global warming.
- C. Chain-of-Custody Certification - certificates signed by manufacturers certifying that wood used to make products was obtained from FSC certified forests. Certificates include evidence that mill is certified for chain-of-custody by FSC-accredited certification body.
- D. Carbon Dioxide Monitoring: A method for determining indoor air quality by using the concentration of carbon dioxide as an indicator. Although the level of CO₂ is a good general indicator of air quality, it is reliant on the presence of certain conditions and must be applied accordingly.
- E. Commissioning (Building): The process of ensuring installed systems function as specified, performed by a third-party Commissioning Authority. Elements to be commissioned are identified, installation is observed, sampling is conducted, test procedures are devised and executed, staff training is verified, and operations and maintenance manuals are reviewed.
- F. Construction and Demolition Waste: Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements. May contain lead, asbestos, or other hazardous substances.
- G. Construction Indoor Air Quality Management Plan: A systematic plan for addressing construction practices that can impact air quality during construction and continuing to occupation.
- H. Construction Site Recycling: See Construction Waste Management
- I. Construction Waste Management: General term for strategies employed during construction and demolition to reduce the amount of waste and maximize reuse and recycling. Construction waste management is a sustainable building strategy in that it reduces the disposal of valuable resources, provides materials for reuse and recycling, and can promote community industries.
- J. Energy Star: Program administered by the Environmental Protection Agency that evaluates products based on energy efficiency.
- K. Environmental Product Declaration (EPD): An Environmental Product Declaration is an independently verified and registered document that communicates transparent and comparable information about the life-cycle environmental impact of products.

- L. Fluorocarbons (FCs): Any of several organic compounds analogous to hydrocarbons in which one or more hydrogen atoms are replaced by fluorine. Once used in the United States as a propellant for domestic aerosols, they are now found mainly in coolants and some industrial processes. FCs containing chlorine are called chlorofluorocarbons (CFCs). They are believed to be modifying the ozone layer in the stratosphere, thereby allowing more harmful solar radiation to reach the Earth's surface.
- M. Flush-Out: A period after finish work and prior to occupation that allows the building's materials to cure and release volatile compounds and other toxins. A building flush-out procedure is normally followed, with specified time periods, ventilation rate, and other criteria.
- N. Forest Stewardship Council (FSC): A third-party certification organization, evaluating the sustainability of forest products. FSC-certified wood products have met specific criteria in areas such as forest management, labor conditions, and fair trade.
- O. Global Warming: An increase in the near surface temperature of the earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases. Scientists generally agree that the earth's surface has warmed by about 1 degree Fahrenheit in the past 140 years. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that increased concentrations of greenhouse gases are causing an increase in the earth's surface temperature and that increased concentrations of sulfate aerosols have led to relative cooling in some regions, generally over and downwind of heavily industrialized areas.
- P. Green Label: A certification program by the Carpet and Rug Institute for carpet and adhesives meeting specified criteria for release of volatile compounds.
- Q. Halon: Bromine-containing compounds with long atmospheric lifetimes whose breakdown in the stratosphere causes depletion of ozone. Halons are used in firefighting.
- R. Health Product Declaration (HPD): Created using the Health Product Declaration Open Standard, sponsored by the Health Product Declaration Collaborative (HPDC), HPD documents conform to a specific format, contain material content and health information about products.
- S. Heat Island Effect: A "dome" of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.
- T. HCFC - Hydrochlorofluorocarbon: HCFCs are generally less environmentally detrimental to depletion of stratospheric ozone than CFCs (chlorofluorocarbons). HCFCs are generally used to replace CFC's where

mandates require CFC's to be eliminated. A total ban on all CFC's and HCFCs is scheduled, effective 2030.

- U. HVAC: Heating Ventilation and Air Conditioning to provide thermal comfort and ventilation to building.
- V. Hydrocarbons (HC): Chemical compounds that consist entirely of carbon and hydrogen.
- W. Indoor Air Quality (IAQ): ASHRAE defines acceptable indoor air quality as air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which 80% or more people exposed do not express dissatisfaction.
- X. LEED: Leadership in Energy and Environmental Design. A voluntary, consensus-based, standard, measurement system designed for rating new and existing buildings based on accepted energy and environmental principles, striking a balance between knowledge, established practices, and emerging concepts. A performance-oriented system where points are earned for satisfying criterion in each of five categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. LEED promotes integrated and sustainable design practices. LEED® is a trademarked name.
- Y. LEED Accredited Professional (LAP): A professional who has successfully passed the LEED Accreditation exam and is knowledgeable in green building design practices.
- Z. Low VOC: Building materials and finishes that exhibit low levels of "off gassing," the process by which VOCs (Volatile Organic Compounds) are released from the material, impacting health and comfort indoors and producing smog outdoors. Low (or zero) VOC is an attribute to look for in an environmentally preferable building material or finish. See "Volatile Organic Compound (VOC)" for more information.
- AA. Organic Compound: Vast array of substances typically characterized principally as carbon and hydrogen, but that may also contain oxygen, nitrogen and a variety of other elements as structural building blocks.
- BB. Ozone Depletion: Destruction of the earth's ozone layer, which can be caused by the photolytic breakdown of certain chlorine- and/or bromine-containing compounds (e.g., chlorofluorocarbons), which catalytically decompose ozone molecules.
- CC. Post-Consumer Recycling: Use of materials generated from residential and consumer waste, raw material, or feedstock, for new product or similar purposes, e.g., converting wastepaper from offices into corrugated boxes or newsprint.

- DD. Post-Consumer Recycle Content: A product composition that contains some percentage of material that has been reclaimed from the same or another end use at the end of its former, useful life.
- EE. Post-Industrial Material: Industrial manufacturing process scrap or waste; also called pre-consumer material.
- FF. Post-Industrial Recycle Content: A product composition that contains some percentage of manufacturing waste material that has been reclaimed from a process generating the same or a similar product. Also called pre-consumer recycle content.
- GG. Pre-Consumer Materials/Waste: Materials generated in manufacturing and converting processes such as manufacturing scrap and trimmings and cuttings. Includes print overruns, over issue publications, and obsolete inventories.
- HH. Rapidly Renewable Materials - materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials include but are not limited to products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, and wool.
- II. Recycled Content - percentage by weight of constituents that have been recovered or otherwise diverted from solid waste stream, either pre-consumer or post-consumer.
 - 1. Waste and scraps from manufacturing process that are combined with other materials after minimal amount of reprocessing for use in further production of same product are not recycled materials.
 - 2. Discarded materials from one manufacturing process that are used as materials in another manufacturing process are pre-consumer recycled materials.
- JJ. Reuse: Using a product or component of municipal solid waste in its original form more than once. (e.g., refilling a glass bottle that has been returned or using a coffee can to hold nuts and bolts.)
 - 1. Reuse is a sustainable building strategy in that it:
 - a. Reduces the strain on both renewable and nonrenewable resources.
 - b. When materials are reused on or near the site of salvage, they reduce transportation-related environmental impacts.
- KK. VOC: (Volatile Organic Compound). Organic substances capable of entering the gas phase from either a liquid or solid form. VOCs are volatile enough to evaporate from material surfaces into indoor air at normal room temperatures (referred to as off-gassing). These substances are generally thought of to be harmful to both humans and the environment. They are common in and emitted by many building products over time throughout-gassing:

1. Solvents in paints and other coatings
 2. Wood preservatives; strippers and household cleaners
 3. Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
 4. When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- LL. Wastewater: The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.
- MM. Waste Management Plan: See Construction Waste Management

1.04 REFERENCES

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE); 1791 Tullie Circle, NE, Atlanta, GA 30329. Tel: (404) 636-8400. Fax: (404) 321-5478. www.ashrae.org
1. ASHRAE Guideline 0 - The Commissioning Process
 2. ASHRAE Guideline 1.1 - HVAC&R Technical Requirements for the Commissioning Process
 3. ASHRAE 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
 4. ASHRAE 55 - Thermal Environmental Conditions for Human Occupancy
 5. ASHRAE 62.1 - Ventilation for Acceptable Indoor Air Quality
 6. ANSI/ASHRAE/IES 90.1 – Performance Rating Method
 7. ASHRAE 129 - Measuring Air-Change Effectiveness
- B. ASTM International:
1. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
 2. ASTM E903 - Standard Test Methods for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrated Spheres.
- C. Center for Resource Solutions (CRS): Presidio Building, 49 P.O. Box 29512, San Francisco, CA 94129. Tel: (415) 561-2100. Fax: (415) 561-2105. www.resource-solutions.org or www.green-e.org.
- D. Green Seal: 1001 Connecticut Avenue, NW, Suite 827, Washington, DC 20036-5525. Tel: (202) 872-6400. Fax: (202) 872-4324. www.greenseal.org.
- E. South Coast Air Quality Management District (SCAQMD); 21865 E. Copley Drive, Diamond Bar, CA 91765. Tel: (909) 396-2000. www.aqmd.gov.

- F. U.S. Green Building Council (USGBC); 1015 18th Street, NW, Suite 805, Washington, DC 20036. Tel (202) 82-USGBC or (202) 828-7422. Fax: (202) 828-5110. www.usgbc.org.
- G. Carpet and Rug Institute: CRI Green Label Testing Program
- H. U.S. Green Building Council:
 - 1. LEED Reference Guide for Building Design and Construction v4 updated with addenda on July 25, 2019
 - 2. LEED v4 for BD+C: New Construction and Major Renovation Project Checklist (scorecard)
- I. Sheet Metal and Air Conditioning Contractor's National Association; www.smacna.org.

1.05 LEED ADMINISTRATION REQUIREMENTS

- A. The Consultant will apply for LEED Certification for the building through LEED Online.
- B. Submission criteria, and support documentation will be provided by the Contractor and assembled by the Consultant.
- C. Contractor and Subcontractors shall assist the Consultant to assemble complete and accurate information as part of the contract requirements and as their portion of work is undertaken.
- D. The State Engineer has established, with the design team, the general sustainable goals for design and for construction of the Project. The Contractor, Subcontractors, suppliers, and manufacturers shall assist the Consultant by making the required submissions and performing the required procedures to realize the State's sustainable goals.
- E. Contractor will be granted access to LEED Online, and will be required to fill out all construction related credits and forms on the website.

1.06 LEED SUBMITTALS

- A. General: Submit additional LEED-related submittals included in other Sections of the Specifications.
- B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.
- C. Project Materials Cost Data: Provide the necessary materials and cost data required for credit calculations on the LEED Materials Buyout Form (sample

available upon request to the LEED Consultant), including the total Project materials cost and itemized costs of specific materials being tracked for LEED credits. All material costs exclude labor and construction equipment, and the total materials cost is exclusive of Specialties, Conveying Systems and Mechanical and Electrical components.

D. LEED Action Plans: Within 30 days of Notice to Proceed, submit the following action plans to the Architect and the Owner:

1. Materials and Resources:

- a. MR Credit: Construction and Demolition Waste Management
 - 1) Prepare Construction Waste Management Plan in accordance with Section 01524 - Construction Waste Management
 - 2) Achieve one of the options for a minimum of one credit point: Waste Management goal for the project is 50%.
 - Option 1: Diversion (1-2 points)
 - Option 2: Reduction of Total Waste Material: (2 points) Do not generate more than 2.5 pounds of construction waste per square foot of the building's floor area
- b. MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations
 - 1) Achieve one of the options for a minimum of one credit point:
 - Option 1: Environmental Product Declaration (EPD) (1 point)
 - Option 2: Multi-Attribute Optimization. (1 point)
- c. MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials
 - 1) Achieve one of the options for a minimum of one credit point:
 - Option 1: Raw Material Source and Extraction Reporting. (1 point)
 - Option 2: Leadership Extraction Practices. (1 point)
- d. MR Credit: Building Product Disclosure and Optimization – Material Ingredients
 - 1) Achieve one of the options for a minimum of one credit point:
 - Option 1: Material Ingredient Reporting. (1 point)
 - Option 2: Material Ingredient Optimization.
 - Option 3: Product Manufacturer Supply Chain Optimization (1 point)

2. Indoor Environment Quality:

- a. EQ Credit: Construction Indoor Air Quality Management Plan
 - 1) Achieve one credit point
 - 2) Submit Construction Indoor Air Quality Management Plan prior to construction on site

- E. LEED Progress Reports: Submit with Applications for Progress Payments, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:
1. MR Credit Construction and Demolition Waste Management Planning. Submit Waste reduction progress reports in accordance with Section 01524 - Construction Waste Management
 2. MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point
 3. MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point
 4. MR Credit: Building Product Disclosure and Optimization – Material Ingredients. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point
- F. LEED Documentation Submittals:
1. Submit product data for roofing materials for Sustainable Sites Credit: Heat Island Reduction: Nonroof and Roof - indicating Energy Star compliance and emissivity rating to ASTM E408 (minimum initial reflectance and minimum 3-year-aged reflectance)
 1. Submit product data for lighting fixtures for Sustainable Sites Credit: Light Pollution Reduction. Submit data for interior and exterior lighting fixtures that stop direct-beam illumination from leaving the building site. Submit photos per credit requirements.
 2. Submit product data for plumbing fixture for Water Efficiency: Prerequisite: Indoor Water Use Reduction, WE Prerequisite: Building – Level Water Metering, Prerequisite: Outdoor Water Use Reduction, WE Credit: Outdoor Water Use Reduction, WE Credit: Indoor Water Use Reduction, WE Credit: Water Metering. Submit Data for plumbing fixtures indicating water consumption.
 3. Submit product data for Energy and Atmosphere Prerequisite: Fundamental Refrigerant Management. Include product data for new HVAC equipment indicating absence of CFC refrigerants.
 4. Submit product data for Energy and Atmosphere Credit : Enhanced Refrigerant Management. Submit product data for new equipment indicating low-impact refrigerants, or absence of refrigerants.
 5. Submit product data for Energy and Atmosphere Prerequisite: Building-Level Energy Metering. Submit product data and wiring diagrams for

sensors and data collection systems for metering of building energy consumption performance.

6. Submit waste diversion documentation for Materials and Resources Credit: Construction and Demolition Waste Management Planning. Submit Waste reduction progress reports in accordance with 01524 - Construction Waste Management
7. Submit product data for Materials and Resources Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point. Fill out the attached MR Credit Building Product Disclosure and Optimization - Environmental Product Declarations, MR Credit Building Product Disclosure and Optimization -Sourcing of Raw Materials, and MR Credit Building Product Disclosure and Optimization - Material Ingredients form for each product used.
8. Submit product data for Materials and Resources Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point. Fill out the attached MR Credit Building Product Disclosure and Optimization - Environmental Product Declarations, MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials, and MR Credit Building Product Disclosure and Optimization - Material Ingredients form for each product used.
9. Submit product data for Materials and Resources Credit: Building Product Disclosure and Optimization – Material Ingredients. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point. Fill out the attached MR Credit Building Product Disclosure and Optimization - Environmental Product Declarations, MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials, and MR Credit Building Product Disclosure and Optimization - Material Ingredients form for each product used.
10. Submit product data and shop drawings for Indoor Environmental Quality Prerequisite: Minimum Indoor Air Quality Performance. Submit product data and shop drawings for requirements of ASHRAE 62.1-2010
11. Provide submittals for Indoor Environmental Quality Credit Construction Indoor Air Quality Management Plan. Include the following:
 - a. Construction indoor air quality management plan
 - b. Product data for temporary filtration media
 - c. Product data for filtration media used during occupancy
 - d. Construction documentation submit description of utilized IAQ measures in accordance with Sheet Metal and Air Conditioning National Contractors Association (SMACNA), IAQ Guidelines for

Occupied Buildings under Construction, 2nd edition, 2007,
ANSI/SMACNA 008-2008, Chapter 3.

12. Submit product data for Indoor Environmental Quality Credit: Low-Emitting Materials: Submit product data for products used for compliance with [Product Category Calculations] [Budget Calculation Method]
13. Submit product data and shop drawing for Indoor Environmental Quality Credit: Interior Lighting. Submit product data and shop drawings for lighting system controls for minimum 90% of the building occupants
14. Submit product data and shop drawing for Indoor Environmental Quality Credit: Thermal Comfort. Submit design compliance to ASHRAE 55-2010. Submit product data and shop drawings for sensors and control systems used for individual airflow and temperature for minimum 50% of the building occupants

PART 2 - PRODUCTS

2.01 SALVAGED AND RE-FURBISHED MATERIALS

- A. MR Credit: Building Life-Cycle Impact Reduction
 1. Provide documentation of which option[s] will be followed, and a narrative on how the proponent will attain the credit points.
 - a. Option 2. Renovation of Abandoned or Blighted Building: Maintain at least 50%, by surface area, of the existing building structure, enclosure, and interior structural elements for buildings that meet local criteria of abandoned or are considered blight.
 - b. Option 3. Building and Material Reuse: Reuse or salvage building materials from off site or on site as a percentage of the surface area, as listed in Table 1. Include structural elements (e.g., floors, roof decking), enclosure materials (e.g., skin, framing), and permanently installed interior elements (e.g., walls, doors, floor coverings, ceiling systems).
 - c. Option 4. Whole-Building Life-Cycle Assessment: For new construction (buildings or portions of buildings), conduct a life-cycle assessment of the project's structure and enclosure that demonstrates a minimum of 10% reduction, compared with a baseline building.
- B. MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials
 1. The following materials shall be salvaged, refurbished or reused materials:

- a. TBD

2.02 SOURCING OF RAW MATERIALS

A. MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials

1. Provide appropriate documentation to meet the option[s] for the credit point[s]:
 - a. Option 1. Raw Material Source and Extraction Reporting: Use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers which include raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria
 - b. Option 2. Leadership Extraction Practices: Use products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project
 - 1) Extended producer responsibility. Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility
 - 2) Bio-based materials. Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard
 - 3) Wood products. Wood products must be certified by the Forest Stewardship Council or USGBC-approved equivalent.
 - 4) Materials reuse. Reuse includes salvaged, refurbished, or reused products
 - 5) Recycled content. Recycled content is the sum of postconsumer recycled content plus one-half the pre-consumer recycled content, based on cost
 - 6) Other USGBC approved programs meeting leadership extraction criteria

2.03 REGIONAL MATERIALS

A. MR Credit: Building Product Disclosure and Optimization – Material Ingredients

1. Provide appropriate documentation to meet the credit intent for
 - a. [Option 1. Environmental Product Declaration][and][or]
 - b. [Option 2. Multi-Attribute Optimization]

- B. MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials:
 - 1. Provide appropriate documentation to meet the credit intent for
 - a. [Option 1. Raw Material Source and Extraction Reporting][and][or]
 - b. [Option 2. Leadership Extraction Practices]

- C. MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw
 - 1. Provide appropriate documentation to meet the credit intent for
 - a. [Option 1. Material Ingredient Reporting][and][or]
 - b. [Option 2. Material Ingredient Optimization][and][or]
 - c. [Option 3. Product Manufacturer Supply Chain Optimization]

- D. For each MR credit: credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles of the project site are to be valued at 200% of their base contributing cost

2.04 LOW EMITTING MATERIALS

- A. EQ Credit: Indoor Environmental Quality, Low Emitting Materials
 - 1. Provide appropriate documentation to meet the credit intent for
 - a. Option 1. Product Category Calculations: Achieve the threshold level of compliance with emissions and content standards to achieve the credit points utilizing the seven product categories listed:
 - 1) Interior paints and coatings applied on site
 - 2) Interior adhesives and sealants applied on site (including flooring adhesive)
 - 3) Flooring
 - 4) Composite Wood
 - 5) Ceilings, walls, thermal, and acoustic insulation
 - 6) Furniture (include in calculations if part of scope of work)
 - 7) Healthcare and Schools projects only: Exterior applied products

 - b. Option 2. Budget Calculation Method: If some products in a category do not meet the criteria, project teams may use the budget calculation method. Each layer of the assembly, including paints, coatings, adhesives, and sealants, must be evaluated for compliance. The Budget Calculation Method organizes the building interior into six assemblies:
 - 1) Flooring
 - 2) Ceilings

- 3) Walls
- 4) Thermal and acoustic insulation
- 5) Furniture (include in calculations if part of scope of work)
- 6) Healthcare and Schools only: Exterior applied products

B. Emissions and Content Requirements:

1. To demonstrate compliance, a product or layer must meet all the following requirements, as applicable:
 - a. Inherently non-emitting sources. Products that are inherently non-emitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.
 - b. General emissions evaluation. Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010, or the German AgBB Testing and Evaluation Scheme (2010) using the applicable exposure scenario.
 - c. Additional VOC content requirements for wet-applied products. In addition to meeting the general requirements for VOC emissions within the General emissions evaluation, on-site wet-applied products must not contain excessive levels of VOCs, for the health of the installers and other trades workers who are exposed to these products. For projects in Alberta, methylene chloride and perchloroethylene may not be intentionally added in paints, coatings, adhesives, or sealants. To demonstrate compliance, a product or layer must meet the following requirements, as applicable:
 - 1) All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.
 - 2) All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, or comply with Canadian VOC Concentration Limits for Architectural Coatings, Regulations (SOR/2009-264).
 - 3) If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.
 - 4) If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

- 5) Composite wood evaluation. Composite wood, as defined by the California Air Resources Board, Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation, must be documented to have low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins. Salvaged and reused architectural millwork more than one year old at the time of occupancy is considered compliant, provided it meets the requirements for any site-applied paints, coatings, adhesives, and sealants.
- 6) Furniture evaluation: new furniture and furnishing items must be tested in accordance with ANSI/BIFMA Standard Method M7.1–2011. Comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 (for half credit, by cost) OR 7.6.2 (for full credit, by cost), using either the concentration modeling approach or the emissions factor approach. USGBC-approved equivalent testing methodologies and contaminant thresholds are also acceptable.

PART 3 - EXECUTION

3.01 SITE DISTURBANCE

- A. Sustainable Sites Prerequisite: Construction Activity Pollution Prevention:
 1. Create and implement an erosion and sedimentation control plan for all construction activities associated with the project. The plan must conform to the erosion and sedimentation requirements of the 2012 U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP) or local equivalent, whichever is more stringent.

3.02 CONSTRUCTION WASTE MANAGEMENT

- A. Materials and Resources Credit: Construction and Demolition Waste Management Planning:
 1. Develop and implement a Construction and Demolition Waste Management Plan. Provide a final report detailing all major waste streams generated, including disposal and diversion rates
 2. In accordance with Section 01524 – Construction Waste Management

3.03 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

A. Indoor Environmental Quality Credit: Construction Indoor Air Quality Management Plan:

1. Develop and implement a Construction Indoor Air Quality (IAQ) Management plan for the construction and preoccupancy phases of the building. The plan must address all the following:
 - a. During construction, meet or exceed all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3
 - b. Protect absorptive materials stored on-site and installed from moisture damage
 - c. Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, (or equivalent) are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer's recommendations
 - d. Prohibit the use of tobacco products inside the building and within 25 feet (7.5 meters) of the building entrance during construction
 - e. Additional Healthcare requirements to address:
 - 1) Moisture: Develop and implement a moisture control plan to protect stored on-site and installed absorptive materials from moisture damage.
 - 2) Particulates: Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, (or equivalent) are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer's recommendations.
 - 3) VOC's: Schedule construction procedures to minimize exposure of absorbent materials to VOC emissions.
 - 4) Outdoor Emissions: Outdoor activities that generate high VOC emissions, develop a plan to manage fumes and avoid infiltration to occupied spaces.
 - 5) Tobacco: Prohibit the use of tobacco products inside the building and within 25 feet (7.5 meters) of the building entrance during construction.
 - 6) Noise and vibration: Develop a plan applicable to the credit intent, to reduce noise emissions and vibrations from construction equipment and other nonroad engines.

- 7) Infection Control: For projects adjacent to occupied facilities or phased occupancy in new construction, follow the credit intent guidelines and standards to assess risk and to select mitigation procedures for construction activities.
- B. Indoor Environmental Quality Credit: Indoor Air Quality Assessment:
1. Select one of the following two options, to be implemented after construction ends and the building has been completely cleaned.
 - a. Option 1. Flush Out:
 - 1) Path 1. Before occupancy: Install new filtration media and perform a building flush-out by supplying a total air volume of 4,267,140 liters of outdoor air per square meter (14,000 cubic feet of outdoor air per square foot) of gross floor area while maintaining an internal temperature of at least 15°C (60°F) and no higher than 27°C (80°F) and relative humidity no higher than 60%.
 - 2) Path 2. During Occupancy: The space may be occupied only after delivery of a minimum of 1,066,260 liters of outdoor air per square meter (3,500 cubic feet of outdoor air per square foot) of gross floor area while maintaining an internal temperature of at least 15°C (60°F) and no higher than 27°C (80°F) and relative humidity no higher than 60%. Once the space is occupied, it must be ventilated at a minimum rate of 1.5 liters per second per square meter of outside air (0.30 cubic foot per minute (cfm) per square foot of outdoor air) or the design minimum outdoor air rate determined in EQ Prerequisite Minimum Indoor Air Quality Performance, whichever is greater. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 4,267,140 liters of outdoor air per square meter (14,000 cubic feet of outdoor air per square foot) has been delivered to the space.
 - b. Option 2. Air Testing: After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing following the credit intent requirements for all occupied spaces. Use current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated. Laboratories that conduct the tests for chemical analysis of formaldehyde and volatile organic compounds must be accredited under ISO/IEC 17025 for the test methods they use.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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



LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist

CD MAY 24, 2023

Project Name: South TSA Checkpoint, Kahului Airport
Date: MAY 24, 2023

Y ? N

Credit Integrative Process 1

5	0	11	Location and Transportation	16
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit LEED for Neighborhood Development Location	16
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Sensitive Land Protection	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit High Priority Site	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Surrounding Density and Diverse Uses	5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Access to Quality Transit	5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Bicycle Facilities	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Reduced Parking Footprint	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Green Vehicles	1

2	9	2	Materials and Resources	13
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Storage and Collection of Recyclables	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Construction and Demolition Waste Management Planning	Required
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Building Life-Cycle Impact Reduction*	5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Building Product Disclosure and Optimization - Environmental Product Declarations	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Building Product Disclosure and Optimization - Material Ingredients	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Construction and Demolition Waste Management	2

5	3	2	Sustainable Sites	10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Construction Activity Pollution Prevention	Required
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Site Assessment	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Site Development - Protect or Restore Habitat	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Open Space	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Rainwater Management	3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Heat Island Reduction	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Light Pollution Reduction	1

6	10	0	Indoor Environmental Quality	16
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Minimum Indoor Air Quality Performance	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Environmental Tobacco Smoke Control	Required
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Enhanced Indoor Air Quality Strategies	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Low-Emitting Materials	3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Construction Indoor Air Quality Management Plan	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Indoor Air Quality Assessment	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Thermal Comfort	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Interior Lighting	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Daylight*	3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Quality Views	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Acoustic Performance	1

1	8	2	Water Efficiency	11
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Outdoor Water Use Reduction	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Indoor Water Use Reduction	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Building-Level Water Metering	Required
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Outdoor Water Use Reduction	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Indoor Water Use Reduction	6
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Cooling Tower Water Use	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Water Metering	1

3	3	0	Innovation	6
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Innovation	5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit LEED Accredited Professional	1

15	3	15	Energy and Atmosphere	33
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Fundamental Commissioning and Verification	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Minimum Energy Performance	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Building-Level Energy Metering	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Fundamental Refrigerant Management	Required
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Enhanced Commissioning*	6
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Optimize Energy Performance	18
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Advanced Energy Metering	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Demand Response	2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Renewable Energy Production	3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Enhanced Refrigerant Management	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Green Power and Carbon Offsets*	2

4	0	0	Regional Priority	4
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Sensitive Land Protection	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Renewable Energy	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Optimize Energy Performance	1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Outdoor Water Use Reduction	1

41 36 32 TOTALS Possible Points: **110**
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

LEED Requirements
Attachments – LEED Checklist

Material Information

Enter product and material information for those included in MR Credit Building Product Disclosure and Optimization - Environmental Product Declarations, MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials, and MR Credit Building Product Disclosure and Optimization - Material Ingredients.

All permanently installed building products contributing toward credit compliance are required to be included in all building product disclosure and optimization credits. Optional products and materials, such as MEP, are not required to be included. However, if they are, they will be included consistently across all cost-based Materials and Resources credits.

Product and materials cost includes all taxes and expenses to deliver the material to the project site incurred by the contractor but excludes any cost for labor and equipment required for installation after the material is delivered to the site. Product and materials cost equals the cost per item multiplied by number of items purchased. The cost of salvaged, reused or reclaimed materials is either the actual cost paid or the replacement value, whichever is higher.

Material Description	CSI Div (optional)	Is the material structure or enclosure?	Description of Product	Manufacturer Name	Material Cost (\$)
Total value of sustainable materials (unweighted)					\$ -
Total materials cost					\$ -

Environmental Product Declarations

Complete all columns with applicable material data for the attempted options. If the option is not attempted, leave the column blank.

General Information (from Materials tab)				Option 1 Environmental Product Declaration			Option 2 Multi-Attribute Optimization			
Material Description	Description of Product	Manufacturer Name	Is the material structure or enclosure?	Material Cost	EPD Program Operator	EPD Type	Weighted EPD Value (\$)	Third Party Certification Program	Does the entire product meet local criteria?	Total Sustainable Criteria Value with Location Valuation Factor (\$)
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
										\$ -
Weighted number of products with EPD							0	Total sustainable criteria value with location valuation factor		\$ -

Sourcing of Raw Materials

Fill in all columns with applicable material data for all attempted options. If the option is not attempted, leave the column blank.

General Information (from Materials tab)				Option 1 Raw Material Source and Extraction Reporting		
Material Description	Description of Product	Manufacturer Name	Is the material structure or enclosure?	Material Cost (\$)	Corporate Sustainability Report Type	Weighted Sustainable Criteria Value (#)
Total value						0

Sourcing of Raw Materials

Fill in all columns with applicable material data for all attempted options. If the option is not attempted, leave the column blank.

General Information (from Material tab)		Option 2 Leadership Extension Practices																
Material Description	Manufacturer Name	Is this material a manufacturer or end-user?	Material Cost (\$)	Extended Producer Responsibility			Recycled Materials			Wood Products		Material Reuse		Recycled Content		Does the waste land on site?	Sustainable Criteria Value Subtotal (\$)	Total Sustainable Criteria Value (Material Factor Value) (\$)
				Extended Producer Responsibility Table Back Program Name	Percent Extended Producer Responsibility (%)	Sustainable Criteria Value (\$)	Percent Recycled Agriculture Network Reported (%)	Sustainable Criteria Value (\$)	Percent Recycled or Reused (%)	Sustainable Criteria Value (\$)	Percent Post-Consumer (%)	Sustainable Criteria Value (\$)	Percent Post-Consumer (%)	Sustainable Criteria Value (\$)				
Total value																		

Material Ingredients

Fill in all columns with applicable material data for all attempted options. If the option is not attempted, leave the column blank.

General Information (from Materials tab)				Option 1 Material Ingredient Reporting		Option 2 Material Ingredient Optimization			
Material Description	Description of Product	Manufacturer Name	Is the material structure or enclosure?	Material Cost (\$)	Type of Reporting	Certification Program	Does the entire product meet local criteria?	Sustainable Criteria Subtotal (\$)	Total Sustainable Criteria Value with Location Valuation Factor (\$)
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
								\$ -	\$ -
Total number of products								\$ -	\$ -
						0		\$ -	\$ -
Total sustainable criteria value with location valuation factor								\$ -	\$ -

SECTION 01400 – CONTRACTOR QUALITY CONTROL PROGRAM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 CONTRACTOR QUALITY CONTROL PROGRAM

A. GENERAL

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.

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.

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 accepted by the Engineer and State 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 by the Engineer and State Engineer.

The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer. All inspection and

test reports shall be stamped and signed by a licensed professional engineer.

B. DESCRIPTION OF PROGRAM

1. General Description. The Contractor shall establish a Quality Control Program to perform work quality inspections and control testing on all materials and items of work required by the technical specifications, including those performed by subcontractors. This program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The program shall be effective for control of all construction work performed under this Contract, 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.
2. Quality Control Program. The Contractor shall describe the Quality Control Program in a written document which shall be reviewed by the Engineer and State 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 within thirty (30) calendar days after the date of award.
3. The Quality Control Program shall be organized to address, as a minimum, the following items:
 - a. Quality control organization;
 - b. Submittals schedule;
 - c. Inspection Requirements;
 - d. Quality control testing plan;
 - e. Documentation of quality control activities; and
 - f. Requirements for corrective action when quality control and/or acceptance criteria are not met.
 - g. A listing of the definable features of work for the project.

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.

C. QUALITY CONTROL ORGANIZATION

The Contractor's Quality Control Program shall be implemented by the establishment of a separate organization that is not a part of the production organization. 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 program, including work quality inspection and control testing on materials 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.

The quality control organization shall consist of the following minimum personnel:

1. Contractor Quality Control System Manager. The CQCSM shall be a Licensed Engineer of the Contractor, or a consultant engaged by the Contractor. The CQCSM shall have a minimum of 10 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.

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 either be an engineer, engineering technicians, or experienced craftsman with qualifications in the appropriate fields and shall have a minimum of 7 years of experience in their area of expertise. The Quality Control Technician shall be on the project full time and shall have no production duties.

The quality control technicians shall report directly to the CQCSM and shall perform the following functions:

- a. Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by Section 1.05E.
 - b. Performance of quality control tests as required by the Contractor's program.
3. Staffing. 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.

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.

D. SUBMITTALS SCHEDULE

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.

E. INSPECTION REQUIREMENTS

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.

Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work.

Before any definable feature of work is started, the CQCSM shall notify the Engineer and State Engineer of such work at least 48 hours in advance. Upon notification, the Engineer or State 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 and State Engineer.

F. QUALITY CONTROL TESTING PLAN

As part of the overall Quality Control Program, the Contractor shall implement a quality control testing plan that the Contractor deems necessary to adequately control production and/or construction processes.

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., plant control, concrete cylinder tests);
3. Test type (e.g., concrete compressive strength);
4. Test standard (e.g., ASTM or AASHTO test number, as applicable);
5. Test results and adjustments made (e.g., to meet specification tolerance requirements; and,)
6. Responsibility (e.g., plant technician, independent lab).

The testing plan shall contain a statistically based procedure of random sampling for acquiring test samples in accordance with ASTM D 3665.

All quality control test results shall be documented by the Contractor as required by Section 1.02G.

G. DOCUMENTATION

The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that inspections or tests have been performed, including type, results of inspections or test; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and/or corrective actions taken.

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 and State Engineer.

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 and State 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. Compliance with approved submittals;
 - c. Proper storage of materials and equipment;
 - d. Proper operation of all equipment;
 - e. Adherence to plans and technical specifications;
 - f. Review of quality control tests; and
 - g. Safety inspection.

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.

The daily inspection reports shall be stamped and signed by the licensed professional engineer CQCSM. The Engineer and State Engineer shall be provided at least one copy of each daily inspection report on the workday following the day of record.

2. Test Reports. The Contractor shall be responsible for establishing a system which will record all off-site and on-site control test results. 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. Remedial action and retest results.

Test results shall be submitted to the Engineer and State Engineer within one (1) week of testing. The test reports shall be stamped and signed by the licensed professional engineer CQCSM.

H. CORRECTIVE ACTION REQUIREMENTS

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.

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.

I. SURVEILLANCE BY THE ENGINEER AND STATE ENGINEER

All items of material and equipment shall be subject to surveillance by the Engineer or State Engineer at the point of production, manufacture or shipment.

Off-site or on-site surveillance by the Engineer or State Engineer does not relieve the Contractor of performing quality control inspections of either the Contractor's or subcontractor's work.

J. NONCOMPLIANCE

The Engineer or State 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 authorized representative at the site of the work, shall be considered sufficient notice.

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 or State Engineer the Engineer or State Engineer may:

1. Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors in accordance with Section 8.4 – "Character and Proficiency of Workers" of the General Provisions for Construction Projects (2016).
2. Order the Contractor to stop operations in accordance with Section 8.10 – "Suspension of Work" of the General Provisions for Construction Projects (2016).
3. Determine work performed by the Contractor during periods of noncompliance to be unacceptable and subject to removal or non-payment in accordance with Section 5.12 – "Removal of Non-Conforming and Unauthorized Work: Performance of Corrective or Remedial Work" of the General Provisions for Construction Projects (2016).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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 01500 - TEMPORARY WATER POLLUTION,
DUST, AND EROSION CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

A. This section describes the requirements for temporary water pollution, dust, and erosion control.

1. Including detailed plans, diagrams, and written site-specific best management practices (BMP); constructing, maintaining, and repairing temporary water pollution, dust, and erosion control measures at the project site, including local material sources, work areas and haul roads; removing and disposing hazardous wastes; control of fugitive dust (defined as uncontrolled emission of solid airborne particulate matter from any source other than combustion); and complying with applicable State and Federal permit conditions.
2. Work associated with dewatering activities and complying with conditions of the National Pollutant Discharge Elimination System (NPDES) general permit coverage authorizing discharges associated with construction activity dewatering.

Requirements of this section also apply to borrow pit operations, haul roads and Contractor's storage sites located outside of the project site.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. The Contractor shall submit the following items within 30 calendar days after the Notice to Proceed Date:
 1. Submit proposed means, methods, techniques and procedures to be used for temporary water pollution, dust and erosion control.
 2. Submit Best Management Practice to ensure dust/water and construction debris does not enter the drainage system within Airport property in compliance with the current Airport's Division NPDES permit.

PART 2 – PRODUCTS

2.01 MATERIALS

Materials shall conform to the following:

- A. Slope Drains. Slope drains may be constructed of pipe, fiber, mats, erosion control fabric, geotextiles, rubble, portland cement concrete, bituminous concrete, plastic sheets, or other materials acceptable to the State Engineer.
- B. Mulches. Mulches shall be recycled materials include bagasse, hay, straw, wood cellulose, bark, wood chips, or other materials acceptable to the State Engineer. Mulches shall be clean and free of noxious weeds and deleterious materials.
- C. Grass. Grass shall be a quick growing species such as rye grass, Italian rye grass, or cereal grasses. Grass shall be suitable to the area and provide a temporary cover that will not compete later with permanent cover. Alternative grasses are allowable if acceptable to the State Engineer.
- D. Fertilizer and Soil Conditioners. Fertilizer and soil conditioners shall be a standard commercial grade acceptable to the State Engineer.
- E. Hydro-mulching. Hydro-mulching used as a BMP shall consist of materials in the following subsections of the 2005 Standard Specifications for Road and Bridge Construction: Subsections 209.02(B) - Mulches, 209.02(C) - Grass, and 209.02(D) –Fertilizer and Soil conditioners, with potable water meeting the requirements of Subsection 712.01 - Water. Installation and other requirements shall in accordance with portions of Section 641- Hydro-Mulch Seeding.
- F. Berms. Berms shall be gravel or sand wrapped with geotextile material. Alternate materials are allowable if acceptable to the State Engineer.
- G. Catch Basin Inlet Protection. To be “True Dam” sediment filter by Dandy Products, Inc. or approved equal.
- H. Compost Filter Sock. To be “Filtrex Siltsoxx” or approved equal. To be a minimum of 12-inches in diameter and filled with sanitized mature compost. The filter socks shall be staked with 2”x2” wooden stakes or #4 steel rebar with safety cap at a minimum of 10-feet on center when placed on unpaved surfaces only.
- I. Grate Inlet Protection. Filter fabric to be Mirafi 140 or approved equal.
- J. Stabilized Construction Entrance. Filter fabric shall be Mirafi 600X or approved equal. Aggregate shall be basalt material 1”-3” coarse aggregate or larger (7” max.).

- K. Alternative materials or methods to control, prevent, remove and dispose pollution are allowable if acceptable to the State Engineer.

PART 3 - EXECUTION

3.01 PRECONSTRUCTION REQUIREMENTS

- A. Water Pollution, Dust, and Erosion Control Meeting. Submit site specific BMP to the State Engineer. Schedule a water pollution, dust, and erosion control meeting with the State Engineer after site specific BMP is accepted in writing by the State Engineer. Meeting shall be scheduled 14 days before start of construction work. Discuss sequence of work, plans and proposals for water pollution, dust, and erosion control.
- B. Water Pollution, Dust, and Erosion Control Submittals. Submit the following:
 - 1. Written site-specific BMP describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems. BMP shall include the following:
 - a. An identification of potential pollutants and their sources.
 - b. A list of all materials and heavy equipment to be used during construction.
 - c. Descriptions of the methods and devices used to minimize the discharge of pollutants into State waters, drainage or sewer systems.
 - d. Details of the procedures used for the maintenance and subsequent removal of any erosion or siltation control devices.
 - e. Methods of removing and disposing hazardous wastes encountered or generated during construction.
 - f. Methods of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydrodemolition water.
 - g. Spill control.
 - h. Fugitive dust control, including dust from grinding, sweeping, or brooming off operations or combination thereof.
 - i. Methods of storing and handling of oils, paints and other products used for the project.
 - j. Material storage and handling areas, and other staging areas.
 - k. Concrete truck washouts.

- l. Concrete waste control.
 - m. Fueling and maintenance of vehicles and other equipment.
 - n. Tracking of sediment offsite from project entries and exits.
 - o. Litter management.
 - p. Toilet facilities.
 - q. Other factors that may cause water pollution, dust and erosion control.
2. Provide plans indicating location of water pollution, dust and erosion control devices; provide plans and details of BMPs to be installed or utilized; show areas of soil disturbance in cut and fill, indicate areas used for storage of aggregate (indicate type of aggregate), asphalt cold mix, soil or waste, and show areas where vegetative practices are to be implemented. Indicate intended drainage pattern on plans. Include separate drawing for each phase of construction that alters drainage patterns. Indicate approximate date when device will be installed and removed.
 3. Construction schedule.
 4. Name(s) of specific individual(s) designated responsible for water pollution, dust, and erosion controls on the project site. Include home and business telephone numbers, fax numbers, and e-mail addresses.
 5. Description of fill material to be used.

Date and sign BMP. Keep accepted copy on site throughout duration of the project. Revisions to the BMP shall be included with original BMP. Modify contract documents to conform to revisions. Include actual date of installation and removal of BMP. Obtain written acceptance by the State Engineer before revising BMP.

Follow guidelines in the "Best Management Practices Manual for Construction Sites in Honolulu", in developing, installing, and maintaining BMPs for all projects. Follow Honolulu's City and County "Rules for Soil Erosion Standards and Guidelines" for all projects on Oahu. Use respective Soil Erosion Guidelines for Maui, Kauai and Hawaii projects.

- C. Construction Requirements. Do not begin work until submittals detailed in Item 3.01, paragraph B. "Water Pollution, Dust, and Erosion Control Submittals" are completed and accepted in writing by the State Engineer.

Install, maintain, monitor, repair and replace site-specific BMP measures, 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 hydrodemolition water.

Furnish, install rain gage in a secure location for projects that require NPDES permit from the Department of Health prior to field work including installation of site-specific BMP. Provide rain gage with a tolerance of at least 0.05 inches of rainfall, and an opening of at least 1-inch diameter. Install rain gage on project site in an area that will not deter rainfall from entering the gate opening. Maintain rain gage and replace rain gage that is stolen, does not function properly or accurately, is worn out, or needs to be relocated. Do not begin field work until rain gage is installed and site specific BMPs are in place.

Address all comments received from the State Engineer.

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

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

Limit maximum surface area of earth material exposed at any time to 300,000 square feet. Do not expose or disturb surface area of earth material (including clearing and grubbing) until BMP measures are installed and accepted in writing by State Engineer. Protect temporarily or permanently disturbed soil surface from rainfall impact, runoff and wind before end of workday.

Protect exposed or disturbed surface area with mulches, grass seeds or hydromulch. Spray mulches at a rate of 2,000 pounds per acre. Add tackifier to mix at a rate of 85 pounds per acre. Apply grass seeds at a rate of 125 pounds per acre. For hydromulch use the ingredients and rates required for mulches and grass seeds.

Apply fertilizer to mulches, grass seed or hydromulch at a rate of 450 pounds per acre. Apply an additional 250 pounds per acre every 90 calendar days.

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

BMP measures shall be in place and operational (such as shaping the earthwork to control and directing the runoff) at the end of workday. Shaping earthwork may include constructing earth berms along the top edges of embankments if acceptable to the State Engineer.

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

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

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. Placing an 8- to 15-inch layer of excavated rock, if available on-site, without reducing the cross section of the drainageway. Rocks shall be less than four inches in diameter.
3. Installing check dams and salutation control devices.
4. Other methods acceptable to the State Engineer.

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

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

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

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

Properly maintain all BMP features. Inspect, prepare a written report, and make repairs to BMP measures at following intervals:

1. Weekly during dry periods.
2. Within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period.
3. Daily during periods of prolonged rainfall.
4. When existing erosion control measures are damaged or not operating properly as required by site specific BMP.

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

Maintain records of inspections of BMP work. Keep continuous records for duration of the project. Submit weekly copy of records to the State Engineer.

In addition to weekly reports, submit to the State Engineer all amounts spent initializing and maintaining BMP during previous week. Amount spent includes, but is not limited to: purchases of erosion control material, construction of storage areas, and installation of water pollution, erosion and dust control measures. Submit report weekly along with site inspection report.

Protect finished and previously seeded areas from damage and from spillover materials placed in upper lifts of embankment.

The Contractor's designated representative specified in item 3.01, paragraph (B)(4), shall address any BMP concerns brought up by the State Engineer within 24 hours of notification, including weekends and holidays. Failure to satisfactorily address these concerns, the State Engineer reserves the right to employ outside assistance or use the State Engineer's own labor forces to provide necessary corrective measures. The State Engineer will charge Contractor such incurred costs plus any associated project engineering costs. The State Engineer will make appropriate deductions from Contractor's monthly progress estimate. Failure to apply BMP measures shall result in either or both the establishment and increase in the amount of retainage due to unsatisfactory progress or withholding of monthly progress payment. Continued failure to apply BMP measures may result in one or more of the following: assessment of liquidated damages, suspension, or cancellation of Contract with Contractor being fully responsible for all additional costs incurred by State.

- D. **Hydrotesting Activities.** If work includes removing, relocation or installing waterlines, and Contractor elects to flush waterline or discharge hydrotesting effluent into State waters or drainage systems, obtain an NPDES Hydrotesting Waters Permit from Department of Health, Clean Water Branch (DOH-CWB).

Do not begin hydrotesting activities until the DOH-CWB has issued a Notice of General Permit Coverage (NGPC). Hydrotesting operations shall be in accordance with conditions in NGPC. Submit a copy of the NPDES Hydrotesting Waters Application and Permit to the State Engineer.

- E. **Dewatering Activities.** If excavation of backfilling operations require dewatering, and Contractor elects to discharge dewatering effluent into State waters or existing drainage systems, obtain NPDES General Permit Coverage authorizing discharges associated with construction activity dewatering from Department of Health, Clean Water Branch (DOH-CWB). If permit is required, prepare and submit permit application (CWB-NOI Form G) to DOH-CWB.

Do not begin dewatering activities until DOH-CWB has issued Notice of General Permit Coverage (NGPC). Conduct dewatering operations in accordance with conditions in NGPC. Submit copy of NPDES Hydrotesting Waters Application and Permit to the State Engineer.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Additional Water Pollution, Dust, and Erosion Control, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for added Additional Water Pollution, Dust, and Erosion Control required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
01500.1	Installation, Maintenance, Monitoring, and Removal of BMP	Lump Sum
01500.2	Additional Water Pollution, Dust, and, Erosion Control	Allowance

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 PRICE.

END OF SECTION

SECTION 01524 – CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections:
 - 1. Section 01352 – LEED Requirements

1.03 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 PERFORMANCE REQUIREMENTS

- A. General: Achieve End-of-Project rates for salvage/recycling of **75** percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following but not limited to:

1. Demolition Waste:
 - a. Asphaltic concrete paving
 - b. Concrete
 - c. Concrete reinforcing steel
 - d. Brick
 - e. Concrete masonry units
 - f. Wood studs
 - g. Wood joists
 - h. Plywood and oriented strand board
 - i. Wood paneling
 - j. Wood trim
 - k. Structural and miscellaneous steel
 - l. Rough hardware
 - m. Roofing
 - n. Insulation
 - o. Doors and frames
 - p. Door hardware
 - q. Windows
 - r. Glazing
 - s. Metal studs
 - t. Gypsum board
 - u. Acoustical tile and panels
 - v. Carpet
 - w. Carpet pad
 - x. Demountable partitions
 - y. Equipment
 - z. Cabinets
 - aa. Plumbing fixtures
 - bb. Piping
 - cc. Supports and hangers
 - dd. Valves
 - ee. Sprinklers
 - ff. Mechanical equipment
 - gg. Refrigerants
 - hh. Electrical conduit
 - ii. Copper wiring
 - jj. Lighting fixtures
 - kk. Lamps
 - ll. Ballasts

- mm. Electrical devices
- nn. Switchgear and panelboards
- oo. Transformers

2. Construction Waste:

- a. Site-clearing waste
- b. Masonry and CMU
- c. Lumber
- d. Wood sheet materials
- e. Wood trim
- f. Metals
- g. Roofing
- h. Insulation
- i. Carpet and pad
- j. Gypsum board
- k. Piping
- l. Electrical conduit
- m. Packaging, including uncontaminated materials as follows:
 - 1) Paper
 - 2) Cardboard
 - 3) Boxes
 - 4) Plastic sheet and film
 - 5) Polystyrene packaging
 - 6) Wood crates
 - 7) Plastic pails

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - Submittals.
- B. Waste Management Plan: Submit plan within 30 days of date established for the Notice of Award.

1.06 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use **Form CWM-7** for construction waste and Form CWM-8 for demolition waste. Include the following information:
 - 1. Material category
 - 2. Generation point of waste.
 - 3. Diversion/Recycler Hauler or Location
 - 4. Total quantity of waste in tons.
 - 5. Quantity of waste salvaged, both estimated and actual in tons.
 - 6. Quantity of waste recycled, both estimated and actual in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) in tons.

8. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. LEED Submittal: LEED Submittal template for Credit MR 2, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
- H. Qualification Data for waste management coordinator.
- I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.07 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: General Contractor shall hire a third party independent experienced firm, with a record of successful waste management coordination of Projects with similar requirements, that employs a LEED Accredited Professional, certified by USGBC, as waste management coordinator.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference: Conduct conference at Project site to comply with requirements in the General Provisions of the contract. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.08 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements of this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Use **Form CWM-1** for construction waste and **Form CWM-2** for demolition waste. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use **Form CWM-3** for construction waste and **Form CWM-4** for demolition waste. Include points of waste generation, potential recycling hauler or locations, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use **Form CWM-5** for construction waste and **Form CWM-6** for demolition waste. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged materials.
 5. Revenue from recycled materials.
 6. Savings in hauling and tipping fees by donating materials.
 7. Savings in hauling and tipping fees that are avoided.
 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 1. Comply with 01010 Description of Work for operation, termination, and removal requirements.
- B. Waste Management Coordinator: Waste management coordinator shall be responsible for implementing, monitoring, and reporting status of waste management work plan.

- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 01560 - Environmental Controls for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.

5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.03 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Grind asphalt to maximum 1-1/2-inch size.
- B. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 1. Pulverize concrete to maximum 1-1/2-inch size.
- D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 1. Pulverize masonry to maximum 3/4-inch size.
 2. Clean and stack undamaged, whole masonry units on wood pallets.
- E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- F. Metals: Separate metals by type.
 1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- J. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

- L. Conduit: Reduce conduit to straight lengths and store by type and size.

3.04 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees
- C. Wood Materials: Clean Cut-Offs of Lumber: Grind or chip into small pieces.
- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.05 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of 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 waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

3.06 ATTACHMENTS

The following forms are appended to the end of this Section.

- A. Form CWM-1 for construction waste identification.
- B. Form CWM-2 for demolition waste identification.
- C. Form CWM-3 for construction waste reduction work plan.
- D. Form CWM-4 for demolition waste reduction work plan.
- E. Form CWM-5 cost/revenue analysis of construction waste reduction work plan.
- F. Form CWM-6 cost/revenue analysis of demolition waste reduction work plan.
- G. Form CWM-7 for construction waste.
- H. Form CWM-8 for demolition waste.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

FORM CWM-2: DEMOLITION WASTE IDENTIFICATION

MATERIAL CATEGORY, DESCRIPTION OF GENERATION POINT	EST. QUANTITY	EST. VOLUME cy (cm)	EST. WEIGHT tons	REMARKS AND ASSUMPTIONS

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
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Construction Waste Management
01524-12

FORM CWM-3: CONSTRUCTION WASTE WORK PLAN

MATERIAL CATEGORY, DESCRIPTION OF GENERATION POINT	DIVERSION / RECYCLER HAULER OR LOCATION	TOTAL EST. QUANTITY OF WASTE tons (a)	DISPOSAL METHOD AND QUANTITY			HANDLING AND TRANSPORTATION PROCEDURES
			EST. AMOUNT SALVAGED tons	EST. AMOUNT RECYCLED tons	EST. AMOUNT DISPOSED TO LANDFILL tons	

FORM **CWM-4**: DEMOLITION WASTE REDUCTION WORK PLAN

MATERIAL CATEGORY, DESCRIPTION OF GENERATION POINT	DIVERSION / RECYCLER HAULER OR LOCATION	TOTAL EST. QUANTITY OF WASTE tons (a)	DISPOSAL METHOD AND QUANTITY			HANDLING AND TRANSPORTATION PROCEDURES
			EST. AMOUNT SALVAGED tons	EST. AMOUNT RECYCLED tons	EST. AMOUNT DISPOSED TO LANDFILL tons	

FORM CMM-5: COST/REVENUE ANALYSIS OF CONSTRUCTION WASTE REDUCTION WORK PLAN								
MATERIALS	TOTAL QUANTITY OF MATERIALS (VOL. OR WEIGHT) (A)	EST. COST OF DISPOSAL (B)	TOTAL EST. COST OF DISPOSAL (C = A X B)	REVENUE FROM SALVAGED MATERIALS (D)	REVENUE FROM RECYCLED MATERIALS (E)	LANDFILL TIPPING FEES AVOIDED (F)	HANDLING AND TRANSPORTATION COSTS AVOIDED (G)	NET COST SAVINGS OF WORK PLAN (H=D+E+F+G)
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site Clearing Waste								
Masonry or CMU								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								

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Construction Waste Management
01524-15

FORM CWM-6: COST/REVENUE ANALYSIS OF DEMOLITION WASTE REDUCTION WORK PLAN								
MATERIALS	TOTAL QUANTITY OF MATERIALS (VOL. OR WEIGHT) (A)	EST. COST OF DISPOSAL (B)	TOTAL EST. COST OF DISPOSAL (C = A X B)	REVENUE FROM SALVAGED MATERIALS (D)	REVENUE FROM RECYCLED MATERIALS (E)	LANDFILL TIPPING FEES AVOIDED (F)	HANDLING AND TRANSPORTATION COSTS AVOIDED (G)	NET COST SAVINGS OF WORK PLAN (H=D+E+F+G)
Asphaltic Concrete Paving								
Concrete								
Brick								
CMU								
Lumber								
Plywood or OSB								
Wood Paneling								
Wood Trim								
Miscellaneous Metals								
Structural Steel								
Rough Hardware								
Insulation								
Roofing								
Doors and Frames								
Door Hardware								
Windows								
Glazing								
Acoustical Tile								
Carpet								
Carpet Pad								
Demountable Partitions								
Equipment								
Cabinets								
Plumbing Fixtures								
Piping								
Supports and Hangars								
Valves								
Sprinklers								
Mech. Equipment								
Electrical Conduit								
Copper Wiring								
Light Fixtures								
Lamps								
Lighting Ballasts								
Electrical Devices								
Switchgear and Panels								
Transformers								
Other:								

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Construction Waste Management
01524-16

FORM CWM-7: CONSTRUCTION WASTE REDUCTION PROGRESS REPORT

MATERIAL CATEGORY, DESCRIPTION OF GENERATION POINT	DIVERSION / RECYCLER HAULER OR LOCATION	TOTAL EST. QUANTITY OF WASTE tons (a)	QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED tons (d = b + c)	TOTAL QUANTITY OF WASTE RECOVERED % (d / a X 100)
			ESTIMATED tons	ACTUAL tons (b)	ESTIMATED tons	ACTUAL tons (c)		

FORM CWM-8: DEMOLITION WASTE REDUCTION PROGRESS REPORT										
MATERIAL CATEGORY, DESCRIPTION OF GENERATION POINT	DIVERSION / RECYCLER HAULER OR LOCATION	TOTAL EST. QUANTITY OF WASTE tons (a)		QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED tons (d = b + c)	TOTAL QUANTITY OF WASTE RECOVERED % (d / a X 100)	
		ESTIMATED tons	ACTUAL tons (b)	ESTIMATED tons	ACTUAL tons (c)					

SOUTH TSA CHECKPOINT
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SECTION 01533 - BARRICADES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The General Provisions for Construction Projects (2016), Special Provisions 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. The Contractor shall erect barricades to delineate and secure their work areas from unauthorized entry. The Contractor shall provide the appropriate signing, hazard lights, and temporary paint striping per the safety plan as approved by the State Engineer, to aid public and airport pedestrian and vehicular traffic around his work areas.
 - 1. Barricades shall be full height, floor to ceiling, painted, plywood faced with framing. Other means of barrier protection may be considered on a case by case basis as submitted for review and approval by the State Engineer to provide proper protection of the public and airport workers. Barricades shall have a lockable, secure door from the public side for emergency access.
- B. The Contractor shall be responsible for their own security and protection of their 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 (see Attachments 1 to 3 for barricade details and requirements). 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 State 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.
- E. The Contractor shall be responsible for securing access into and out of the barricaded areas.
- F. Temporary routes due to barricades shall be accessible and comply with the guidelines below:
 - 1. ADAAG 201.3 Temporary and Permanent Structures. These requirements shall apply to temporary and permanent buildings and facilities.

2. ADAAG 206.1 General. Accessible routes shall be provided in accordance with 206 and shall comply with Chapter 4.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. In addition to the security plan as specified in Section 01565 - SECURITY MEASURES, submit drawings showing locations for temporary dust and noise control protection, including details of barrier construction, to be submitted within thirty (30) calendar days after NTP.

PART 2 - PRODUCTS (Not Used)

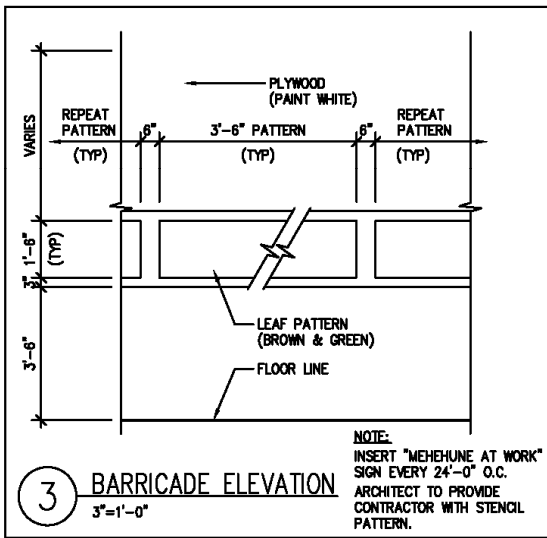
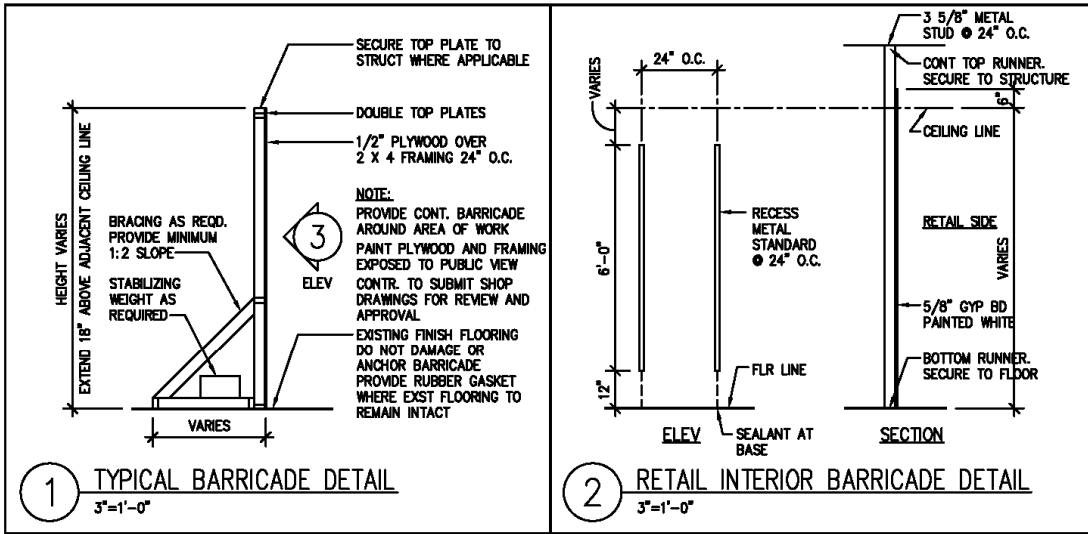
PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT & PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

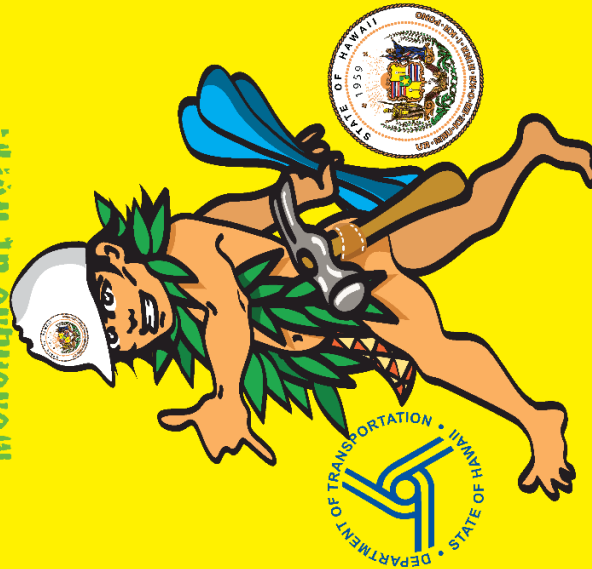




SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Barricades
Attachment 2

Menehune at work!



**Aloha,
Please pardon the inconvenience.**

ご迷惑をおかけしますが。

不便之处敬请原谅

서비스 이용에 불편함을 드려 진심으로 사과 드립니다.

**We are working hard to improve
and safeguard your flying experience!**

皆様の安全な飛行のため 日々努力を重ねています。

我们正在致力改善和保障您的飞行体验

저희는 귀하의 안전한 항공여행을 위해서 최선을 다해 노력하고 있습니다.

Mahalo for your patience and understanding.

ご協力に感謝いたします。

感谢您的忍耐和体谅

승객 여러분의 이해와 협조에 감사 드립니다.

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. United States, Environmental Protection Agency, CLEAN WATER ACT; 33 United States Code §1251 et seq.
- C. State of Hawaii, Department of Health, Administrative Rules, Chapter 59, AMBIENT AIR QUALITY, Chapter 60.1, AIR POLLUTION CONTROL.
- D. United States, Environmental Protection Agency, CLEAN AIR ACT; 42 United States Code §7401 et seq.
- E. State of Hawaii, Department of Health, Administrative Rules, Chapter 42, VEHICULAR NOISE CONTROL.
- F. State of Hawaii, Department of Health, Administrative Rules, Chapter 46, COMMUNITY NOISE CONTROL.
- G. 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.
- H. 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.
- I. State of Hawaii, Department of Health, Title 11, Chapter 501, Asbestos Requirements.
- J. 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

1.1 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

2.1 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

3.1 PRECONSTRUCTION REQUIREMENTS

- (A) 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.

(B) 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:

1. 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:
 - a. An identification of potential pollutants and their sources.
 - b. A list of all materials and heavy equipment to be used during construction.
 - c. Descriptions of the methods and devices used to minimize the discharge of pollutants into drainage systems, sewer system, and State waters.
 - d. Details of the procedures used for the maintenance and subsequent removal of any erosion or siltation control devices.
 - e. Methods of removing and disposing hazardous wastes encountered or generated during construction.
 - f. Methods of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydro-demolition water.
 - g. Spill Control and Prevention, and Emergency Spill Response Plan.
 - h. Fugitive dust control, including dust from earth-disturbing, hauling, grinding, sweeping, or brooming off operations, or combination thereof.
 - i. Methods of storing and handling of oils, paints, and other products used for the project.
 - j. Material storage and handling areas, and other staging areas, including storage of reinforcing steel and building material.
 - k. Concrete truck washouts.

- l. Concrete waste and asphalt concrete waste control.
 - m. Fueling and maintenance of vehicles and other equipment.
 - n. Tracking of sediment offsite from project entries and exits.
 - o. Litter management. Prevention of Foreign Object Debris (FOD) is essential.
 - p. Sanitary/Septic Waste Management and Facilities.
 - q. Stockpiles of Aggregates, Soils, Asphalt Concrete Material, Concrete Waste, and Asphalt Concrete Waste.
 - r. Methods of Handling and Removal of Contaminated Soils and Groundwater encountered or generated during construction.
 - s. Methods and Procedures for Dewatering.
 - t. Methods and Procedures for Hydro-Testing.
 - u. 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.
 - v. Other factors that may cause water pollution, dust, and erosion control.
2. 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.
 3. Dates when BMP measures will be installed and removed.
 4. 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.
 5. Description of fill material to be used.

6. 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.
7. 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.
8. 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.

- (C) 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 01561.3.1(B) – Water Pollution, Dust, and Erosion Control Submittals are completed, submitted to the Engineer and accepted in writing by the DOTA Environmental Section.

- (D) 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.

- (E) 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.

- (F) 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.

- (G) Construction BMP Training. The Contractor's representative(s), identified in Section 01561.3.1(B)(4), 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.

- (H) 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:

1. A sequence of operations.
2. Method of excavation, transporting, and disposal.
3. Soil Stockpiling and Groundwater Storage procedures.
4. Proposed equipment.
5. 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.

3.2 CONSTRUCTION REQUIREMENTS

Do not begin work until submittals detailed in Subsection 01561.3.1(B) – 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 01561.3.1(B).

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.

3.3 INSPECTIONS

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

- (A) 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.

- (B) 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:

1. Weekly.
2. 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.

3. 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:

1. 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.
2. 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.
3. 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.

4. 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.

- (C) 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.

- (D) Routine Inspections Conducted by DOTA. The Contractor's designated representative specified in Subsection 01561.3.1(B)(4) 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 01561.3.3(B).

(E) 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:

1. 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

4.1 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 01561.3.3(A), 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 01561.3.3(E), 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 01561.3.3(C), 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 current DOTA's Construction Activities Best Management Practices (BMP) Field Manual can be found on DOTA's Environmental Website at

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

The manual is periodically updated and should be downloaded via the website to ensure that the latest version is applied. The manual identifies potential pollutant sources and BMPs that should be used to mitigate pollutants.

Additional information and requirements for stormwater programs at all airports can also be found at the above website, including additional requirements for Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG).

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.	<p>\$1,000 for each of the first ten violations,</p> <p>\$2,500 for each of the next ten violations,</p> <p>\$5,000 for each subsequent violation.</p>
Failure to submit required reports such as BMP inspection reports, rain gauge data logs, etc.	<p>\$500 per calendar day for the first ten days of each violation,</p> <p>\$1,000 per calendar day for the next ten days of each violation,</p> <p>\$2,500 per calendar day for each subsequent day of violation.</p>

Non-Compliance	Amount
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

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Construction Site Runoff Control Program
01561-22
03/01/20

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 DOH required Construction EHMP (C-EHMP) utilizing the C-EHMP Addendum Template or most recent version provided by DOH, also known as a 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 or there is a risk to human health and/or the environment (such as indoor air quality in an occupied building), the Contractor shall be responsible to revise, update, and finalize the C-EHMP Addendum. The Contractor shall coordinate with, as well as have their C-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. 29 CFR 1910, "Occupational Safety and Health Standards".
 - 2. 29 CFR 1926, "Safety and Health Regulations for Construction".
 - 3. 40 CFR 50, "National Primary and Secondary Ambient Air Quality Standards A".
 - 4. 40 CFR 122, "EPA Administered Permit Program: The National Pollutant Discharge Elimination System".
 - 5. 40 CFR 261, "Identification and Listing of Hazardous Waste".
 - 6. 40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste".
 - 7. 40 CFR 302, "Designation, Reportable Quantities, and Notification".
 - 8. 49 CFR 172, Subpart E, "Labeling".
 - 9. 49 CFR 172, Subpart F, "Placarding".
 - 10. 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).
 - 11. The Hazard Evaluation and Emergency Response Office Technical Guidance Manual (TGM) for Implementation of the State Contingency Plan (Interim Final, June 21, 2009).
 - 12. Hawaii Hazardous Waste Laws and Regulations (HRS Chapter 342J, HAR Title

- 11, Chapters 260.1–279.1).
13. Hawaii Solid Waste Laws and Regulations (HRS Chapters 342H and I, HAR Title 11, Chapter 58.1).
 14. Hawaii Underground Storage Tank Laws and Regulations (HRS Chapter 342L; HAR Title 11, Chapter 280.1).
 15. Hawaii Water Quality Standards (HAR Title 11, Chapter 54).
 16. Hawaii Ambient Air Quality Standards (HAR Title 11, Chapter 59).
 17. Hawaii Occupational Safety and Health Standards (HAR Title 12, Subtitle 8).
 18. 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).
 19. 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).
 20. Hawaii Department of Health, Office of Hazard Evaluation and Emergency Response. Construction EHMP Addendum Template, available from AIR-EE.
 21. 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 & SIGNAGE

- A. Provide workers with Personal Protective Equipment (PPE) according to the Contractor’s PPE Assessment.
- B. Provide warning signs and labels to protect the workers and the public.

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. Communicate any existing, potential, or new hazards to workers before a job begins or as necessary. 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. Where applicable, 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.
- 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. Measure, monitor, and record worker exposure to toxic materials or harmful agents as necessary.
- H. Follow Decontamination regulations and procedures as necessary.
- I. 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.
- J. 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.
- K. 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) or if needed, a C-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. Proposed schedule of work.

e. A sketch identifying the location of temporary soil stockpiling and water storage devices, including pipes and appurtenances, if applicable.

f. A map showing the location of the work and nearest medical facilities and hospitals.

g. A copy of this Work Plan must be on the construction site and available at all times.

h. 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

The Contractor and its subcontractors shall implement safe work places and practices by eliminating, mitigating, or protecting against existing or potential hazards to the workers who may be exposed to harmful, hazardous, and toxic materials and substances, including contaminated water and soil.

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 known 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 C- EHMP Addendum 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 the workers 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, 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 the workers 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
SOUTH TSA CHECKPOINT Management of Contaminated Medias
KAHULUI AIRPORT 01562-11
STATE PROJECT NO. AM1095-10 r10/21/2020
AIP PROJECT NO. 3-15-0006-##

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 808-236-8200). 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 HDOH HEER Office.
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 immediately to AIR-EE, State Engineer, and appropriate airport personnel and regulatory agencies (if applicable) following the DOTA Spill Reporting Fact Sheets for each airport. Spill Reporting Fact Sheets can be found on DOTA's Environmental Webpage for Construction site Runoff at <https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/>.
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 C-EHMP Addendum, 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, DOTA Site-Specific EHMP, or C-EHMP Addendum. 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 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

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

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 14 calendar days after award of the Contract.

PART 2 – PRODUCTS (Not Used)

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 Special Provisions, Paragraph 8.21 – "OPERATION OF CONTRACTOR'S MOTOR VEHICLE AND PERSONNEL IN RESTRICTED AIR OPERATIONS AND MOVEMENT AREAS". All requests for badges and AOA decals shall be submitted in writing to the Airport District Manager through the State Engineer within 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.

Currently, the fee to obtain a new airport identification badge is \$60.00, but due to the changing fee structure of these services, the Contractor shall inquire with the Kahului Airport Pass & ID office at (808) 872-3874.

For other Airport Districts cost inquiries should be made the District Manager's office.

- 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 State 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 BASIS OF PAYMENT

Work under this Section, except for posting security guards, shall be considered incidental to, and included in the bid prices for the various items of work in this project.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
01565	Security Measures	Allowance

Posting of security guards 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 PRICE.

END OF SECTION

SECTION 01570 - TRAFFIC CONTROL WORK ZONE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. Furnishing, installing, maintaining and subsequently removing work zone traffic control devices, and personnel. Work zone traffic control shall include providing flaggers and police officers.
- B. Keeping roads for public traffic open and in passable condition; providing and maintaining temporary access for businesses, parking lots, and driveways; taking necessary work precautions for the protection, safety, and convenience of the public; should pedestrian facilities exist, taking necessary measures for safe and accessible passage, with route information and ADAAG compliance, for pedestrians traveling through or near work zone.
- C. Taking safety and precautionary measures, such as illuminating roadway obstructions during hours of darkness, in accordance with Chapter 286, HRS; Title 19, Subtitle 5, Chapters 127, 128, and 129, HAR; and MUTCD.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Shop Drawings: Submit complete shop drawings and manufacturer's certifications for the State Engineer's review before any materials are ordered or fabricated. Submit shop drawings for traffic control guide signs and posts.
- C. The Contractor shall submit a detailed Traffic Control Plan (TCP) to the State Engineer for approval at least 15 days before work on that phase commences if deviating from the construction drawings.
- D. Traffic plates shall be skid resistant. Plates shall be rated and secured to permit the safe passage of all vehicles.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Signs 750.01

Sign Posts 750.02

Fasteners for Signs and Route Markers 750.03

Reflector Marker 750.07

Flexible Delineator Posts and Reflectors 750.08

Traffic Delineators 750.09

Preformed Pavement Marking Tape 755.04

Traffic control devices, including signs, barricades, warning lights, arrow boards, changeable message signs, cones, delineators, and markers, shall conform to the American Traffic Safety Services Association (ATSSA), Quality Standards for Work Zone Traffic Control Devices and MUTCD.

Protective devices including barricades, warning signs, lights, and temporary signals shall conform to Title 19, Subtitle 5, Chapters 127, 128, and 129, HAR. Reflectorization for protective devices such as barricades, delineators, and warning signs shall conform to Hawaii Standard Specifications for Road and Bridge Construction, 2005, Subsection 750.01 – Signs.

PART 3 – EXECUTION

3.01 INSTALLATION

Furnish, install, and maintain barricades, signs, cones, delineators, lights, flashing signals, and other traffic control devices.

When directing traffic, flaggers shall be in direct communication with each other.

Submit schedule at least 15 working days before work starts. Submit

modifications and deviations to the construction drawing TCP at least 15 working days before start of work requiring modification or deviation. Illegible TCP will not be accepted.

Include the following in modified or deviated TCP and schedule:

1. Signs (type, size, designation, and placement).
2. Traffic movements shown by arrows.
3. Positions of flaggers and police officers.
4. Barricades, cones, delineators, and additional traffic control devices and measures necessary for protection of work and public safety; and placement, spacing, distances, and reference points for traffic control devices.
5. Layout, drawn to scale, of traffic control devices, including information needed to layout TCP.
6. Brief description of work.
7. Dates of work.
8. Times of day affected.
9. Proposed public information sign.
10. Proposed news release.

Place sign or device situated farthest upstream from work zone first. Then place others progressively downstream toward work zone.

Extend cones or delineators to point where cones or delineators are visible to approaching traffic.

For signs with messages on both faces, cover inapplicable message before placement.

Keep barricades, construction and warning signs, and other traffic control devices in good condition. Repair, clean, or replace barricades, signs, or other devices as required to maintain effectiveness and appearance. The State Engineer alone will decide suitable condition of each barricade, sign, or other traffic control device.

Remove or cover regulatory and warning signs that conflict with TCP. Restore signs upon completion of work or as ordered by the State Engineer. Affix object markers to post(s) of covered sign.

Promptly remove or cover construction and warning signs that are not applicable or not in use.

Promptly remove traffic control devices that are no longer needed.

Remove traffic control devices in reverse order of installation, starting closest to zone and continuing away from work zone.

Maintain abutting owners' existing access until replacement access is usable. Obtain permission from abutting owners, including conditions for closing existing access. Submit copy of agreement with abutting owners before beginning work in the affected area.

When working on existing facility that will be kept open to traffic, provide smooth and even surface for public traffic use. Only work on a portion of roadway at one time, and stage construction from one side to other while routing traffic over opposite side.

During subgrade and paving operations, paved shoulders may be used for public traffic.

Do not store material or equipment where it will interfere with public traffic. Remove equipment and other obstructions out of right-of-way or clear zone to permit free and safe passage of public traffic during non-working hours or suspension of work.

Notify Fire Department, in writing, at least 24 hours before blocking or closing road access. Keep fire hydrants accessible to Fire Department by not placing material or other obstructions within five feet of fire hydrant or closer than permitted by applicable ordinances, rules, and regulations.

Notify the State Engineer and County, including Bus Systems Division, Police Department, Fire Department, Emergency Medical Services, and Department of Health in writing at least five days before start of construction.

- A. Signs. Install signs sufficiently ahead of location where operations may interfere with use of road by traffic and at intermediate points where new work crosses or coincides with existing road.

Place signs in accordance with construction drawing TCP or modified/deviated TCP as accepted by the State Engineer.

- B. Construction Signs. Erect construction signs at the beginning of project and at the end of project at the location indicated by the State Engineer. These signs shall remain for the duration of the highway project. Maintain these signs. Place these signs besides the required traffic control signs called for herein.

The construction signs shall be new and become the property of the Contractor.

C. Barricades

1. General. Provide, erect, and maintain necessary barricades suitable for protection of work and safety of the public.

Barricades shall be in good condition. Barricade application and installation shall be in accordance with accepted TCP.

During hours of darkness, install steady burn or flashing lamps on barricades selected by the State Engineer. Attach lamps on barricade ends closest to traveled way and visible to oncoming traffic.

Do not install signs on barricades unless signs and barricades have been crash tested as a unit and accepted under NCHRP Report 350.

2. Retroreflectorization. Retroreflectorize barricade rails and attachment with retroreflective sheeting in accordance with Hawaii Standard Specifications for Road and Bridge Construction, 2005, Subsection 750.01(C)(4). Type III or IV Retroreflective Sheeting (High Intensity) or Hawaii Standard Specifications for Road and Bridge Construction, 2005, Subsection 750.01(C)(5) - Hardened Aluminum-Backed Retroreflective Sheeting.

Retroreflectorize both vertical faces of each barricade rail.

3. Color. Provide white colored rails, frames, and braces with front and back rail faces having 6-inch-wide alternating orange or red and white stripes sloping downward toward traveled way at angle of 45 degrees from vertical. Use stripe colors in accordance with the following:
 - a. Use orange and white stripes for the following conditions:
 - (1) Construction work.
 - (2) Detours.
 - (3) Maintenance work.
 - b. Use red and white stripes for the following conditions:
 - (1) On roadways with no outlet, such as dead ends and cul de sacs.
 - (2) Permanent or semi permanent closure or termination of roadway.
4. Maintenance. Keep barricades in good condition. Repair, repaint, clean,

or replace barricades to maintain effectiveness and appearance. Immediately replace missing or damaged barricades, lamps, sandbags, and other accepted weights.

Clean and repair barricades before relocating to other locations.

- D. Traffic Delineators. Install traffic delineators in accordance with accepted TCP.

Maintain traffic delineators in good condition. Immediately replace missing or damaged traffic delineators.

Clean delineator prior to relocating to new location.

- E. Cones. Install traffic cones in accordance with accepted TCP.

Maintain traffic cones. Keep traffic cones clean and in good repair. Immediately replace lost, stolen, or damaged traffic cones.

Clean cones prior to relocating to new location.

- F. Lane Closures. Lane closures will be allowed only from 8:30 a.m. to 3:00 p.m., Monday through Friday. Exceptions to lane closure hours specified require written acceptance by the State Engineer. No increase in contract price or contract time will be given for lane closure restrictions specified.

No lane closures will be allowed during 24-hour periods as follows:

1. Day preceding holiday (3:00 p.m. to Midnight), except as otherwise specified.
2. Holidays (Midnight to Midnight).
3. Day before and day after Thanksgiving Day (Midnight to Midnight).
4. Three-week holiday period for Christmas and New Years (Midnight to Midnight).
5. Other dates of events indicated in the contract documents.

No time extension will be given for the above restrictions. The contract time for the project has accounted for any loss of time due to the above restrictions.

Closure of only one lane of traffic will be allowed during lane-closure hours. Keep lanes open to traffic and allow flow at normal posted speed limit during nonlane-closure hours.

If applicable, coordinate lane closures with adjacent project(s) at no increase in contract price or contract time.

Before scheduling work, submit requests for detours and lane closures as

follows:

1. Detours - 8 weeks before implementing detours.
2. Lane closures - 6 weeks before implementing lane closures.

Include the following with detour and lane closure requests:

1. Explanation of proposed changes to existing traffic pattern.
2. Installation schedule for informational and traffic control signs.
3. Publication schedule for legal notices.
4. Plan showing proposed informational signs.
5. Plan showing lane changes or detours in accordance with accepted TCP, including details at beginning of multi lane highway lane changes and detours.

Detours or lane closures will not be allowed before the State Engineer accepts detour or lane closure request.

TABLE I - FOR TRAFFIC CONTROL PLAN							
POSTED SPEED LIMIT (M.P.H.)	SIGN SPACING (D) (FEET)	TAPER LENGTH (T) (FEET)		LONGITUDINAL BUFFER SPACE (B) (FEET)	SPACING OF CONES OR DELINEATORS (FEET)		
		W = 12' OR LESS *	W = GREATER THAN 12' *		TAPER	TANGENT	WORK AREA
20	250	200	W x 17	35	20	20	10
25	250	200	W x 17	55	25	25	10
30	250	250	W x 20	85	30	30	10
35	250	250	W x 20	120	35	35	10
40	500	350	W x 30	170	40	40	10
45	500	550	W x 45	220	45	45	10
50	1000	600	W x 50	280	50	50	10
55	1000	700	W x 55	335	55	5	10

* W = width of lane or shoulder

- G. Advisory Signs. Submit advisory sign shop drawings. Construct, install, maintain, and remove two advisory signs as ordered by the State Engineer. Place signs at locations designated by the State Engineer. Provide signs, minimum 8 feet wide by 4 feet high, with black letters on orange background, and with three 4.00 pounds/foot flanged channel posts for each sign.

Include starting date and hours of construction in sign message. Use letter heights of 8 inches, Series D. The State Engineer will review and accept

advisory signs' wording before fabrication. Install advisory signs two weeks before start of construction. Remove advisory signs immediately after construction has been completed or as ordered by the State Engineer.

H. Advertisement. Place advertisement in newspaper, as ordered by State Engineer, for the following traffic pattern changes or night work:

1. Detours.
2. Lane closure.
3. Permanent road closure.
4. Permanent new route that changes previous route.

Include the following information:

1. Map of traffic pattern change limits.
2. Map showing lane(s) closure and detour pattern.
3. Notice of starting and ending dates and duration.
4. Explanation of lane(s) closure or detours in "Notice To Motorist".

Quality of map shall conform to the following requirements:

1. No freehand printing or penciling.
2. Highlight important features by darkening, cross hatching, crossing out, or coloring important words, as necessary.
3. Provide maps with minimum size of five columns wide and four columns deep. Lesser width columns may be considered to balance against size of drawing.
4. Text specifications.
 - a. Work being featured 3/16-inch text.
 - b. Major roads and features 1/8-inch text.
 - c. Other roads and features first letter of sentence upper case.
 - d. "NOTICE TO MOTORIST" in upper case.
 - e. Message first letter of sentence upper case.
5. Line Thickness.

- a. Important feature being advertise line thicker than rest of map.
 - b. Directional arrow bolder than rest of lines shown on map, when important, to show route traffic should use.
6. Show reference direction such as "TO HONOLULU" with arrow.

Submit the following:

- a. "Notice to Motorists" before placement in newspaper, six weeks before start of work.
- b. Actual size of notice to be published in newspaper. The State Engineer will not allow size reduction of notices once accepted. Submit final, camera-ready "Notice to Motorists" advertisement.

Place advertisement for three consecutive days and within one week before traffic pattern changes, in publication as ordered by the State Engineer.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
01570	Traffic Control Work Zone	Lump Sum

END OF SECTION

SECTION 01580 - TEMPORARY FACILITIES AND UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

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 State Engineer deems necessary to meet the requirements of the work under the contract.

PART 2 - PRODUCTS (Not Used)

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 State Engineer 14 calendar days prior to the connection and shall include a description of work and a sketch of the proposed installation.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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 01581 - PROJECT IDENTIFICATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

The work covered by this Section consists of fabrication and erection of one finished project sign in accordance with the project sign details and specifications contained herein.

1.03 SUBMITTALS

Submit six (6) copies of the project sign layout to the State Engineer for review prior to fabrication of sign. Sign layout shall be submitted within 30 calendar days after the Notice to Proceed date.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Plywood - 3/4" thick exterior grade high density overlay with resin-bonded surfaces on both sides.
- B. Lumber for frames, braces and supports - S4S construction grade, Douglas Fir, as required.
- C. Paints and Inks - Screen print inks are matte finish. Paints are satin finish, exterior grade, one (1) prime coat and two (2) finish coats minimum all sides and edges.

2.02 SPECIFICATIONS

- A. Lettering: Shall be set in Helvetica Compact Bold. If this specific type is not available, Futura Demi Bold may be substituted. Other letters are set as shown in Helvetica Medium with the exception of the initial capitals of the Governor which is set in Baskerville. Copy should be set and spaced by a professional typesetter and enlarged photographically for photo stencil screen process.

- B. Artwork: Constant elements of the sign layout-frame, stripe, and official State information may be duplicated following working drawing measurements as specified in the drawings. The "STATE OF HAWAII" masthead letters shall be Baskerville Bold as indicated on the drawing layout.
- C. Title: The specific major work of the project under construction is emphasized by using type in all capitals. Other related information of lesser importance use type in initial caps and lower case letters.
- D. Materials: Panel is 3/4" exterior grade high density overlaid plywood, with resin bonded surfaces on both sides.
- E. Paints and Inks: Screen print inks are matte finish. Paints are satin finish, exterior grade. References to Ameritone color key paint are for color match only.
- F. Color:
 - 1. IBL10A Bohemian Blue
 - 2. 2H16P Softly (White)
 - 3. 2VR2A Hot Tango (Red)
 - 4. 1M52E Tokay (Gray)

PART 3 - EXECUTION

3.01 TITLES

- A. Constant elements of the sign layout (frame, outline, stripe, and official state information) may be duplicated following working drawing measurements or be reproduced and enlarged photographically using a layout template if provided. The "STATE OF HAWAII" master head should be reproduced and enlarged as specified, using the artwork provided.
- B. The specific major work of the project under construction is emphasized by using 3-3/4" type, all capitals. Secondary information such as locations or buildings uses 2-1/4" type, all capitals. Other related information of lesser importance uses 1-1/2" (capital height) type in lower case letters. All lines of type should not exceed the width of the 6'-2" stripe.

3.03 INSTALLATION

- A. Locations of all signs shall be as directed by the State Engineer. Mounting shall be secure and in a presentable manner.
- B. The project sign shall be erected within five (5) calendar days after the Notice to Proceed date. The sign shall be installed only after the submittal is approved.

3.04 MAINTENANCE

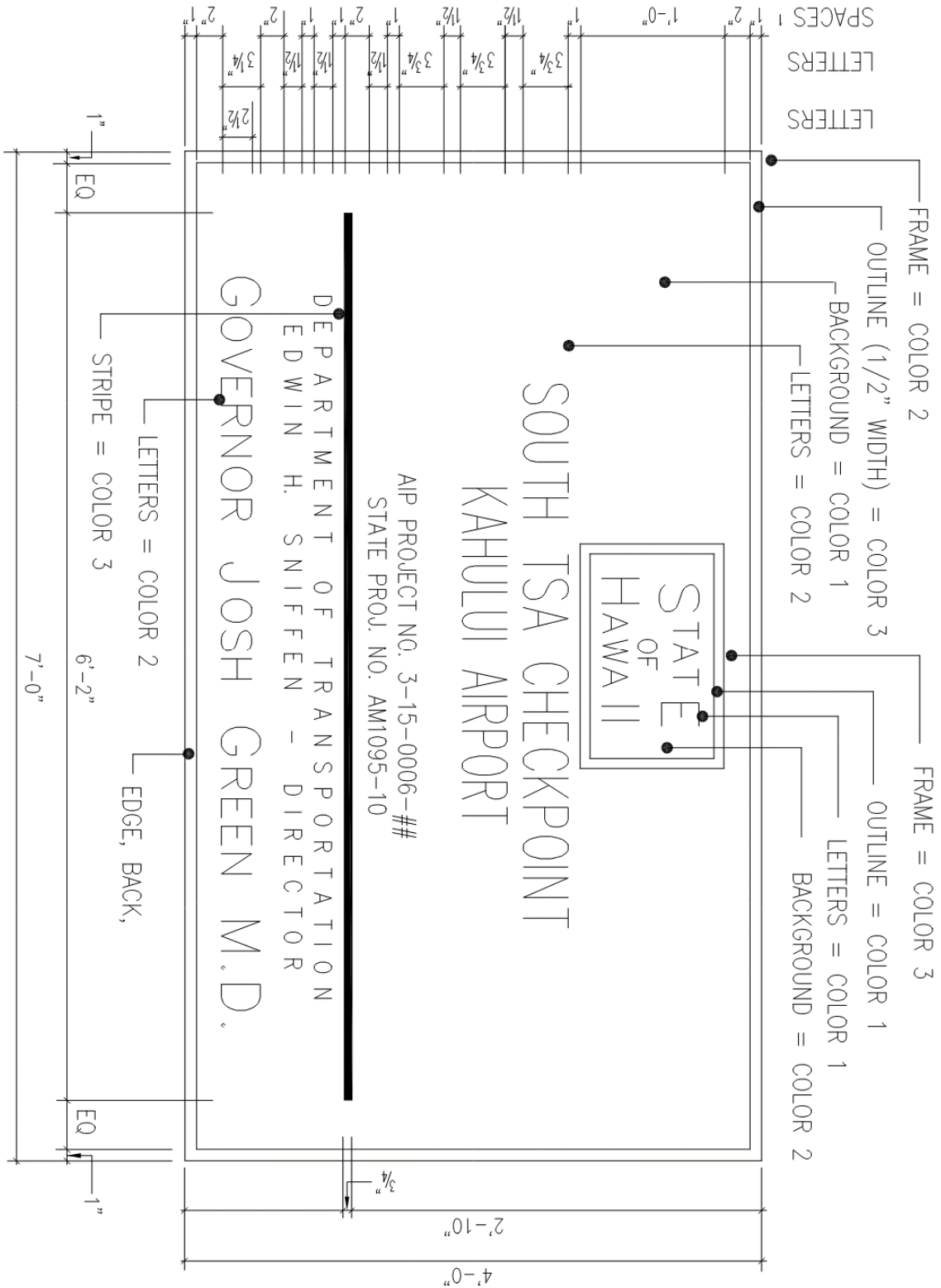
- A. Contractor shall maintain all signs and keep them legible and in good repair at their own expense for the entire construction period.
- B. After the final approval of the construction work by the State, the project sign shall be removed from the site and shall become the property of the Contractor.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

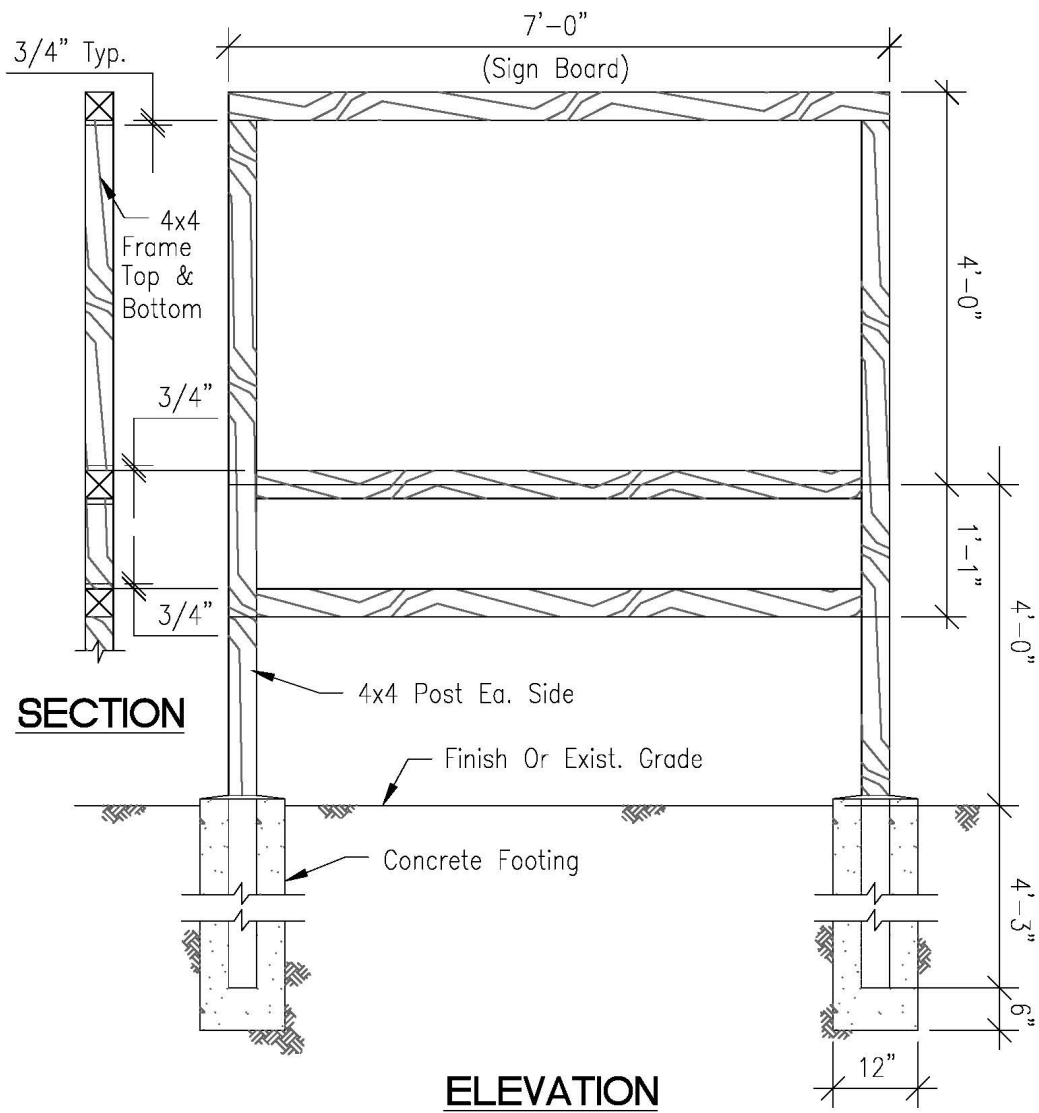
Work under this section will not be measured nor paid for separately but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION



SOUTH TSA CHECKPOINT
 KAHULUI AIRPORT
 STATE PROJECT NO. AM1095-10
 AIP PROJECT NO. 3-15-0006-##

Project Identification
 01581-4



PROJECT SIGN DETAIL

Not To Scale

SOUTH TSA CHECKPOINT
 KAHULUI AIRPORT
 STATE PROJECT NO. AM1095-10
 AIP PROJECT NO. 3-15-0006-##

Project Identification
 01581-5

SECTION 01700 – MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 GENERAL REQUIREMENTS

- A. "Hawaii Standard Specifications for Road, Bridge, and Public Works Construction, 2005," 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 State 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.

Payment for the Contractor's bond premium will be made 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 "Total Amount for Comparison of Bids," in the proposal schedule shall be adjusted to reflect any such reduction. For the purposes of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the "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. A separate line item called "Demobilization" will be added to the Contractor's Schedule of Values after the contract has been awarded. The total amount for this item shall be 2.5% of the Contractor's total bid amount and will be deducted from other line items in the schedule of values as negotiated between the Contractor and the State. **THE CONTRACTOR SHALL NOT MODIFY THE PROPOSAL SCHEDULE BY ADDING A "DEMobilIZATION" BID ITEM TO THE PROPOSAL SCHEDULE.**

4.02 BASIS OF PAYMENT

- A. Mobilization will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
01700	Mobilization (Not to Exceed 6% of sum of all items, excluding this item and all allowances)	Lump Sum

- B. 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.

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

- B. Partial payment will not be paid for Demobilization. Full payment will be made on the Contractor's final payment request. This will occur after the Contractor has fulfilled all of the requirements of the Contract bid documents to the satisfaction of the State and issuance of the Final Acceptance letter to the Contractor by the State.

END OF SECTION

SECTION 01810 - COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. HVAC systems and associated controls, including HVAC equipment, exhaust fans, temperature controls and TAB (Testing, Adjusting and Balancing).
- B. Plumbing systems, including domestic hot water heating equipment, circulation pumps, mixing valves, low flow devices, plumbing fixtures, piping and valves.
- C. Lighting controls, including scheduled lighting controls, occupancy sensors and daylighting controls.
- D. Renewable energy systems, including solar.
- E. The State Engineer, LEED Coordinator, Architect/Engineer, and Commissioning Authority are not responsible for construction means, methods, job safety, or management function related to commissioning on the job site.
- F. Related Sections include the following:
 - 1. Divisions 1 through 16 Sections for LEED requirements specific to the Work of each of those Sections. These requirements may or may not include reference to LEED.
 - 2. Under Division 15 - COMMISSIONING OF PLUMBING for commissioning process activities for restroom fixtures.
 - 3. Under Division 15 - COMMISSIONING OF HVAC SYSTEMS for commissioning process activities for heating, ventilating, air conditioning, and thermal comfort systems, assemblies, equipment, and components.
 - 4. Under Division 16 - ELECTRICAL SYSTEMS COMMISSIONING for commissioning process activities for indoor lighting, outdoor lighting, assemblies, equipment, and components.

1.03 DEFINITIONS

- A. Basis of Design (BoD): The basis of design is the documentation of the primary thought processes and assumptions behind design decisions that were made to meet the design intent. The basis of design describes the systems, components,

conditions and methods chosen to meet the intent. Some reiterating of the design intent may be included.

- B. Commissioning: Commissioning is a comprehensive and systematic process to verify that the building systems perform as designed to meet Hawaii DOT's requirements. Commissioning during the construction, acceptance, and warranty phases is intended to achieve the following specific objectives:
1. Verify and document that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing Contractors.
 2. Verify and document the performance of applicable equipment and systems meet the Hawaii DOT's Project Requirements, as documented through acceptance criteria in Divisions 15, and 16.
 3. Verify and document that equipment and systems receive complete operational checkout by installing contractors.
 4. Verify and document equipment and system performance.
 5. Verify completeness of operations and maintenance materials and ensure Hawaii DOT's operating personnel are trained on operation and maintenance of building equipment.

The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.

- C. Commissioning Authority (CxA): An Engineer designated party not otherwise associated with Contractor's team. The CxA facilitates and coordinates the commissioning activities in concert with the Contractor and the State Engineer.
- D. Commissioning Plan: An overall plan that provides the structure, schedule and coordination planning for the commissioning process.
- E. Deficiency: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents, does not perform properly or is not complying with the design intent.
- F. Functional Performance Test: Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are

run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word.

TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The Commissioning Authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. Functional Performance Tests are performed after pre-functional checklists and startup is completed.

- G. Hawaii DOT Project Requirements (OPR): The documentation of the functional performance requirements of the facility and the State Engineer's expectations of how it will be used and operated. Hawaii DOT's sustainable design goals, as reflected in the LEED rating for the facility, for energy and water efficiencies and indoor environmental qualities are articulated in this document.
- H. Pre-functional Checklist: A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the Commissioning Authority to the contractor. Pre-functional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some pre-functional checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The word "pre-functional" refers to before functional testing. Pre-functional checklists augment and are combined with the manufacturer's start-up checklist.

1.04 COMMISSIONING TEAM

- A. The commissioning process will require cooperation of the Contractor, subcontractors, vendors, Architect/Engineer, Commissioning Authority, LEED Coordinator, and State Engineer.
- B. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the Commissioning Authority (CxA).
- C. Members Appointed by State Engineer:
 - 1. Commissioning Authority (CxA): The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process.

2. Representatives of the facility user and operation and maintenance personnel.
3. The Design and Construction Management Consultant.
4. Hawaii DOT's operational and maintenance personnel.

1.05 STATE ENGINEER'S RESPONSIBILITIES

- A. Provide the OPR documentation to the CxA for use in developing the commissioning implementation plan and for incorporation into the system manual.
- B. Provide the BOD documentation, prepared by Architect and approved by State Engineer, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.06 CONTRACTOR'S RESPONSIBILITIES

Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Certify, as a condition for Substantial Completion, that work is complete and systems are operational and functioning according to the contract documents.
2. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
3. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
4. Attend commissioning team meetings held on biweekly basis.
5. Integrate and coordinate commissioning process activities with construction schedule.
6. Review and accept construction checklists provided by the CxA.
7. Complete paper and construction checklists as work is completed and provide to the Commissioning Authority on a weekly basis.
8. Review and accept commissioning process test procedures provided by the Commissioning Authority.
9. Complete commissioning process test procedures.

10. As part of the LEED requirements for this project, the Contractor shall be required to participate in a post-occupancy performance review of the commissioned building systems. This review will be conducted by the Commissioning Team at a point in time approximately 10 months into the one year warranty period or as otherwise indicated in the Commissioning Plan.

1.07 CxA'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Provide commissioning plan including checklist and test report forms.
- C. Assist the Contractor in ensuring the scheduled commissioning activities are coordinated with the Contractor's overall Project schedule.
- D. Convene commissioning team meetings.
- E. Provide Project-specific construction checklists and commissioning process test procedures.
- F. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, construction checklists, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.
- G. Prepare and maintain the "Issues Log".
- H. Prepare and maintain completed "Construction Checklist Log".
- I. Witness systems, assemblies, equipment, and component startup.
- J. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

1.08 COORDINATION

- A. Perform commissioning services to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
- B. Commissioning Authority shall provide overall coordination and management of the commissioning program as specified herein.
- C. The contractor will be responsible for the scheduling of the activities identified and integrate all commissioning activities into the master schedule.

- D. Progress Meetings: Attend construction job-site meetings, as necessary, to monitor construction and commissioning progress. Coordinate with contractor to address coordination, deficiency resolution and planning issues.
- E. Site Observations: Perform site visits, as necessary, to observe component and system installations.
- F. Functional Testing Coordination:
 - 1. Equipment shall not be "temporarily" started for commissioning.
 - 2. Functional performance testing shall not begin until pre-functional, start-up and TAB is completed for a given system.
 - 3. The controls system and equipment it controls shall not be functionally tested until all points have been calibrated and pre-functional checklists are completed.
- G. Equipment shall not be "temporarily" started for commissioning.
- H. Functional performance testing shall not begin until pre-functional, start-up and TAB is completed for a given system.
- I. The controls system and equipment it controls shall not be functionally tested until all points have been calibrated and pre-functional checklists are completed.

1.09 SUBMITTALS

Commissioning Authority shall submit the following:

- 1. Basis of Design: Update as necessary during the work to reflect the progress on the components and systems. Forward updates to the LEED Coordinator in a timely manner.
- 2. Scoping Meeting Minutes.
- 3. Commissioning Plan Submit within 180 calendar days of the Construction Notice to Proceed.
 - a. Update as necessary during the work to reflect the progress on the components and systems. Forward updates to the LEED Coordinator in a timely manner.
- 4. Commissioning Schedule: Submit with Commissioning Plan.
 - a. Update as necessary during the work to reflect the progress on the components and systems. Forward updates to the LEED Coordinator in a timely manner.

5. Functional Performance Test Forms: Submit minimum 30 calendar days prior to testing.
6. Deficiency Report and Resolution Record: Document items of non-compliance in materials, installation or operation. Document the results from start-up/pre-functional checklists, functional performance testing, and short-term diagnostic monitoring. Include details of the components or systems found to be non-compliant with the drawings and specifications. Identify adjustments and alterations required to correct the system operation, and identify who is responsible for making the corrective changes.
 - a. Update as necessary during the work to reflect the progress on the components and systems. Forward updates to the LEED Coordinator in a timely manner.
7. Final Commissioning Report: Compile a final Commissioning Report. Summarize all of the tasks, findings, conclusions, and recommendations of the commissioning process. Indicate the actual performance of the building systems in reference to the design intent and contract documents. Include completed pre-functional inspection checklists, functional performance testing records, diagnostic monitoring results, identified deficiencies, recommendations, and a summary of commissioning activities.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. Instrumentation shall meet the following standards:
 1. Be of sufficient quality and accuracy to test and measure system performance within the tolerances required to determine adequate performance.
 2. Be calibrated on the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument being used.
 3. Be maintained in good repair and operation condition throughout the duration of use on this project.
- B. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the contractor for the equipment being tested.
- C. Data logging equipment or software required to test equipment will be provided by the Commissioning Authority, but shall not become the property of the Hawaii DOT.

PART 3 - EXECUTION

3.01 COMMISSIONING PROCESS

The following activities outline the commissioning tasks and the general order in which they occur. The Commissioning Authority shall coordinate all activities.

1. Commissioning Scoping Meeting
2. Commissioning Plan
3. Start-Up/Pre-Functional Checklists
4. Functional Performance Testing
5. Short-Term Diagnostic Testing
6. Deficiency Report and Resolution Record

3.02 COMMISSIONING SCOPING MEETING

A. Commissioning Scoping Meeting:

1. Schedule, coordinate, and facilitate a scoping meeting.
2. Review each building system to be commissioned, including its intended operation, commissioning requirements, and completion and start-up schedules.
3. Establish the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan.

B. Attendance: Commissioning Team members.

3.03 COMMISSIONING PLAN

Commissioning Plan: Develop a commissioning plan to identify how commissioning activities will be integrated into general construction and trade activities. The commissioning plan shall identify how commissioning responsibilities are distributed. The intent of this plan is to evoke questions, expose issues, and resolve them with input from the entire commissioning team early in construction.

1. Identify who will be responsible for producing the various procedures, reports, Hawaii DOT notifications and forms.
2. Include the commissioning schedule.
3. Describe the test/acceptance procedure.

3.04 START-UP/PRE-FUNCTIONAL CHECKLISTS

- A. Start-Up/Pre-Functional Checklists: Coordinate start-up plans and documentation formats, including providing contractor with pre-functional checklists to be completed during the startup process.
 - 1. Manufacturer's start-up checklists and other technical documentation guidelines may be used as the basis for pre-functional checklists.
- B. Start-Up/Pre-Functional Checklist shall help verify that the systems are complete and operational, so that the functional performance testing can be scheduled.

3.05 FUNCTIONAL PERFORMANCE TESTING

- A. Functional Performance Testing: Test procedures shall fully describe system configuration and steps required for each test; appropriately documented so that another party can repeat the tests with virtually identical results.
 - 1. Test Methods: Functional performance testing and verification may be achieved by direct manipulation of system inputs (i.e. heating or cooling sensors), manipulation of system inputs with the building automation system (i.e. software override of sensor inputs), trend logs of system inputs and outputs using the building automation system, or short-term monitoring of system inputs and outputs using standalone data loggers. A combination of methods may be required to completely test the complete sequence of operations. The Commissioning Authority shall determine which method, or combination, is most appropriate.
 - 2. Setup: Each test procedure shall be performed under conditions that simulate normal operating conditions as closely as possible. Where equipment requires integral safety devices to stop/prevent equipment operation unless minimum safety standards or conditions are met, functional performance test procedures shall demonstrate the actual performance of safety shutoffs in a real or closely-simulated condition of failure.
 - 3. Sampling: Multiple identical pieces of non-life-safety or non-critical equipment may be functionally tested using a sampling strategy. The sampling strategy shall be developed by the Commissioning Authority. If, after three attempts at testing the specified sample percentage, failures are still present, then all remaining units shall be tested at the contractors' expense.

- B. Develop functional performance test procedures for equipment and systems. Identify specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Coordinate test procedures with the contractor for feasibility, safety, equipment and warranty protection. Functional performance test forms shall include the following information:
1. System and equipment or component name(s).
 2. Equipment location and ID number.
 3. Date.
 4. Project name.
 5. Participating parties.
 6. Instructions for setting up the test, including special cautions, alarm limits, etc.
 7. Specific step-by-step procedures to execute the test.
 8. Acceptance criteria of proper performance with a Yes I No check box.
 9. A section for comments.
- C. Coordinate, observe and record the results of contractor's functional performance testing.
1. Coordinate retesting as necessary until satisfactory performance is verified.
 2. Verify the intended operation of individual components and system interactions under various conditions and modes of operation.

3.06 SHORT-TERM DIAGNOSTIC TESTING

Short-Term Diagnostic Testing: After initial occupancy, perform short-term diagnostic testing, using data acquisition equipment or the building automation system to record system operation over a two to three week period.

1. Investigate the dynamic interactions between components in the building system.
2. Evaluate the scheduling, the interaction between heating and cooling, and the effectiveness of the HVAC system in meeting the comfort requirements.

3.07 DEFICIENCY REPORT AND RESOLUTION RECORD

- A. Deficiency Report and Resolution Record: Document items of non-compliance in materials, installation or operation.
- B. Non-Conformance: Non-conformance and deficiencies observed shall be addressed immediately, in terms of notification to responsible parties, and providing recommended actions to correct deficiencies.
 - 1. Corrections of minor deficiencies identified may be made during the tests at the discretion of the Commissioning Authority. In such cases the deficiency and resolution shall be documented on the procedure form.
 - 2. For identified deficiencies: If there is no dispute on the deficiency and the responsibility to correct it:
 - a. The Commissioning Authority documents the deficiency and the adjustments or alterations required to correct it. The contractor corrects the deficiency and notifies the Commissioning Authority that the equipment is ready to be retested.
 - b. The Commissioning Authority reschedules the test and the test is repeated.
 - 3. If there is a dispute about a deficiency or who is responsible:
 - a. The deficiency is documented on the non-compliance form and a copy given to the LEED Coordinator.
 - b. Resolutions are made at the lowest management level possible. Additional parties are brought into the discussions as needed. Contractor shall have responsibility for resolving construction deficiencies. If a design revision is deemed necessary and approved by State Engineer, Architect/Engineer shall have responsibility for providing design revision.
 - c. The Commissioning Authority documents the resolution process.
 - d. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency and notifies the Commissioning Authority that the equipment is ready to be retested. The Commissioning Authority reschedules the test and the test is repeated until satisfactory performance is achieved.
 - 4. Cost of Retesting: Costs for retesting shall be charged to the Contractor.

3.08 FINAL COMMISSIONING REPORT AND LEED™ DOCUMENTATION

- A Final Commissioning Report: Compile final commissioning report. Summarize all of the tasks, findings, conclusions, and recommendations of the commissioning process.
- B. Documentation: Compile LEED™ Documentation. Format as required by USGBC for submittal under the referenced green building rating system.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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

DIVISION 2 – SITE CONSTRUCTION

SECTION 02070 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This section describes demolishing, razing, removing, disposing of, walls, fences, utility structures, old pavements, abandoned pipelines or utilities, and other obstructions designated for removal.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Submit proposed demolition and removal procedures to the State Engineer for approval before work is started. Procedures shall provide for coordination with other work in progress and a detailed description of methods and equipment to be used for each operation, and sequence of operations.
- C. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 CONSTRUCTION

- A. Preserve and protect structures, fences, and utilities to remain or to be removed by others in accordance with Section 02080 – PROTECTION OF EXISTING UTILITIES.
- B. Removal of Obstructions. Remove obstructions that interfere with construction,

such as the following:

1. Signs, posts, raised bars, guardrails, and structures placed for the information, safety, direction, or control of traffic.
2. Monuments, fences, walls, and headers, including associated footings, except items indicated to remain.
3. Curb and gutter, drainage and structures, except items indicated to remain.
4. Utility structures, such as pull boxes and handholes, except items indicated to remain.

Remove existing pavements that are not to remain in place. Removal includes rooting, plowing, pulverizing, or scarifying to a minimum depth of 6 inches or to bottom of new underlying Aggregate Subbase course, whichever is less.

Remove abandoned utility lines, such as pipes and conduits, contained inside project limits.

C. Seal pipes to be abandoned with one of the following:

1. Tight-fitting plug.
2. Wall of Class A or Class B concrete not less than 6 inches thick.
3. Brick wall not less than 8 inches thick with cement mortar joints.

Demolish abandoned manholes, catch basins, and drop inlets to an Elevation 3 feet below finished grade. Demolish and remove bottom of abandoned manholes, catch basins, and drop inlets before backfilling in accordance with the contract documents.

D. Remove material and debris, and dispose of at an authorized disposal site. Obtain written authorization from property owners and governmental authorities for disposal locations outside of project limits.

Leave adjacent areas with neat and finished appearance. Dispose of slashings, flammable material, and other debris within or adjacent to project limits. Do not burn material and debris.

Backfill trenches, basements, cavities, depressions and pits left by the removal of obstruction to level of surrounding ground in accordance with Section 02221 – TRENCHING AND BACKFILL.

E. Removal of Concrete Structures. Remove existing concrete slabs, foundations, and old pavements contained inside project limits unless otherwise indicated in the contract documents.

Cut, with power-driven abrasive saw, a 1-1/2-inch-deep joint at interface of concrete curbs, gutters, sidewalks, aprons, driveways, or pavements that are to

remain and that are to be removed. Cut neat and true at the nearest joint if applicable with no shattering or spalling of concrete to remain in place.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Unforeseen Site Demolition will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for Unforeseen Site Demolition required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall be allowed to include overhead, profit, insurances and/or any other mark-ups, as stipulated in Section 9.5 of the General Provisions.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02070.1	Removal of Structures and Obstructions	Lump Sum
02070.2	Unforeseen Site Demolition	Allowance

The allowance is an estimate and the amount shall not exceed the maximum amount shown in the proposal schedule.

END OF SECTION

SECTION 02080 – PROTECTION OF EXISTING UTILITES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This section describes the Contractor's duties to protect existing utilities within the project limits. Commitment

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 UTILITIES AND SERVICES

A. Contractor's Duty to Coordinate Utility Work.

The Contractor shall contact and cooperate with each affected utility Owner in order for the work to progress on schedule and without unreasonable disruption of such utility services. If the work calls for permanent utility service installations or corrections to, or modifications of, existing utilities, the Contractor is responsible for scheduling and coordinating such work with appropriate utility Owners. If the work required by the contract documents conflicts with the instructions, demands, or requirements of a utility Owner, the Contractor shall notify the State Engineer immediately. The Contractor shall furnish the State Engineer with evidence that the Contractor has provided all relevant utility Owners reasonable opportunity to review the drawings.

When the State has a separate agreement with utility Owners for work to be performed within the worksite, at the direction of the State Engineer, the Contractor shall make available all portions of the work and the worksite necessary for the utility Owners to do their work.

The Contractor hereby holds the State harmless against all risks arising from acts or omissions of utility Owners that damage the work, or create delays, disruptions, and additional cost to the Contractor in the performance of the work.

The Contractor may relocate or adjust the utility lines or service connections for

its convenience with the permission of the Owner of the utility and the State Engineer at no increase in contract price or contract time.

B. Contractor's Duty to Locate and Protect Utility.

Before beginning any work at the worksite, the Contractor shall:

1. Ascertain and mark the exact location and depth of all utilities within the project area including taking reasonable steps to detect the existence and location of utilities not shown on the drawing.
2. Acquaint all personnel working near utilities with the type, size, location, and depth of the utilities, as well as the consequences that might result from disturbances.
3. Take reasonable steps to protect the utilities and prevent service disruption. If service disruption is necessary to facilitate construction, the Contractor shall be responsible for providing temporary by-pass or other means acceptable to the State Engineer.

C. Discovery of Unknown Utility; Damage to Utility.

Upon discovery of a utility that was not shown to exist in the contract documents, or is found at a location that is substantially different than shown in the contract documents, the Contractor shall promptly notify the State Engineer before the utility and its surrounding area are further disturbed. The Contractor shall be responsible for the safety and protection of the public and the utility, subject to further direction from the State Engineer. Whenever the Contractor damages a utility or causes any interruption to any utility service, the Contractor shall promptly notify the State Engineer, the affected utility Owner, and the appropriate governmental authorities. The Contractor shall cooperate with the affected utility Owner and the appropriate governmental authorities in the restoration of service. If the damage is to a utility that is known, or should have been discovered before the damage occurred, the Contractor shall be responsible for all costs associated with its repair and restoration of service, at no increase in contract price or contract time.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section, except for Removal or Relocation of Unknown Utility, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for added Removal or Relocation of Unknown Utility required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall be allowed to include overhead, profit, insurances, as stipulated in Section 9.5 of the General Provisions.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02080.1	Protection of Existing Utilities	Lump Sum
02080.2	Removal or Relocation of Unknown Utility	Allowance

The allowance is an estimate and the amount shall not exceed the maximum amount shown in the proposal schedule.

END OF SECTION

SECTION 02210 – EXCAVATION AND EMBANKMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This section describes excavation, disposal, placement, compaction, and environmental testing of all materials within the limits of the work required to construct, building foundations, slabs-on-grade, site structures, aprons, walkways, and other areas necessary to construct the project in accordance with these specifications and in conformity to the construction plans, including, but not limited to, the following items.
1. Excavation and embankment.
 2. Grading and compaction.
 3. Borrow excavated material.
 4. Excavation of unsuitable material and backfill.
 5. Related Work Specified Elsewhere:
 - a. Section 02221 – TRENCHING AND BACKFILL.
 - b. Section 02232 – AGGREGATE BASE AND SUBBASE COURSE

1.03 REFERENCE STANDARDS

- A. State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.

1.04 QUALITY ASSURANCE

Perform work in accordance with Section 105 of the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.

1.05 CLASSIFICATION

- A. All material excavated shall be classified as defined below:
1. Unclassified Excavation: Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature, which is not otherwise classified and paid for under one of the following items.

2. Borrow Excavation: Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas approved by the State Engineer.
3. Unsuitable Excavation. Any material containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material, suitable for topsoil may be used on the embankment slope when approved by the State Engineer. Contaminated soil shall also be considered as unsuitable.

1.06 ENVIRONMENTAL TESTING

The contractor shall hire an environmental consultant to test all excavated material. The environmental consultant shall create a work plan that shall be submitted to the State Engineer, for his record, at least 10 days prior to the start of construction. The work plan shall include testing procedures and frequency of the testing. Test results shall be submitted to the State Engineer within 10 days after the completion of the test. Contaminated soil shall encountered shall be managed according to according to all State and Federal regulations.

1.07 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. The Contractor shall submit to the State Engineer a list of imported materials and name of supplier. The list of imported materials shall consist of laboratory test results performed on the proposed imported materials by an independent testing laboratory.

PART 2 - PRODUCTS

2.02 MATERIALS

- A. Imported Structural Fill: Imported structural fill shall be well graded, non-expansive granular material with particles no larger than 6 inches in largest dimension and should contain less than 30 percent of soil by weight passing the No. 200 sieve.

The maximum particle size of the fills and backfills should be limited to 3 inches or less for fills and backfills to be placed in confined locations. Confined locations are defined as areas where the compaction equipment is limited in size to less than 2 tons in static weight. In addition, if the contractor elects to use smaller-sized compaction equipment (less than 2 tons in static weight), the maximum particle size of the fill and backfill materials also should be limited to

3 inches in dimension.

- B. Onsite Fill: The onsite gravel material will be acceptable for reuse in compacted fills and backfills provided that particles be no larger than 6 inches in maximum dimension. The onsite basalt may also be reused in compacted fills and backfills provided that the material is processed into a well-graded consistency and all particles larger than 6 inches in maximum dimension be removed.

PART 3 - EXECUTION

3.01 GENERAL

- A. The suitability of material to be placed in embankments shall be subject to approval by the State Engineer. All unsuitable material shall be disposed of at an authorized legal disposal site off Airport property. The Contractor shall submit waste manifests that document the quantity of material being hauled off-site and where it was taken, for every day that hauling occurs.
- B. When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall cease immediately. The Contractor shall notify the State Engineer and the State Historic Preservation Office, Department of Land and Natural Resources at (808) 692-8015.
- C. Those areas outside of the limits of the pavement areas where the top layer of soil material has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches, to loosen and pulverize the soil.
- D. If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the State Engineer, who shall arrange for their removal if necessary. The Contractor, at his or her expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

3.02 EXCAVATION

- A. No excavation shall be started until the work has been staked out by the Contractor and the State Engineer has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the State Engineer. All suitable excavated material shall be used in the formation of

embankment, subgrade, or other purposes shown on the plans. All unsuitable material shall be properly disposed.

- B. When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, the excess shall be used to grade the areas of ultimate development or disposed as directed by the State Engineer. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.
- C. The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work.
- D. Selective Grading: When selective grading is indicated on the plans, the more suitable material designated by the State Engineer shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas so that it can be measured for payment for rehandling.
- E. Undercutting: Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches below the subgrade or to the depth specified by the State Engineer. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed off the airport. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with selected material.
- F. Overbreak: Overbreak, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the State Engineer. All overbreak shall be graded or removed by the Contractor and disposed of as directed by the State Engineer. The State Engineer shall determine if the displacement of such material was unavoidable and his or her decision shall be final. Payment will not be made for the removal and disposal of overbreak that the State Engineer determines as avoidable. Unavoidable overbreak will be classified as "Unclassified Excavation."
- G. Removal of Utilities: The Contractor shall coordinate with the Owners of the utilities prior to removal. All existing foundations shall be excavated for at least 2 feet below the top of subgrade or as indicated on the plans, and the material disposed of as directed. All foundations thus excavated shall be backfilled with suitable material and compacted as specified herein.
- H. Compaction Requirements: The subgrade under areas to be paved shall be scarified to a depth of 8 inches, moisture-conditioned, and compacted to a

density of not less than 95 percent of the maximum density as determined by ASTM D1557. Where basalt is encountered or exposed, scarification may be terminated prior to the minimum scarification depth. The finished subgrade shall also be proof-rolled to help detect soft/loose or weak spots. The equipment shall have a static weight of 20,000 lbs. per tire or the tires inflated to a pressure of 125 psi.

- I. The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D2167 or ASTM D6938. In-place field density tests shall be performed at a frequency of 1 test per 5,000 square feet of subgrade and at a frequency of 1 test per 2,500 square feet (structural fill) or 5,000 square feet (non-structural fill) per lift of fill placement.
- J. All loose or protruding rocks on the back slopes of cuts shall be pried loose or otherwise removed to the slope finished grade line. All cut-and-fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the plans or as directed by the State Engineer.
- K. Blasting shall not be allowed.

3.03 PREPARATION OF EMBANKMENT AREA

- A. Where an embankment is to be constructed, all sod and vegetable matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be completely broken up by plowing or scarifying to a minimum depth of 6 inches and shall be compacted as indicated in item entitled "FORMATION OF EMBANKMENTS" herein below.
- B. Where embankments are to be placed on natural slopes steeper than 5 horizontal to 1 vertical, the embankment fill should be keyed and benched into the natural slopes.

3.04 FORMATION OF EMBANKMENTS

- A. Embankments made with structural fill (6-inch minus) shall be formed in successive horizontal layers of not more than 12 inches in loose depth for the full width of the cross section, unless otherwise approved by the State Engineer.
- B. The layers shall be placed, to produce a soil structure as shown on the typical cross- stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.
- C. Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained because of rain, or other unsatisfactory weather conditions in the field. Material shall not be placed on surfaces that are muddy. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

- D. The material in each layer shall be moisture conditioned to obtain the prescribed compaction. To achieve a uniform moisture content throughout the layer, the material shall be moistened or aerated as necessary. Samples of all embankment materials for testing, both before and after placement and compaction, will be taken for each 1,000 square yards. Based on these tests, the Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.
- E. Rolling operations shall be continued until the embankment is compacted to not less than 95 percent of maximum density as determined by ASTM D1557. Under all areas to be paved, the embankments shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

Structural fill shall be compacted by using a large vibratory drum roller having a static weight of at least 10 tons traveling at a speed of about 300 feet per minute (about 3½ miles per hour). The roller should pass over the fill surface at least eight times for structural fill.

- F. On all landscape areas outside of the pavement areas, the top 4 inches shall be compacted to not less than 85 percent of the maximum dry density as determined by ASTM D1557.
- G. The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D2167 or ASTM D6938.
- H. Compaction areas shall be kept separate, and no layer shall be covered by another until the proper density is obtained.
- I. During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each layer is placed. Layer placement shall begin in the deepest portion of the embankment fill. As placement progresses, the layers shall be constructed approximately parallel to the finished pavement grade line.
- J. When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the embankment and the other material shall be incorporated under the future paved areas. Rockfill shall be brought up in layers as specified or as directed by the State Engineer and the finer material shall be used to fill the voids with forming a dense, compact mass. Rock or boulders shall not be disposed of outside the excavation or embankment areas, except at places and in the manner designated on the plans or by the State Engineer.
- K. When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in layers not exceeding 2 feet in

thickness. Each layer shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The layer shall not be constructed above an elevation 4 feet below the finished subgrade.

- L. There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in layers, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

3.05 FINISHING AND PROTECTION OF SUBGRADE

- A. After the subgrade is substantially complete, the Contractor shall remove any soft or other unstable material over the full width of the subgrade that will not compact properly. All low areas, holes or depressions in the subgrade shall be brought to grade with suitable select material. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans.
- B. Grading of the subgrade shall be performed so that it will drain readily. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes. All ruts or rough places that develop in the completed subgrade shall be graded and recompact.
- C. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been approved by the State Engineer.

3.06 HAUL

- A. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

3.07 TOLERANCES

- A. In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 12-foot straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of 1/2-inch or shall not be more than 0.05-foot from true grade as established by grade hubs. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing materials; reshaping; and recompact.
- B. On safety areas, intermediate and other designated areas, the surface shall be of such smoothness that it will not vary more than 0.10 foot from true grade as

established by grade hubs. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Excavation of Unsuitable Material will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for added Excavation of Unsuitable Material required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall be allowed to include overhead, profit, insurances and/or any other mark-ups, as stipulated in Section 9.5 of the General Provision.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02210.1	Excavation and Embankment	Lump Sum
02210.2	Grading and Compaction	Lump Sum
02210.3	Borrow Excavated Material	Lump Sum
02210.4	Excavation of Unsuitable Material	Allowance

The allowance is an estimate and the amount shall not exceed the maximum amount shown in the proposal schedule.

END OF SECTION

SECTION 02221 – TRENCHING AND BACKFILL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This section describes the following:

1. Trenching for drain pipe and drainage structures, water systems and sewer systems.
2. Backfilling to subgrade elevations.
3. Backfilling trenches for drain pipe and drainage structures, water systems and sewer systems.
4. Related Work Specified Elsewhere:
 - a. Section 02232 – AGGREGATE BASE AND SUBBASE COURSE.
 - b. Section 02400 – STORM DRAINAGE.
 - c. Section 02713 – WATER SYSTEMS.
 - d. Section 02722 – SANITARY SEWER SYSTEM.

1.03 REFERENCE STANDARDS

State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.

1.04 QUALITY ASSURANCE

Perform work in accordance with Section 105 of the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall be in accordance to the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Structure Backfill Material 703.20

Trench Backfill Material 703.21

Cullet and Cullet-Made Materials 717

- B. Structure and trench backfill material shall include mixture of aggregate and cullet. When cullet is not produced on the project island, or material unit price of cullet is greater than material unit price of structure backfill or greater than material unit price of trench backfill, cullet may be excluded for that backfill application. Before excluding cullet, submit availability and pricing documentation.
- C. Trench gravel backfill material shall conform to AASHTO M 43, size number 67. When tested in accordance with AASHTO T 96, the LA abrasion shall not exceed 40 percent at 500 revolutions.
- D. Controlled Low Strength Material (CLSM) in accordance with Section 314 of the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005 may be used in place of trench and structure backfill material, subject to the State Engineer’s acceptance. Where CLSM is allowed, provide drainage system to accommodate underground water seepage.
- E. Provide plastic marking tape that is acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch. Provide tape with minimum strength of 1750 psi lengthwise and 1500 psi crosswise. Manufacture tape with integral wires, foil backing, or other means to enable detection by a metal detector when tape is buried up to 3-feet deep. Manufacture tape specifically for marking and locating underground utilities. Provide metallic core of tape encased in a protective jacket or provided with other means to protect it from corrosion. Tape shall conform to the following colors and shall bear a continuous printed inscription describing the specific utility: Blue: Water System; Green: Sewer Systems.

PART 3 - EXECUTION

3.01 INSTALLATION

Perform trenching and backfill work for installation of drain pipe and drainage structures in accordance with Section 206 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

Perform trenching and backfill work for installation of water systems and sewer systems in accordance with Section 204 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02221.1	Trench Excavation and Backfill for Drain Pipe	Lump Sum
02221.2	Trench Excavation and Backfill for Drain Structures	Lump Sum
02221.3	Trench Excavation and Backfill for Water System	Lump Sum
02221.4	Trench Excavation and Backfill for Sewer System	Lump Sum

END OF SECTION

SECTION 02232 - AGGREGATE BASE AND SUBBASE COURSE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This section is applicable to landside work and not airfield work. This section describes furnishing and placing aggregate base course and aggregate subbase on a prepared surface as indicated on the plans and specified herein, including, but not limited to, the following items.

- A. Aggregate subbase.
- B. Aggregate base course.
- C. Related Work Specified Elsewhere:
 - 1. Section 01352 – LEED REQUIREMENTS
 - 2. Section 02221 – TRENCHING AND BACKFILL.
 - 3. Section 02450 – PORTLAND CEMENT CONCRETE SIDEWALKS.
 - 4. Section 02513 – ASPHALT PAVEMENT.

1.03 REFERENCE STANDARDS

State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

1.04 QUALITY ASSURANCE

Perform work in accordance with Section 105 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.

- B. Submit to the State Engineer a list of imported materials and name of supplier. The list of imported materials shall consist of laboratory test results performed on the proposed imported materials by an independent testing laboratory or a certification from the material producer that the material supplied complies with the requirements of these specifications.
- C. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Aggregate for Untreated Base	703.06
Aggregate for Subbase.....	703.17
Water	712.01
Cullet and Cullet-Aggregate Mixtures as Construction Materials	717.01
Cullet Materials for Roadways	717.02

Aggregate subbase course shall include mixture of aggregate and cullet. When cullet is not produced on the project island, or material unit price of cullet is greater than material unit price of aggregate for subbase, cullet may be excluded. Before excluding cullet, submit availability and pricing documentation.

PART 3 - EXECUTION

3.01 INSTALLATION

Perform work in accordance with Section 304 and 305 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02232.1	Aggregate Base Course	Lump Sum
02232.2	Aggregate Subbase	Lump Sum

END OF SECTION

SECTION 02281 - TERMITE CONTROL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This Section includes the following for termite control:

1. Chemical Soil treatment.
2. Termite control barrier system.

1.03 DEFINITIONS

- A. EPA: Environmental Protection Agency.
- B. PCO: Pest control operator.

1.04 SYSTEM DESCRIPTIONS

- A. Chemical Soil Treatment: System consists of application of termiticide chemicals to exposed soil and to voids in construction where insects may gain entry to the building.
- B. Termite Control Barrier System: System consists of a fine stainless steel mesh is placed across all termite entry points to the building, principally penetrations to concrete slab and cavities of walls. The mesh is too fine for the termites to squeeze through, too hard to chew through, and resistant to corrosive resistant to chemical attack.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Product Data:
 1. Treatments.
 2. Application instructions.
 3. Copies of the EPA-registered labels for all chemicals.

- C. Product Certificates: Signed by manufacturers of termite control products certifying that treatments furnished comply with requirements.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed State projects with project names and addresses, names and addresses of Owner's Representatives and owners, and other information specified.
- E. Soil Treatment Application Report: After application of termiticide is completed, submit report for the State's record information, including the following as applicable:
 - 1. Date and time of application.
 - 2. Moisture content of soil before application.
 - 3. Brand name and manufacturer of termiticide.
 - 4. Quantity of undiluted termiticide used.
 - 5. Dilutions, methods, volumes, and rates of application used.
 - 6. Areas of application.
 - 7. Water source for application.
- F. Warranties: Copies of special warranties specified in this Section.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: A PCA who is licensed by the Hawaii State Pest Control Board in Branch #3 and certified as a commercial applicator under the Hawaii Pesticide Law by the Hawaii State Department of Agriculture in category 7b and who is:
 - 1. Chemical Soil Treatment: An experienced installer who has completed termite control treatment similar to that indicated for this Project and whose work has a record of successful in-service performance.
 - 2. Termite Control Barrier System: An experienced installer who employs workers trained and approved by barrier system manufacturer to install manufacturer's products.
- B. Regulatory Requirements: Formulate and apply termiticides, and label with a Federal registration number, to comply with EPA regulations and authorities having jurisdiction.

1.07 PROJECT CONDITIONS

Environmental Limitations: To ensure penetration, do not treat soil that is water saturated. Do not treat soil while precipitation is occurring. Comply with EPA-Registered Label requirements and requirements of authorities having jurisdiction.

1.08 COORDINATION

Coordinate termite control treatment application or installation with excavating, filling, and grading and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs, before construction.

1.09 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive The State of other rights The State may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, signed by applicator and Contractor certifying that termite control work will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
1. Warranty Period: Three years from date of Substantial Completion.
 2. All necessary repairs of damages resulting from subterranean termite infestation within a period of one (1) year from the date of project acceptance will be made at the Contractor's own expense up to a total cost of \$5,000.00; and
 3. If subterranean termite infestation should occur through the treated area within the guarantee period, the soil shall be re-treated as described in item 1.09, paragraph (B)(4) herein below, or, other methods, including but not limited to, installation of a monitored bait station system to reduce infestation shall be installed without cost to the State of Hawaii.
 4. Minimum retreatment under special warranty.
 - a. All corrective treatments shall be performed to at least 10 feet around each visible subterranean termite activity.
 - b. Drill one hole per block along one course above adjacent grade of hollow tile walls which extend below grade, and treat at a rate consistent with the pesticide label.
 - c. Remove carpets from areas being treated.
 - d. Drill and treat through all interior concrete floors, along both sides of all partitions and walls, and all cracks and expansion joints according to label directions. Drill holes through concrete slab shall be 1/2 inch or 9/16 inch diameter and spaced not more than 18 inches apart.
 - e. Drill one hole at each plumbing or utility penetration through ground floor slab and treat according to label instructions.
 - f. Patch drill holes with cement/concrete to full depth of slab thickness and refinish walls/floors as necessary to prevent any backflow and to restore original appearance.

- g. Re-install carpets as applicable / necessary. Installation shall be done by a competent commercial carpet installer.
 - h. Replace any finish/finish materials which are contaminated by spilled chemicals.
5. The above-ground areas infested with subterranean termites shall be treated as appropriate with a proven, effective insecticide to eliminate those termites.

PART 2 - PRODUCTS

2.01 CHEMICAL SOIL TREATMENT

- A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in a soluble or emulsible, concentrated formulation that dilutes with water or foaming agent, and formulated to prevent termite infestation. Use only soil treatment solutions that are not harmful to plants. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to the product's EPA-Registered Label.
- B. Chemicals shall be aqueous solutions of Type I repellent termiticides such as Prelude, Dragnet SFR, Demon TC, or Prevail FT or the Type II non-repellent termiticide Premise 75. The chemicals shall be used in accordance with the labels and provisions related to the use of those pesticides as adopted by the Hawaii Pesticide Law, Chapter 149A, HRS, and the Federal Insecticide, Fungicide and Rodenticide Act. Type II non-repellent termiticides such as Dursban TC shall not be used.
- C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AgrEvo Environmental Health, Inc.; a Company of Hoechst and Schering, Berlin.
 - 2. American Cyanamid Co.; Agricultural Products Group; Specialty Products Department.
 - 3. Bayer Corp.; Garden & Professional Care.
 - 4. DowElanco.
 - 5. FMC Corp.; Pest Control Specialties.
 - 6. Zeneca Professional Products.

2.02 TERMITE CONTROL BARRIER SYSTEM

- A. Barrier Mesh: Type AIM marine grade 316 stainless steel mesh of 0.18 mm diameter wire with mesh openings of 0.66 x 0.45 mm.

- B. Accessories: Parging adhesives, clamps, ties, and other accessories as recommended by system supplier.

PART 3 - EXECUTION

3.01 EXAMINATION

Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of the soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control. Proceed with application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparing substrate. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended by termiticide manufacturer. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.03 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.
- B. Notify the State at least one day before application of chemicals.

3.04 APPLYING CHEMICAL SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute the treatment evenly.

1. A totalizing meter shall be provided to determine application rates and to indicate the total volume of pesticide applied in U.S. gallons. The meter shall be no more than 5 feet from the applicator at all times.
 2. Slabs-on-Grade: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - a. Whenever possible, the solution shall be applied not more than 24 hours before the pouring of concrete over the affected area..
 - b. Where a treated area that is not scheduled to be covered with a vapor retarder moisture barrier in the finished construction (e.g. lanai area) cannot be covered with a poured concrete slab the same day, the area shall be protected with a waterproofing covering such as polyethylene sheeting.
 3. Foundations: Adjacent soil including soil along entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers, piers; and along entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings. Treatment shall include the provision of vertical barriers as stated on the product label.
 4. Masonry: Treat voids.
 5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.05 TERMITE CONTROL BARRIER SYSTEM

- A. Strictly follow the manufacturer's instructions published in Builder's Installation Notes.
 1. Install mesh as required, fit and clamp mesh around all pipe penetrations, and terminate at perimeters as appropriate for the building construction as described in Builder's Installation Notes.

- 2. Install special fittings appropriate to construction as described in Builder's Installation Notes.
- B. Following installation of mesh, vapor retarder, reinforcing steel and concrete is installed as specified under other sections.
- C. Where required, mesh is integrated into subsequent construction as described in Builder's Installation Notes.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02281	Termite Control	Lump Sum

END OF SECTION

SECTION 02282 - SOIL TREATMENT FOR VEGETATION CONTROL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This section describes spraying weed killer on the prepared subgrade prior to the installation of aggregate base course, where called for on plans and on existing growth prior to application.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Before installation, submit to the State Engineer, affidavits from the manufacturers or suppliers of the aggregate base course proposed to be furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of these specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

Weed Killer shall be "Casoron 4G", "Norosac 4G", or an approved equal for under asphalt application on new or rebuilt pavement, and shall be "Hyvar X", "Roundup" or approved equal for application to existing weeds for resurfacing jobs.

PART 3 - EXECUTION

3.01 APPLICATION

- A. The under asphalt weed killer shall be mixed and uniformly spread using calibrated application equipment at the maximum rates permitted for under asphalt use and in strict accordance with the manufacturer's label. Base course material shall be installed as soon as possible after applying the weed killer to preclude loss of germination inhibiting action.

- B. In treatment of existing growth on resurfacing jobs, the weed killer shall be mixed and uniformly sprayed in strict accordance with the manufacturer's label.
- C. Nut grass shall be retreated two (2) days after initial application and again if growth still exists.
- D. The Contractor shall notify the State Engineer 24 hours before application of weed killer.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

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 02400 - STORM DRAINAGE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This section shall consist of the construction of landside drainage system in accordance with these specifications and in reasonably close conformity with the lines and grades shown on plans.
- B. This section describes constructing and reconstructing manholes, inlets, catch basins and other types of drainage structures. This section also describes furnishing, installing, and adjusting steel and cast iron frames and covers. Manholes, inlets, catch basins and other types of drainage structures hereinafter referred to as structures unless otherwise noted.
- C. This section also describes fabricating, furnishing, installing and cleaning PVC drain culverts, hereinafter referred to as culvert unless otherwise noted, up to 5 feet from the building or as indicated on the plans and specified herein, including, but not limited to, the following items.
 - 1. High Density Polyethylene Pipe (HDPE) and Reinforced Concrete Pipe (RCP)
 - 2. Drain manholes
 - 3. Drain inlets
 - 4. Frames, grates, covers and ladder rungs
 - 5. Clean out to grade.
 - 6. Bedding and backfill materials
 - 7. Related Work Specified Elsewhere:
 - a. Section 02221 – TRENCHING AND BACKFILL.
 - b. Section 02232 – AGGREGATE BASE AND SUBBASE COURSE.

1.03 REFERENCE STANDARDS

State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

1.04 QUALITY ASSURANCE

Perform work in accordance with Section 105 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Shop Drawings: Submit complete shop drawings and manufacturer's certifications for the State Engineer's review before any materials are ordered or fabricated.

PART 2- PRODUCTS

2.01 MATERIALS

All materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Structural Concrete	601
Bed Course Material for Crushed Rock Cradle	703.16
Structure Backfill Material.....	703.20
Trench Backfill Material	703.21
Joint Filler.....	705.01
Joint Mortar for Pipe	705.02
Flexible Watertight Gasket	705.03
Mortar for Manhole	705.08
Reinforced Concrete Pipe (RCP).....	706.02
High Density Polyethylene Pipe (HDPE).....	706.10
Reinforcing Steel	709.01
Non-Shrink Grout	712.04 (A)

Precast Concrete Unit	712.06
Frames, Grates, Covers and Ladder Rungs	712.07
Cullet Materials for Drainage Systems.....	717.04

PART 3 - EXECUTION

3.01 INSTALLATION

Perform work in accordance with Sections 603 and 604 of the State of Hawaii
 “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION”
 dated 2005.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at
 the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02400	Storm Drainage	Lump Sum

END OF SECTION

SECTION 02411 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of portions of buildings and structures.
 - 2. Demolition and removal of site improvements adjacent to a building or structure to be demolished.
 - 3. Removing below-grade construction.
 - 4. Disconnecting, capping or sealing, and removing site utilities.
 - 5. Salvaging items for reuse by Owner.
- B. Related Requirements:
 - 1. Section 01524 "Construction Waste Management" for recycling disposal of demolished materials.
 - 2. Section 02070 "Removal of Structures and Obstruction" for removal of site and other structures and obstructions designated for removal.

1.03 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.

1.04 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, FIDS monitors, PA speakers, decorative bollards, trash bins, benches, and other items of interest or value to the State that may be encountered during demolition remain the property of the State. Coordinate with State Engineer, who will establish special procedures for removal and salvage. Carefully salvage in a manner to prevent damage and promptly return to the State.

1.05 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site. Review methods and procedures related to building and structure demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review structural load limitations of existing structures.
 - 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment and facilities needed to make progress and avoid delays.
 - 4. Review and finalize protection requirements
 - 5. Review procedures for noise control and dust control.
 - 6. Review procedures for protection of adjacent buildings.
 - 7. Review items to be salvaged and returned to the State.

1.06 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals".
- B. Engineering Survey: Submit engineering survey of condition of existing checkpoint building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.
- D. Schedule of Building Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition and removal work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping or re-routing of utility services.
 - 4. Locations of temporary protection and means of egress, including for other tenants affected by building demolition activities.

- 5. Coordination of State's continuing occupancy of adjacent buildings and use of premises.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before the Work begins.
- F. Inventory: After building demolition is complete, submit a list of items that have been removed and salvaged.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals:

1.07 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. State assumes no responsibility for buildings and structures to be demolished. Conditions existing at time of inspection for bidding purpose will be maintained by the State as far as practical.
- D. On-site storage or sale of removed items or materials is not permitted.

1.08 COORDINATION

- A. Arrange demolition schedule so as not to interfere with State's on-site operations or operations of adjacent occupied buildings.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by the State Engineer. State does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. When unanticipated mechanical, electrical, or structural elements are encountered, investigate, and measure the nature and extent of the element. Promptly submit a written report to the State Engineer.
- D. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.02 PREPARATION

- A. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.03 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Refer to Division 15 "Mechanical" and Division 16 "Electrical" for shutting off, disconnecting, removing, and sealing or capping utilities.

- B. Existing Utilities to be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 3. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.04 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished. Strengthen or add new supports when required during progress of demolition.
- C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 01533 "Barricades".
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.05 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 2. Maintain fire watch during and for at least 24 hours after flame-cutting operations.
 3. Maintain adequate ventilation when using cutting torches.
 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

3.06 DEMOLITION BY MECHANICAL MEANS

- A. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

- B. Salvage: Items to be removed and salvaged are indicated on Drawings.
- C. Below-Grade Construction: Demolish foundation walls and other below-grade construction that are within footprint of new construction and extending 5 feet outside footprint indicated for new construction. Abandon below-grade construction outside this area. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- D. Existing Utilities: Demolish existing utilities and below-grade utility structures that are within 5 feet outside footprint indicated for new construction. Abandon utilities outside this area. Fill abandoned utility structures with satisfactory soil materials according to backfill requirements in Division 2 "Site Construction".

3.07 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 2 "Site Construction".
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.08 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.09 DISPOSAL OF DEMOLISHED MATERIALS

- A. Refer to Section 01524 "Construction Waste Management".
 - 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. Do not burn demolished materials.

3.10 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began. Clean roadways of debris caused by debris transport.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02411.1	Structure Demolition	Lump Sum
02411.2	Structure Demolition - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 02450 – PORTLAND CEMENT CONCRETE SIDEWALKS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This section describes constructing portland cement concrete sidewalks.
- B. Related Work Specified Elsewhere:
 - 1. Section 01352 – LEED REQUIREMENTS
 - 2. Section 02210 – EXCAVATION AND EMBANKMENT.
 - 3. Section 02232 – AGGREGATE BASE AND SUBBASE COURSE.

1.03 REFERENCE STANDARDS

State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with Section 105 of the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.
- B. Mockups: Cast concrete slabs-on-grade to demonstrate surface finish, texture, typical joints, tolerances, and standard of workmanship.
 - 1. Build mockups approximately 3 ft. x 3 ft. square in the location directed by State Engineer.
 - 2. If the State Engineer determines that mockups do not meet requirements, demolish and remove them from the site and cast another until the mockup is approved.
 - 3. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- C. Pre-installation Conference: Before submitting design mixes, review existing concrete surfaces and concrete mix design. Examine procedures for ensuring quality of concrete materials and design intent of the Drawings. Require representatives of each entity directly concerned with work covered under this Section to attend along with State Engineer. Agenda shall include review of joint locations.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Shop Drawings: Submit complete shop drawings and manufacturer's certifications for the State's review before any materials are ordered or fabricated.
- C. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The following materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Structural Concrete	601
Aggregate for Untreated Base	703.06
Joint Filler.....	705.01
Welded Wire Fabric Reinforcement.....	709.0C

- B. Admixture Colorant: Powdered admixture that produce durable and structurally sound integrally color conditioned concrete.

1. Colors: Where applicable and indicated on the Drawings, match existing adjacent pavement colors and finishes.
 2. Available products subject to compliance with requirements include Chromix Admixture by L. M. Scofield Co.; Powder Pigments for Coloring Concrete by Huntsman Davis Colors; Dry Pigment Ready Mix by Solomon Colors, Inc.; or approved equal.
- C. Surface Retarder:
1. Surface retarder shall temporarily halt the set of concrete at the surface while the concrete below the surface hardens normally. Retarder shall allow the concrete surface to be lightly washed or brushed to remove the surface paste and expose the fine aggregates to create a sand finish.
 2. Available products subject to compliance with requirements include Top Etch Surface Retarder by Unitex; Exposee by ChemMasters, Inc.; True Etch Surface Retarder by Edoco (Burke Construction Chemicals); or approved equal.
- D. Concrete Sealer: A color-matched, water based, low VOC, environmentally sound, concrete sealer for exterior concrete flatwork. Same manufacturer as the colored admixture shall supply concrete sealer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Excavating: Excavate to required depth, remove unsuitable material, and compact subgrade to firm, even surface in accordance with Section 02210 – EXCAVATION AND EMBANKMENT.
- B. Forms: Use full-depth wood or metal forms that are straight, free of warp and of sufficient strength to resist pressure of concrete without springing. Brace and stake forms to remain in both horizontal and vertical alignment until removal.
- C. Aggregate Base Course: Use aggregate for untreated base conforming to Section 02232 – AGGREGATE BASE AND SUBBASE COURSE, as base course material. Place base course material a minimum of 4 inches in depth. Compact with three passes of lightweight mechanical tamper, roller, or vibratory system.
- D. Reinforcement: Provide welded wire reinforcement, in accordance with Section 602 - REINFORCING STEEL of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005, if specified.
- E. Placing Concrete: Moisten aggregate and forms to saturated, surface-dry

condition immediately before placing concrete. Place concrete sidewalk 4-inches thick according to Section 503 – CONCRETE STRUCTURES of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

F. Finishing:

1. Finish concrete in accordance with Subsection 503.03(M)(3)(b) – SIDEWALKS AND MEDIAN STRIPS of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005. Do not plaster surface. Use edging tool with 1/4-inch radius to finish outside edges of sidewalk. Finish sidewalk as plane surface with 2-percent (allowable construction tolerance of plus or minus 0.4 percent
2. Rock Salt Finish:
 - a) Rock salt crystals of size ranging from 1/8 to 3/8 of an inch can be used for obtaining the desired results.
 - b) Salt crystals larger than 3/8 of an inch should be avoided to prevent hazards resulting from larger indents.
 - c) Salt crystals should be pressed and lodged into the concrete surface up to a depth not exceeding half of their diameter at most.
 - d) The concentration of salt crystal may vary according to the type of finish required ranging from 3-12pounds per 100 sq feet.
 - e) The surface before salting should be smooth and even obtain better finish, all the lines and marks left due to the edge of the floats and rollers should be smoothened.
 - f) The salt crystal should be spread evenly all over the surface to obtain better finish quality.
 - g) The stiffness of the concrete surface should be enough to prevent an indent larger than ¼ of an inch when the pressed with a thumb with moderate pressure.
 - h) Too wet or too dried surface results in poor finish quality.
 - i) The surface after salting should be washed properly with water removing all traces of salt content which can cause discoloration in the case of colored concrete.
 - j) Sealant should be applied only after removing all traces of salt content

G. Joints: Match joints with curb or pavement joints.

1. Expansion Joints: Use 1/2-inch-thick preformed expansion joint filler at fixed structures, such as buildings, bridges, or walls, and at curb returns. Extend preformed expansion joint filler from bottom of sidewalk to approximately 1/4 inch below top of sidewalk.
2. Weakened-Plane Joints: Divide sidewalk between expansion or construction joints into sections approximately 5 feet in length by providing transverse, weakened-plane joints. Provide transverse, weakened-plane joints when time period between consecutive concrete

- placements is more than 45 minutes.
3. Where sidewalks are more than 7 feet in width, provide longitudinal, weakened-plane joints to obtain secure uniform blocks that are approximately square unless otherwise shown on the plans. Where sidewalk joints exceed 7 feet in any direction, the Contractor shall add Propex fibermesh or approved equal to the concrete mix as directed by the manufacturer's specifications.
 4. Provide weakened-plane joints where corners of drop inlets project into sidewalk. Form weakened-plane joints to 1-inch minimum depth and approximately 1/8-inch width using scoring tool, saw, or other means acceptable to the State.
 5. Construction Joints: Form construction joints around appurtenances such as manholes and utility poles extending through entire sidewalk. Provide 1/4-inch-thick preformed expansion joint filler for full depth of joints.
- H. Curing: Cure concrete for at least 72 hours in accordance with Subsection 503.03(L) – CURING METHODS of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005. Protect concrete from pedestrian traffic for 72 hours and from vehicular traffic for seven days.
- I. Backfilling: After sidewalk has set, fill remaining excavated areas with material acceptable to the State. Place and tamp fill in lifts up to 6 inches in depth.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02450	Portland Cement Concrete Sidewalks	Lump Sum

END OF SECTION

SECTION 02513 - ASPHALT PAVEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

A. This section is applicable to landside work and not airfield work. This section describes furnishing and placing asphalt pavement on a prepared surface, including, but not limited to, the following items.

1. Asphalt materials
2. Aggregate materials
3. Aggregate subbase
4. Asphalt paving base course, binder course, and wearing course.

B. Related Work Specified Elsewhere:

1. Section 01352 – LEED REQUIREMENTS
2. Section 02221 – TRENCHING AND BACKFILL.
3. Section 02232 – AGGREGATE BASE AND SUBBASE COURSE.

1.03 REFERENCE STANDARDS

State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

1.04 QUALITY ASSURANCE

Perform work in accordance with Section 105 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Establish and submit job-mix formula for asphalt pavement mix as follows:
 1. Design percent of aggregate passing each required sieve size.
 2. Design asphalt content added to aggregate, based on total weight of mix.

3. Design proportion of processed RAP.
4. Design temperature of mixture at point of discharge at paver.
5. Source of aggregate.
6. Grade of asphalt cement.
7. Test data used to develop job-mix formula.

With the exception of item (4) in this subsection, if design requirements are modified after the State Engineer accepts job-mix formula, submit new job-mix formula before using asphalt pavement produced from modified mix design.

- C. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Asphalt Cement (PG 64-16)	702.01
Emulsified Asphalt.....	702.04
Aggregate for Hot Mix Asphalt Pavement.....	703.09
Filler	703.15
Hydrated Lime	712.03

- B. General: Asphalt pavement shall be plant mixed and shall include mixture of aggregate and asphalt cement, and may include reclaimed asphalt pavement (RAP) or filler, or both.

Asphalt pavement shall include surface course and may include one or more binder courses, depending on asphalt pavement thickness indicated in the contract documents.

RAP is defined as removed or reprocessed pavement materials containing asphalt and aggregates. Process RAP by crushing until 100 percent of RAP passes 3/4-inch sieve. Size, grade uniformly, and combine materials such that blend of RAP and aggregate material conforms to grading requirements of Subsection 703.09 - AGGREGATE FOR HOT MIX ASPHALT PAVEMENT of

the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

In surface and binder courses, aggregate for asphalt may include RAP quantities up to 15 percent of total mix weight.

Quantity of filler material to correct deficiencies in aggregate gradation passing the No. 200 sieve shall not exceed 3 percent by weight of fine aggregates.

- C. Job-Mix Formula and Tests: Design job-mix formula in accordance with procedures contained in current edition of Asphalt Institute's Mix Design Methods for Asphalt Concrete and Other Hot Mix Types, Manual Series No. 2 (MS-2) for either Marshall Method or Hveem Method of Mix Design.

Limit compacted lift thickness and asphalt content of job-mix formula as specified in Table 2.01-1 - Limits of Compacted Lift Thickness and Asphalt Content.

TABLE 2.01-1 - LIMITS OF COMPACTED LIFT THICKNESS AND ASPHALT CONTENT				
MIX NO.	II	III	IV	V
Minimum to Maximum Compacted Thickness for Individual Lifts (Inches)	2-1/4 to 3	2 to 3	1-1/2 to 3	1-1/4 to 3
Asphalt Content Limits (Percent of Total Weight of Mix)	3.8 to 6.1	4.3 to 6.1	4.3 to 6.5	4.8 to 7.0

Asphalt content limits for porous aggregate may be exceeded only if accepted in writing by the State Engineer.

Meet job-mix formula design criteria specified in Table 2.01-2 - Job-Mix Formula Design Criteria.

TABLE 2.01-2 - JOB-MIX FORMULA DESIGN CRITERIA	
Hveem Method Mix Criteria (AASHTO T 246 and AASHTO T 247)	
Stability, minimum	37
Air Voids (percent) ¹	3 - 5
Marshall Method Mix Criteria (AASHTO T 245)	

Compaction (number of blows each end of specimen)	75
Stability, minimum (pounds)	1,800
Flow (x 0.01 inch)	8 - 16
Air Voids (percent) ¹	3 - 5
<u>Notes:</u> 1. Air Voids: AASHTO T 166 or AASHTO T 275; AASHTO T 209, AASHTO T 269.	

Minimum percent voids in mineral aggregates (VMA) of job-mix formula shall be as specified in Table 2.01-3 - Minimum Percent Voids in Mineral Aggregates (VMA).

TABLE 2.01-3 - MINIMUM PERCENT VOIDS IN MINERAL AGGREGATES (VMA)					
Nominal Maximum Particle Size, (Inches)	1-1/2	1	3/4	1/2	3/8
VMA, (percent) ¹	11	12	13	14	15
<u>Notes:</u> 1. VMA: See Asphalt Institute Manual MS-2, Chapter 4.					

- D. Range of Tolerances for Asphalt Pavement: Provide asphalt pavement within allowable tolerances of accepted job-mix formula as specified in Table 2.01-4 - Range of Tolerances for Asphalt Pavement.

TABLE 2.01-4 - RANGE OF TOLERANCES FOR ASPHALT PAVEMENT	
Passing No. 4 and larger sieves (percent)	± 7
Passing No. 8 to No. 100 sieves (inclusive) (percent)	± 4
Passing No. 200 sieve (percent)	± 3
Asphalt Content (percent)	± 0.4
Mixture Temperature (degrees F)	± 20

PART 3 - EXECUTION

3.01 INSTALLATION

Perform work in accordance with Section 401 of the State of Hawaii
"STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION"
dated 2005.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at
the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02513	Asphalt Pavement	Lump Sum

END OF SECTION

SECTION 02515 - TACK COAT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This section is applicable to landside work and not airfield work. This section describes furnishing and applying tack coat on existing asphalt, new asphalt, concrete surface, or both.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Shop Drawings: Submit complete shop drawings and manufacturer's certifications for the State Engineer's review before any materials are ordered or fabricated.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Emulsified Asphalt (Type SS-1, SS-1h, CSS-1 or CSS-1h) 702.04

Water 712.01

Dilute emulsified asphalt with water at rate of one part emulsified asphalt to one part water by volume.

Submit certificate of compliance for emulsified asphalt, accompanied by certified test data in accordance with AASHTO M 140 (Type SS-1 or SS-1h) or AASHTO M 208 (Type CSS-1 or CSS-1h), as modified by Subsection 702.04 - Emulsified Asphalt.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Weather Limitations. Application of tack coat will not be allowed under the following conditions:
1. On wet surfaces as determined by the State Engineer.
 2. When air temperature is below 60 degrees F and falling. Tack coat may be applied when air temperature is above 50 degrees F and rising. Air temperature will be measured in shade and away from artificial heat.
 3. When weather conditions prevent proper method of construction.
- B. Equipment: Provide equipment, including distributor and heater capable of applying asphaltic material as follows:
1. At constant heat on variable surface widths of up to 15 feet.
 2. At readily determined and controlled rates from 0.05 to 2.0 gallons per square yard.
 3. With uniform pressure.
 4. With allowable variation from specified rate, not to exceed 0.02 gallon per square yard.

Equip distributor with tachometer, pressure gages, accurate volume measuring devices or calibrated tank, thermometer for measuring temperature of tank contents, power unit for pump, and full circulation spray bars adjustable laterally and vertically, with covers to prevent overspraying. Provide hose and nozzle attachment for spotting skipped areas and areas inaccessible to distributor.

- C. Preparation of Surface: If surface conditions described in Subsection 310.03 - Construction are applicable, clean surface in accordance with Section 310 - Brooming Off immediately before applying tack coat.
- D. Application of Tack Coat: Protect structures including guardrails, guardrail post, and other appurtenances from tack coat splatter.

Apply tack coat on existing asphalt or concrete surface, or both, to be overlaid by asphalt pavement course. Once water has evaporated from asphalt emulsion, tack coat is said to have set. Place asphalt pavement overlay after tack coat has set and within four hours of application. For multiple lift construction, tack coat application may be waived when upper lift is placed within 12 hours of placing lower lift.

Before placing asphalt pavement course, apply tack coat to contact surfaces of curbs, gutters, manholes, other structures, vertical faces of existing pavements, and exposed transverse and longitudinal edges of each course.

Apply tack coat uniformly at rate of 0.12 - 0.18 gallon per square yard. At transverse and longitudinal application joints, ensure that specified tack coat application rate is not exceeded. Squeegee excess tack coat from surface. Use hand sprays to cover areas inaccessible to distributor and to correct deficient areas.

- E. Protection of Tack Coat: Except for construction equipment directly connected with paving operations, keep traffic off tack coat. Protect tack coat from damage until asphalt pavement layer is placed. Repair tack coat damage at no increase in contract price or contract time.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the price bid under Item No. 02513 – ASPHALT PAVEMENT.

END OF SECTION

SECTION 02528 - CONCRETE CURBS

PART I – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This section describes constructing concrete curbs and gutters.
- B. Related Work Specified Elsewhere: Section 01352 – LEED REQUIREMENTS.

1.03 STORAGE OF MATERIALS

Cement and aggregates shall be stored in such a manner as to prevent their deterioration or the intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete and shall be promptly removed from the site.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Shop Drawings: Submit complete shop drawings and manufacturer’s certifications for the State Engineer’s review before any materials are ordered or fabricated.
- C. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall be in accordance with the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Portland Cement Concrete Curb and Gutter 638

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All work shall be as indicated and as detailed in the State of Hawaii, Department of Transportation, Highways Division, Design Branch "STANDARD PLANS" dated 2008, as revised or the construction drawings.
- B. All work shall conform to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02528	Concrete Curbs	Lump Sum

END OF SECTION

SECTION 02578 - PAINTED PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

This section describes furnishing, installation and removal of pavement markings for landside roadways and not airfield markings.

1.03 REFERENCE STANDARDS

State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

1.04 QUALITY ASSURANCE

Perform work in accordance with Section 105 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

White and Yellow Traffic Paint.....	755.01
Pavement Markers	755.02
Adhesives for Pavement Markers	755.03
Preformed Pavement Marking Tape	755.04
Retroreflective Thermoplastic Compound Pavement Markings.....	755.05

- B. Pavement markers shall be of uniform composition, free from surface irregularities, and free from other physical damage or defects that affect appearance or performance, or both.

PART 3 - EXECUTION

3.01 INSTALLATION

Perform work in accordance with Section 629 of the State of Hawaii
"STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION"
dated 2005.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02578	Painted Pavement Markings	Lump Sum

END OF SECTION

SECTION 02713 - WATER SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

Furnish all labor, materials, equipment, and tools to install exterior water system up to 5 feet from the building or as indicated on the plans and specified herein, including, but not limited to, the following items.

1. Section Includes:

- a. Pipe and fittings for water system.
- b. Valves and valve boxes
- c. Backflow preventers
- d. Bedding and backfill materials.
- e. Reinforced concrete jacket
- f. Concrete reaction blocks
- g. Chlorination and Testing

2. Related Work Specified Elsewhere: Section 02221 – TRENCHING AND BACKFILL.

1.03 REFERENCE STANDARDS

- A. State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.
- B. County of Maui Department of Water Supply “WATER SYSTEM STANDARDS” dated 2002.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with Section 105 of the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.
- B. Perform Work in accordance with County of Maui Department of Water Supply, “WATER SYSTEM STANDARDS” dated 2002.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Shop Drawings: Submit complete shop drawings and manufacturer's certifications for the State Engineer's review before any materials are ordered or fabricated. Required submittals are as specified in the County of Maui Department of Water Supply "WATER SYSTEM STANDARDS" dated 2002.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall conform to the County of Maui Department of Water Supply "WATER SYSTEM STANDARDS" dated 2002. Water mains shall be Class 52 ductile iron pipe with push-on joint and CL. 150 PVC C900 with DR of 18. Fittings shall be Class 250 cast iron with mechanical joints. Gate valves shall be cast iron, Class 200, with mechanical joints. Laterals shall be Copper, Type K. All ductile iron pipe, fittings and valves shall be supplied with a fusion bonded epoxy coating.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Perform Work in accordance with Section 624 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.
- B. Perform Work in accordance with County of Maui Department of Water Supply, "WATER SYSTEM STANDARDS" dated 2002.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02713	Water Systems	Lump Sum

END OF SECTION

SECTION 02722 - SANITARY SEWER SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

Furnish all labor, materials, equipment and tools to construct the exterior sewer system up to 5 feet from the building as indicated on the drawings and herein specified, including, but not limited to, the following items.

1. Section Includes:
 - a. VCP sewer pipe and fittings.
 - b. Clean Out to Grade
 - c. Bedding and backfill materials.
2. Related Work Specified Elsewhere: Section 02221 – TRENCHING AND BACKFILL.

1.03 REFERENCE STANDARDS

State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.

1.04 QUALITY ASSURANCE

Perform work in accordance with Section 105 of the State of Hawaii “STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION” dated 2005.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Shop Drawings: Submit shop drawings of sanitary sewer system items showing dimensioned plans and elevations, large scale details, attachment devices and other components.

PART 2 - PRODUCTS

2.01 MATERIALS

All materials shall be in accordance to the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005 except as amended in the plans and/or specifications herein paragraphs of Measurements and Payments in the Sections are not applicable to this project.

Bed Course Materials for Crushed Rock Cradle	703.16
Trench Backfill Material	703.21
Joint Mortar for Pipe	705.11
VCP for Sewer System.....	706.08

PART 3 - EXECUTION

3.01 INSTALLATION

Perform work in accordance with Section 625 of the State of Hawaii "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" dated 2005.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02722	Sanitary Sewer System	Lump Sum

END OF SECTION

SECTION 02810 - SPRINKLER SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. Provide a landscape irrigation system in the areas shown on the Drawings in the phases as indicated on the plans and specifications. All work indicated on the Drawings by notes shall be provided whether or not specifically mentioned in the Specifications. Items not specifically shown in the Drawings or specified, but normally required to conform with such intent, are considered part of the work.
- B. Make minor field adjustments required due to existing site conditions and revisions that are a result of project construction and not noted in the plans to insure adequate coverage and even distribution of water in all landscape areas.
- C. The work in this Section includes, but is not limited to, the following:
 - 1. Excavation and backfilling.
 - 2. Pipe Sleeves, Fittings and sprinkler heads.
 - 3. Valves.
 - 4. Automatic controller, remote control valves and control wire.
 - 5. Adjustments and instructions.
 - 6. Project and record drawings.
 - 7. Warranty.

1.03 CODES AND STANDARDS

- A. Perform work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work and provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.

- B. Substitutions: Substitutions of any equipment or material specified or indicated will not be considered, unless the State deems the substitute to be of equal or greater quality and for which a cost savings is offered.
- C. Construction Schedule: At the pre-construction meeting, provide a written copy of the projected construction schedule noting the estimated completion date, number of working days required and any special coordination requirements.
- D. Certificates of Warranty: Provide all certificates of warranty from the irrigation equipment manufacturers.
- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 JOB CONDITIONS

- A. Acceptance of Previous Work: Inspect and accept the condition of the site relative to this Section before commencing with the work covered herein. If not acceptable, notify the State Engineer in writing. By proceeding with the work under this Section, the Contractor indicates his acceptance of previous related work.
- B. Meet on Site: Prior to commencing work, meet with the State Engineer, Landscape Architect, and all other concerned parties on the site to review the work under this Section. Request this meeting one week prior to the desired meeting time.
- C. Underground Utilities and Obstructions: Verify the location of underground utilities and other obstructions that may affect the work. Any obstructions encountered shall be reported to the State Engineer. Repair all damage to any known utility line or other underground obstruction at the Contractor's expense. Report damage to any unknown utilities to the State Engineer.
- D. Protection:
 - 1. Provide necessary safeguards and exercise caution against injury or defacement of existing site improvements. Prevent vehicles of any kind from passing over sidewalks, curbs, etc., unless adequate protection is provided. Do not store materials or equipment or operate equipment near or under the branches of any existing plants that are to remain, except as actually required for construction in those areas.
 - 2. Be responsible for damage caused by leaks in the piping systems being installed or during the Warranty period due to failure of workmanship or materials. Repair all damage to return the area to the previous condition at Contractor's expense.
- E. Clean Up: Keep all areas of work clean, neat, and orderly at all times during the period of Contract. Clean all construction areas at the end of each day.

F. Final Inspection:

1. At the completion of all irrigation work request a final inspection. Notify the State Engineer ten (10) working days prior to the inspection so a mutually agreeable time for inspection may be arranged.
2. The State Engineer shall be present at the inspection.
3. If, after the inspection, the State Engineer is of the opinion all work has been performed in accordance with the Drawings and Specifications, written notice of acceptance and completion of the Project will be given. If all or certain portions of the work are not acceptable under the terms and intent of the Drawings and Specifications, a reasonable amount will be retained from the final payment and the defects in the work shall be corrected before the work is accepted by the State Engineer.

1.06 WARRANTY

- A. Warranty all work for a period of one (1) year after acceptance. Immediately repair or replace without cost to the State all material and equipment found to be defective due to faulty material or workmanship during the period. This warranty does not include vandalism, negligence by others or acts of God.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Material incorporated in the system shall be new, without flaws or defects and of quality and performance specified. Material overages at the completion of the installation are the property of the Contractor and shall be removed from the site.

2.02 PIPE

- A. Potable Pressure Mains: All main line piping 2½ inches or smaller shall be Schedule 40 PVC, ASTM D-1785, with Schedule 80 PVC fittings. All main line piping 3 inches and larger shall be Class 200 PVC with Christy's detectable marking tape, green color with irrigation line below warning, SDR 21, ASTM D-2241 piping with Integral gasketed bell ends. All fittings on piping 3 inches and larger shall be Harco or acceptable equal Ductile Iron gasketed fittings with a factory-applied epoxy coating.
- B. Copper Pressure Mains: Type K hard temper pipe, ASTM B88; solder joint type wrought copper fittings, ASTM B828; 95/5 solder, ASTM B32. Install Christy's detectable marking tape, green color with irrigation line below warning per manufacturer's written instructions and recommendations.

- C. Laterals: Class 200 PVC, SDR 21, ASTM D-2241; (3/4 inch minimum size) with integral solvent weld bell end, ASTM D-2672; solvent weld coupling, ASTM D-2466. All lateral piping shall use Schedule 40 PVC fittings.
- D. Polyethylene Distribution Tubing: UV resistant, thick-walled polyethylene with pressure operating range of 0 to 60 PSI, O.D of 0.700 inches; I.D. of 0.580 inches; wall thickness of 0.06 inches.
- E. Flexible Tubing: Toro 850-01, Rain Bird Swing Pipe or equal thick wall flexible pipe.
- F. Visible Pipe and Fittings:
 - 1. General: Integral gray color.
 - 2. Threaded Risers and Nipples: Schedule 80 PVC.
 - 3. Other Risers and Fittings: Schedule 40 PVC, Type 1, solvent weld.
 - 4. Cement: ASTM D-2564 or as recommended by the manufacturer.
 - 5. PVC to Ductile Iron Transition Sleeve: GripRing by Romac Industries and Tyler/Union solid sleeve mechanical joint, or as recommended by manufacturers.
- G. Sleeves: Schedule 40 PVC (2 inch minimum size).
- H. Conduit: Schedule 80 PVC Electrical Conduit U.L. Approved.

2.03 VALVES

- A. Quick Coupler Valve: Bronze two-piece, single slot in remote valve box. Refer to drawings for size and model number.
- B. Remote Control Valve: Plastic 200+ psi rated, globe or angle configuration with pressure regulation control. Includes DC-latching solenoids for use with battery-powered irrigation controller. Refer to drawings for size and model number.
- C. Ball Valve: Full ported, PVC manual operated with positive drip-tight shut-off. Size of ball valve shall be the same as that of the largest downstream control valve.
- D. Gate Valves: 2 ½ inches or less shall be American made 200 WOG brass, with non-rising stem and threaded ends. Gate valves 3 inches or larger shall be AWWA C500, bottom wedging double discs, parallel seats, non-rising stems, open by counterclockwise turning. Provide flanged end connections. Provide bronze interior construction of valves including stem containing a maximum 2 percent aluminum and maximum 16 percent zinc.

2.04 AUTOMATIC IRRIGATION CONTROLLER

- A. Irrigation controller shall be battery-powered and compatible with a manufacturer-developed mobile application or handheld transmitter. Refer to drawings for size and model number.

2.05 VALVE BOXES

- A. Plastic box with locking lid. Ametek, Brook, Carson or equal. Rectangular for remote control valves. Round for gate valves, quick couplers, and manual angle valves.

2.06 SWING JOINTS

- A. Dura, Spears, Rain Bird maximum or Lasco or acceptable equal.

2.07 FLEX RISERS

- A. King Brothers, Global Water System, Excalibur or equal.

2.08 STAKES

- A. #4 rebar - length as noted.

2.09 CLAMPS

- A. All Stainless-steel screw clamps.

2.10 CONTROL WIRE

- A. Specifically designed for direct burial use, Type UF with copper conductor, #14 minimum size for control wiring to each individual valve and #12 for the common wire to all valves.
- B. Use white jackets for common wire and different color-coded wires (as available) for individual control lines.
- C. Size of conductor shall meet requirements of the installation instructions of the manufacturer of the valves and controllers.

2.11 WIRE CONNECTORS

- A. 3M DBR/Y-6 or acceptable equal.

2.12 THRUST BLOCKS

- A. 2,500 PSI compressive concrete strength at 28 days as specified under Section 03300, "Cast-In-Place Concrete".

2.13 CONCRETE

- A. All concrete shall be Class "B" or better and in accordance with the Standard Specifications for Public Works Construction, of the Department of Public Works, County of Maui.

2.14 POP-UP SPRAY ROTORS

- A. Matched precipitation rate rotary nozzles on pop-up body with pressure regulator and check valve. Refer to Drawings.

2.15 POP-UP SPRAY HEADS

- A. Matched precipitation rate spray nozzles on pop-up body with pressure regulator and check valve. Refer to Drawings.

2.16 DRIP IRRIGATION SYSTEM

- A. Refer to Drawings for all Drip system components (including filters).

2.17 DETECTABLE WARNING TAPE

- A. Detectable warning tape shall be installed below ground and be detectable with a non-ferrous metal detector when buried flat at depths recommended by the manufacturer. In all cases, install detectable warning tape according to the manufacturer's written instructions and recommendations.
- B. Tape Construction: 100 percent virgin polyethylene; acid, alkaline, and corrosion resistant; 5.0 mil thick, 5-ply construction.
- C. Detectable Core Construction: 2.0 mil solid aluminum foil core, encapsulated within 2.55 mil polyethylene backing.
- D. Tensile Strength: ASTM D882-80A, 7800 PSI minimum.
- E. Elongation: ASTM D882-80A, less than 150 percent at breaking point.
- F. Tape Color: Tape color and legend combination shall be in accordance with APWA or local requirements. Tape lettering shall be 1-1/2 inches tall minimum.
- G. Width: 6 inches minimum.

- H. Printed Text on Tape: "Caution Irrigation Line Below".

PART 3 - EXECUTION

3.01 EXCAVATION

- A. Do all necessary excavation for the proper installation of the irrigation system.
- B. Trenches shall be of adequate width to lay pipe easily, with extra working space provided where necessary to make joints. Trench depth shall be:
 - 1. 24 inch minimum cover over mains.
 - 2. 12 inch minimum cover over laterals.
 - 3. 36 inch minimum cover over sleeves under paving.
- C. Boulders, roots, and other obstructions shall be entirely removed or cut out to the width of the trench and a depth of 6 inches below the trench bottom. Such debris shall be disposed of off-site.
- D. Any rock over 2 inches in largest dimension excavated during trenching shall be removed and disposed of off-site.
- E. The bottom of the trench shall be free of rocks, clods, and other sharp-edged objects. Any rock over 1/2 inch in largest dimension excavated during trenching shall be removed and disposed of off-site.
- F. Over excavation shall be backfilled and carefully tamped to provide a smooth and firm-bearing surface for laying the pipe.
- G. Barricade and/or light the excavated area to prevent undue hazard to the public.
- H. Pipe cushion material shall be imported screened soil or fine sand fine enough to pass 1/4-inch sieve.

3.02 PIPE FITTINGS AND ASSEMBLY

- A. All pipes shall be installed as dimensioned or approximately in the location shown and shall be of the sizes indicated.
- B. Parallel piping shown on the Drawings may be installed in the same trench with all pipe at the same depth and 1 inch (minimum) horizontal separation between pipes. Parallel piping shall not cross in the trench.
- C. Piping shall be laid accurately to the line and grade required, with full bearing on the trench bottom. No pipe shall be laid on soft fill or other unstable material.

- D. Crossing pipes shall have 2 inch (minimum) vertical separation. No direct contact between other pipes or structures will be permitted.
- E. Work shall be performed in strict accordance with the manufacturer's installation instructions for the various types of pipe herein specified.
- F. Pipes shall be flushed out thoroughly to remove all debris and foreign matter prior to installation of any valves or sprinklers.
- G. Prior to backfilling, pipes shall be inspected for leaks at the joints and fittings and repaired or replaced as required.

3.03 SPRINKLER HEADS

- A. Set heads plumb and level at locations indicated on the Drawings.
- B. Thoroughly clean, adjust and inspect all heads for proper operation and performance.
- C. In turf areas heads shall be initially installed on the risers 1/2 inches above grade level. Prior to final inspection of the landscape planting adjust all heads as necessary.
- D. Install Flex Risers on all heads adjacent to paved surfaces, walks and curbs.
- E. Install all sprinklers 12 inches away from buildings, driveways, and roadways without curbs, or as directed by the State Engineer. Install all sprinklers 6 inches away from all walkways, curbs, and non-structural walls.

3.04 VALVES

- A. Valves connected directly to the main line shall be plumb with sufficient clearance for service and operation.
- B. Install at sufficient depth to provide not more than 6 inches and not less than 4 inches cover from top of valve to finish grade.
- C. Install valves in a plumb position with 24 inches minimum maintenance clearance from other equipment.
- D. Ball valves, gate valves, and quick coupler valves shall be installed in the location shown on the Drawings and shall be in valve boxes for accessibility and proper use.
- E. Remote control valves shall be centrally located among the sprinklers as practical, in accordance with the Drawings. All valves shall have their pressure regulations adjusted so the furthest sprinkler on each circuit operates at the pressure shown in the irrigation legend/schedule. Once the pressure regulation

is adjusted, the contractor shall make fine adjustments through the use of the flow control assembly.

- F. Remote control valves shall be connected to corresponding battery-operated controller in numerical sequence as indicated in the Drawings or as directed by the State Engineer.
- G. Thoroughly clean, adjust and inspect all valves for operation and performance.

3.05 VALVE BOXES

- A. Where feasible, several valves shall be grouped together in a large valve box with 4 inch minimum clearance between valves and from the box.
- B. Position over the valves so all parts can be reached for service.
- C. Install above a 3 inch deep gravel pit for drainage. The box shall be reasonably free from dirt and debris.
- D. The top shall be level or following the adjacent finish grade as detailed.
- E. When feasible, install valve boxes within planting areas.
- F. Install the valve boxes with their tops one inch above the surface of surrounding grade. In concrete walks or traffic islands, flush the top of the valve boxes with the surrounding grade.
- G. The Contractor may substitute plastic valve boxes for Portland cement concrete valve boxes.

3.06 CONTROL WIRE

- A. All work shall conform with the NEC. Wires shall be installed at a minimum depth of 24 inches.
- B. A minimum loop of 24 inches shall be left at each valve and at each controller for expansion and/or servicing.
- C. Splices and connections shall be watertight.
- D. Wire shall be within a protective conduit, for pavement crossings, or where other conditions make it necessary.

3.07 AUTOMATIC CONTROLLER

- A. All battery-operated controllers shall be installed in the same valve box as the remote control valve being controlled. Install per manufacturer's recommendations and in locations shown on the Drawings.
- B. Firmly attach controller to inside of valve box where it is readily accessible for maintenance and battery replacement.
- C. Submit a complete maintenance and operations manual for each type of controller to the State Engineer before the plant establishment period.
- D. A complete schematic wiring diagram for each controller shall be a part of the maintenance manual. The diagram shall show in detail the circuits and parts. Also, submit one copy of said diagram in a heavy plastic envelope and attached to the inner portion of each controller cabinet door.

3.08 CONNECTION TO EXISTING IRRIGATION SYSTEM

- A. Connect new irrigation mainline to existing irrigation system.
- B. Provide required modifications to existing irrigation mainline routing to re-establish continuous irrigation mainline condition that was present prior to construction.
- C. All necessary trenching, pavement repairs, and components required to make connections to existing irrigation system shall be included.

3.09 TRENCH BACKFILL

- A. As soon as the work has been installed and reviewed, all trenches shall be backfilled.
- B. Trench backfill material shall be onsite or imported select material free from rocks greater than 1/2 inch diameter and shall be acceptable to the State Engineer before use. Cost of importing backfill material acceptable to State Engineer shall be considered part of the basic bid.
- C. Backfilling of trenches shall be by mechanical or hand methods. Loose soil shall be placed in layers of 6 to 8 inches and compacted by tamping after each placing. The top 4 inches of backfill in planting areas shall be imported screened topsoil. Should any settling of the soil over trenches occur after completion of the irrigation system, the Contractor shall refill and compact the soil as direct by the State Engineer at no additional cost to the State. Before testing of irrigation system, all pipe joints shall be left uncovered and only after acceptance of test results by State Engineer shall the pipe sections be backfilled to completion.

- D. After backfilling, trenches shall be flush with, or slightly above adjacent finish grade.
- E. Repair paving cuts with material to match original surface.
- F. Reseed, resod, or replant the trenched areas as needed.
- G. Should the soil level of the trenches settle during the Warranty period, refill the trenches as needed at no additional cost to the State.

3.10 ADJUSTING SYSTEMS

- A. Prior to final inspection, adjust all sprinklers to provide adequate and uniform spray coverage within each planting area. Balance spray patterns by adjusting individual sprinkler heads with the adjustment screws.
- B. Adjust and balance each system at the listed water pressure for each type of sprinkler head.

3.11 TESTING AND INSPECTION

- A. Backfill of irrigation pipe trenches and installation of heads and quick coupling valves shall be done after all irrigation mainlines, laterals, and valves are in place, connected, flushed, tested, and accepted by the State Engineer. Testing of the system shall be performed on each section of the irrigation system whenever any section of the work can be segregated. The irrigation system shall be flushed under pressure to remove any dirt, scale, or other foreign material. After flushing, the irrigation system shall be tested in the presence of the State Engineer as specified herein. Provide all equipment and man power required to perform testing.
- B. Make necessary provisions for thoroughly bleeding the irrigation piping of air and debris prior to testing.
- C. Hydrostatic pressure test all irrigation piping at 150 PSI with pressure not dropping more than 5 PSI in 30 minutes.
- D. Repair leaks and retest until acceptable to State Engineer.
- E. After installation of sprinkler heads, irrigation system shall be tested for operational adequacy.
- F. All sprinkler heads shall be properly adjusted to provide optimal head-to-head coverage for even water distribution with minimal overthrow and misting. Adjust runtimes to prevent ponding and runoff.

3.12 INSTRUCTIONS

- A. After irrigation system has been completed, inspected, and accepted by the State Engineer, the Contractor shall instruct the maintenance personnel in the operation and maintenance of the system.

3.13 AS-BUILT DRAWINGS

- A. Upon completion and acceptance of the irrigation system by the State Engineer, the Contractor shall submit one set of As-Built Drawings, showing and noting all changes and deviations from the original plans, drawings, and specifications, including all substituted materials and equipment to the State Engineer. The Contractor shall include in these As-Built Drawings all dimensions of each pipe run, the dimensions of each pipe from pavement edges, control points, fence lines, and/or other permanent fixtures. The exact location of each valve, elbow, tee, and sprinkler located in the field shall be documented. As-Built Drawings shall graphically show actual construction changes and deviations made in the field. Reference to addendum numbers, RFI numbers, change orders, etcetera will not be accepted.

3.14 REPAIR OF LEAKS

- A. All leaking joints, whether discovered at time of installation or at any time during the Warranty period, shall be remade with all new materials. Use of caulking or cement to repair leaks is prohibited.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02810	Sprinkler System	Lump Sum

END OF SECTION

SECTION 02950 - LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. Provide landscape plantings in the areas shown on the Drawings with plants in a healthy, vigorous growing condition. All work indicated on the Drawings by notes shall be provided whether or not specifically mentioned in this Standard or the Specifications. Any items not specifically shown in the Drawings or specified, but normally required to conform with such intent, are considered part of the work.
- B. The work of this Section includes but is not limited to the following:
 - 1. Screening and placement of imported screened topsoil.
 - 2. Pre-planting weed control.
 - 3. Soil preparation.
 - 4. Fine grading.
 - 5. Planting operations.
 - 6. Maintenance.
 - 7. Warranty.

1.03 CODES AND STANDARDS

- A. Perform work in accordance with all applicable laws, codes and regulations required by authorities having jurisdiction over such work and provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Substitutions:
 - 1. If any plant specified is not obtainable, submit a written substitution request to the State Engineer during the bidding period. This request may present either a different size of the same species or a similar alternate species with the proposed adjustments to the Contract price for each.

2. Substitutions of plant materials will not be permitted unless authorized in writing by the State Engineer.
- C. Construction Schedule: At the preconstruction meeting, provide a written projected planting schedule noting the estimated completion date, number of working days required and any special coordination requirements.
- D. Selection, Tagging and Ordering Plant Material:
1. Submit a request for inspection and documentation to the State Engineer at least one month prior to start of work under this section that all plant material has been ordered.
 2. Plants shall be subject to inspection and rejection by State Engineer at place of growth and after delivery for conformity to specifications.
 3. Plants identified as specimen, field grown, or field stock will be inspected at place of growth by the State Engineer.
- E. Imported Screened Soil Material:
1. The Landscape Contractor shall provide an even 4 inch layer of screened soil material over all ground level planting areas unless otherwise noted on Drawings. The Landscape Contractor shall be responsible for screening, amending, hauling, and installing the screened soil material over all ground level planting areas on the project site.
 2. The Landscape Contractor shall be responsible for submitting a soils analysis of the imported screened soil material at the beginning of the project for review and acceptance by the State Engineer. Soil analysis results shall include a written summary explain the findings and recommendations to correct soil deficiencies, including but not limited to, type of amendment and fertilizers to be added, application rates for amendments and fertilizers at pre-planting, planting, and plant establishment periods.
 3. Soil testing, analysis of test results, written summary of test results, and recommendations for fertilizers and amendments in the required quantities, rates, and application schedule to correct soil deficiencies shall be included with the soil analysis results. Submit to the State Engineer for review and acceptance prior to installation.
 4. Soil testing shall be done by the University of Hawaii Cooperative Extension service or independent soil engineering laboratory acceptable to the State Engineer.
 5. Soil test shall be performed in accordance with the Methods of Soil Analysis by the Soil Science of America, Inc. Soil tests shall include particle size analysis, percentage of organic carbon, chemical analysis, moisture content, Cation Exchange Capacity (CEC) per EPA Method 9081, Bulk Density and soluble salts, sieve analysis per ASTM D422, Total Nitrogen per ASTM D3590-17 and EPA Method 353.2, Total Phosphorus per EPA Method 365.3, and major cations (K+, Ca++, and Mg++) per EPA Method 6010.

- 6. Soil analysis results shall include a summary of the findings and recommendations to correct soil deficiencies, including but not limited to, type of amendment and fertilizer to be added, application rates for amendments and fertilizers, and a schedule for applying amendments and fertilizers at pre-planting, planting, and plant establishment periods. A test for salinity may be requested by the State Engineer.
 - F. Samples and Producers Specifications: Various samples, certificates, and specifications of seed, fertilizer, sand, compost, soil amendments, and other material shall be submitted for approval.
 - G. Certificate Submittal: Prior to hydro-sprigging operations, provide the State Engineer with the State Certificate stating analysis of purity of the sprig material.
 - H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.
- 1.05 PLANT ALLOWANCE LIST
- A. Plant materials and other landscape-related materials identified on this list shall be provided and installed by the Contractor under the direction of the State Engineer.

1.06 JOB CONDITIONS

- A. Acceptance of Previous Work: Inspect and accept the condition of the site relative to this section before commencing with the work covered herein. If not acceptable, notify the State Engineer in writing. By proceeding with the work under this section, the Contractor indicates his acceptance of all previous related work.
- B. Meet on Site: Prior to commencing work, meet with the State Engineer and all other concerned parties on the site to review the work under this section. Request this meeting ten working days prior to desired meeting time.
- C. Underground Utilities and Obstructions: Verify the location of all underground utilities and other obstructions that may affect the work. Any obstructions encountered shall be reported to the State Engineer. Repair all damage to any known utility line or other underground obstruction at Contractor's expense. Report damage to any unknown utilities to the State Engineer.
- D. Protection:
 - 1. Provide necessary safeguards and exercise caution against injury or defacement of existing site improvements. Prevent vehicles of any kind from passing over sidewalk, curbs, etc., unless adequate protection is

- provided. Do not store materials or equipment or operate equipment near or under the branches of any existing plants that are to remain, except as actually required for construction in those areas.
2. Be responsible for any damage resulting from landscape planting operations. Repair all damage to return the area to the previous condition at Contractor's expense.
- E. Clean Up: Keep all areas of work clean, neat, and orderly at all times during the period of Contract. Clean all construction areas at the end of each day.
- F. Samples and Test: State Engineer reserves the right to take and evaluate samples of materials for conformity to Specifications at any time. Furnish samples upon request by the State Engineer. Rejected materials shall be immediately removed from the site at Contractor's expense.
- G. Premaintenance Inspection and Final Inspection:
1. At the completion of all landscape planting operations and prior to the beginning of the formal maintenance period, the premaintenance inspection shall be held. At the completion of the formal maintenance period, the final inspection shall be held.
 2. Request these inspections of the State Engineer ten (10) working days prior to the completion of work in order that a mutually agreeable time for inspection may be arranged.
 3. The Contractor and State Engineer shall be present at the inspection.
 4. At the time of inspection, the Contractor shall have all the areas under the contract free of weeds, dead leaves, and trash, neatly cultivated and raked. All stakes, guys and plant basins shall be in good order. At the final inspection, lawns shall be neatly cut and all clipping removed.
 5. If, after the premaintenance inspection, the State Engineer is of the opinion that all work has been performed in accordance with the drawings and specifications, written notice of preliminary acceptance will be given. This report will note any items which must be corrected and state the date of commencement and completion of the formal maintenance period.
 6. If, after the final inspection, the State Engineer is of the opinion that all work has been performed in accordance with the drawings and specifications, written notice of acceptance and completion of the project will be given. If all or certain portions of the work are not acceptable under the terms and intent of the drawings and specifications, a reasonable amount will be retained and the final payment and the formal maintenance period for the unaccepted work and any related items shall be extended at no cost to the State until the defects in the work have been corrected and the work is accepted by the State Engineer.

1.07 WARRANTY

A. Plant Material:

1. Plant materials furnished or relocated under this section shall be warranted in writing, for a period of two year from the date of final acceptance against improper installation, defective, unsound, or diseased conditions that may appear.
2. Upon receipt of written notice from the State Engineer of the death of any warranted plant materials shall be promptly replaced with same species as originally planted and shall be of a size closely approximating the size of the plant if normal growth had occurred since the original planting. Replacement shall be subject to all requirements of the specifications.
3. When plants are replaced, advise the State Engineer, in writing, of the necessary establishment maintenance which must be performed. If this information is not provided, the Contractor will be liable for total cost of replacement should the replaced plant die.
4. The expense of replacement shall be borne by the Contractor if replacement is necessary during the maintenance period, or shall be evenly shared by the State and the Contractor if replacement is necessary after the maintenance period but during the remainder of the warranty period.
5. Contractor shall not be held liable for loss of plant materials after final acceptance due to the lack of care by the State, vandalism, acts of God, or accident. The State must show that the plants have been maintained properly.

B. Special Warranty:

1. All plant materials furnished under this section shall be warranted as to the species, hybrid, flower color and/or variety specified.
2. If after acceptance of the project, any warranted plant material proves to be of a different species, hybrid, flower color and/or variety not initially determinable, replace that plant with a new plant of the originally specified species, hybrid, flower color and/or variety. The new plant shall be equal in size to that of the incorrect plant at the time of its removal. The new plant shall meet the quality standards, be subject to the warranty, and be installed according to the specifications.
3. There is no time limit to this warranty, although it does not include plants reverting to the general species. The State Engineer will determine the nonconformance of plant materials, and notify the Landscape Contractor in writing of the required replacement work. All materials and work shall be at the expense of the Landscape Contractor. All work shall be completed within 15 working days from the date of the State Engineer's letter.

C. Liability: The liability under the warranty shall include the repair of damage to the work of other contractors, or damage to the State's property caused by the

failure of the work performed under this section. All of the provisions of this section apply to work performed to satisfy the requirements of the warranty.

- D. Other Work: All other work shall be warranted for a period of two year from the date of preliminary acceptance.

PART 2 - PRODUCTS

2.01 SOURCE OF SOIL MATERIAL

- A. Contractor shall provide amended imported screened soil as source of soil material for this project.
- B. Contractor responsible for providing a 4 inch layer of amended imported screened soil over all planting areas.

2.02 SCREENED SOIL MATERIAL

- A. Natural, fertile, friable soil free from stones, noxious seeds, weeds (especially nut grass), roots, subsoil, or other material detrimental to normal plant growth.
- B. Physical Properties:
 - 1. Designation: Loam or silt loam, USDA classification of fraction passing sieves.

Class	Particle Size Range	Maximum Percentage	Minimum Percentage
Coarse Sand	0.020 – 0.079 inch	15	0
Silt plus Clay	<0.002 inch	5	15
Gravel	0.079 – 0.512 inch	20	0
Rock	1/2	10 percent by volume	----
Organic Material	----	15	0

- C. Chemistry:
 - 1. Salinity: Saturation Extract Conductivity (ECe), less than 3.0 mm hos. Cm at 25 degrees C.
 - 2. Sodium: Sodium Absorption Ratio (SAR), optimum range is 3-5.
 - 3. Boron: Saturation Extraction Concentration, less than 1.0 ppm.
 - 4. Reaction: pH of saturated paste: 6.0 - 7.0.

- D. Imported screened soil shall contain sufficient quantities of available nitrogen, phosphorus, potassium, calcium and magnesium to support normal plant growth in accordance with the soil analysis recommendations.
- E. Red Humic latasol soils, or types known as "Palolo Clay" or "Lualualei Clay" or similar materials will be not accepted.
- F. Screened to pass through 1/2 inch screen.
- G. Soils shall have minimum 5% OM as Humus content. Utilize Walkley-Black soil testing method for determining percent OM as humus.
- H. Backfill Mix for Trees, Palms and Shrubs: Mix thoroughly prior to placing:
 - 3 parts 75% screened soil
 - 1 part 25% "Menehune Magic"/organic soil amendment or approved equal 15 lbs. Gro-Power
- I. Planting Area Soil Mixture, 4 inch layer: Mix thoroughly prior to placing
 - 3 parts 75% screened soil
 - 1 part 25% "Menehune Magic"/organic soil amendment or approved equal 15 lbs. Gro-Power per cubic yard of mix.

Sixty (60) days prior to placement, Contractor shall submit 1 cubic foot of the specified pre-mixed soil mixes to the State Engineer. Contractor shall not place any soil mix on the project site until the State Engineer has given the Contractor written notification to proceed.

2.03 FERTILIZER

- A. General: N-P-K as recommended by soil analysis, uniform in composition, free-flowing and suitable for application with approved equipment, delivered to the site in unopened containers, each fully labeled, conforming to the applicable fertilizer laws, and bearing the name or mark or the manufacturer.
- B. Lime (calcium carbonate): Shall be agriculture type in composition and quantities recommended by soil analysis and acceptable to State Engineer.
- C. Gypsum (calcium sulfate): Shall be granular agricultural type in composition and quantities recommended by the soil analysis and acceptable to the State Engineer.
- D. Plant Tablet: Agriform 21 gram tablet, Woodace 15 gram size or acceptable equal.
- E. Maintenance Period: 15-15-15 or 16-16-16 or as required by soils analysis and acceptable to the State Engineer.

2.04 ORGANIC SOIL AMENDMENT

- A. Soil Amendment: Organic non-nutrient soil conditioner shall be “Menehune Magic”, as manufactured by Hawaiian Earth Products, (Ewa, Oahu), “Kellogg’s Nitrohumus Soil Conditioner” or approved equal.
1. Compost shall meet U.S. Composting Council specifications. Compost shall be well decomposed, stable, weed free organic matter source. It shall be derived from aerobic decomposition of yard trimmings and shall be brown to dark brown in color. Moisture content shall range from 30 to 60 percent with no visible free water.
 2. The carbon:nitrogen (C:N) ratio shall be between 25:1 to 20:1. Compost shall have no unpleasant odor and shall have an earthy smell. 30 to 65 percent of the content shall be organic. 98 percent of the material shall pass through a screen of 3/4 inch or smaller and pH shall be between 6.0 to 8.5. Typical electrical conductivity shall be less than 5 mhos/cm (dS/m), with maximum of 8 mhos/cm.
 3. Compost shall be free of live weed seed or other propagates and shall have reached a temperature of at least 150 degree Fahrenheit for a minimum of 3 days. Active composting shall occur for no less than 90 days at 130 degrees Fahrenheit or higher, with a minimum of 1 turning per week.
 4. Compost shall contain less than 5 percent foreign objects such as rock, metal, paper, plastic, or glass by weight. Compost shall also contain less than the maximum level of heavy metals established by EPA 503. Compost shall not contain any resin, tannin, or other materials that are detrimental to plant life, and shall not contain any treated or painted woods.
- B. Organic nutrient soil conditioners (humus) shall be Gro-Power Plus (5-3-1), Ferto (6-4-2) or acceptable equal.

2.05 PRE-PLANTING HERBICIDE

- A. Non-selective, contact herbicide such as Ranger Pro, Avenger Weed Killers, Scythe Herbicide, Burnout II, or acceptable equal.

2.06 PRE-EMERGENT WEED CONTROL

- A. Ronstar-G, Treflan, Eptam, Vegitex or acceptable equal.

2.07 PLANT MATERIAL

- A. Quantities: Provide sufficient quantities of plant materials needed to complete the work as shown on the planting plans and indicated in the drawings. Quantities indicated on the plant list are approximate only and are provided for the convenience of the Contractor. The planting plans shall have precedence over the plant list.
- B. Nomenclature: Names of plants shall conform with names generally accepted in the local nursery trade, and as interpreted by the State Engineer.
- C. Condition:
 - 1. All trees, palms, shrubs, vines, and groundcovers shall have a normal habit of growth and shall be sound, healthy, vigorous, and free from insect infestations.
 - 2. The minimum acceptable size of all trees and shrubs measures after pruning, with branches in normal positions, shall conform to the measurements specified on the plant list.
 - 3. Caliper measurement shall be taken at a point on the trunk 6 inches above natural ground line for trees up to 4 inches in caliper and at a point 12 inches above the natural ground line for trees over 4 inches in caliper.
 - 4. Plants that meet the measurements specified, but do not possess a normal configuration or balance of height and spread will be rejected.
 - 5. Trees and shrubs shall have been grown in containers of the size stated on drawings, and shall have sufficient roots to hold the rootball together after removal from containers without being rootbound.
 - 6. Specimen, field grown and field stock trees and palms shall have a rootball of sufficient size to support the plant's recovery from transplanting. Trees delivered with small or inadequate rootballs will be rejected.
 - 7. Any tree, palm, or shrub with weak, thin trunk not capable of supporting itself when planted in the open will be rejected.
 - 8. Trees will be straight and of uniform shape without damaged, crooked, or multiple leaders, unless specified. Trees with abrasions of the bark, sunscalds, disfiguring knots, or fresh cuts of limbs over 1/2 inch which have not been pruned and painted or completely calloused will be rejected.
 - 9. Divisions shall be healthy, vegetative material with well-established roots at one or more nodes.

2.08 WATER

- A. Unless noted otherwise, potable water will be readily available to the Landscape Contractor. Landscape Contractor shall pay for water used before the acceptance of the project or until the termination of the maintenance period for the plantings, whichever is later.

2.09 MISCELLANEOUS MATERIALS

- A. Wood Tree Stakes: 2 x 2 x 8 feet rough construction grade redwood or eucalyptus with no paint or stain.
- B. Hose and Wire Ties: 1/2 inch diameter hose with #12 ga. galvanized iron wire.
- C. Guy Wire: #12 ga. galvanized iron for 15 and 25 gallon trees. #9 ga. galvanized iron for field grown trees.
- D. Rebar: #4 24 inch minimum length for 15 and 25 gallon trees. #7 36 inch minimum length for larger trees.
- E. Marker: Plastic surveyor tape. Bright color, minimum 18 inches long. Use same color throughout project.
- F. Concrete Brick Header: Gray brick, 4 inches by 8 inches, with tooled mortar joints on reinforced concrete setting bed.
- G. Root Barriers: Typar Biobarrier, 36 inch depth or acceptable equal.
- H. Filter Fabric: Non-woven; Mirafi, Typar, or acceptable equal.
- I. Gravel: No. 3 blue rock, 3/4 inch size for irrigation valve boxes, under valves, gravel maintenance strips.
- J. Black Cinder Mulch: Min. 1 inch depth coverage. Aggregate ranging from 1/4 inch to 1/2 inch diameter below shrubs and ground covers, below `ili`ili stone, see plans. See details for depth.
- K. `Ili`ili Stone: Smooth flat black stones, 1" to 2" size, set on 1" layer black cinder base, see plans.

PART 3 - EXECUTION

3.01 CLEARING

- A. Clear all planting areas of existing vegetation not specified to remain and all other debris and foreign material considered a hindrance to planting operations and/or unsightly in appearance.
- B. Maintain previously established grades and swales.

3.02 PRE-PLANTING WEED CONTROL

- A. Apply preplanting herbicide to all visible weeds, before and after soil placement.

3.03 SCREENED SOIL

- A. Provide and place an even 4 inch layer of imported screened soil over all planting areas. Screened soil material shall be amended and uniformly blended according to the following rate:
- 3 parts or 75% screened soil
 - 1 part or 25 % "Menehune Magic"/organic soil amendment
 - 15 lbs. Gro-Power per cubic yard of mix.

(All planting areas will be graded low for soil placement.) Transport screened and amended soil materials to project site. Place an even 4 inch layer minimum of screened soil within all new planting areas. Coordinate all work with the General Contractor to insure proper placement of screened soil material and fine grading in relation to the sites overall grading and drainage plan.

3.04 SOIL PREPARATION

- A. Uniformly distribute and blend screened soil, organic soil conditioner and the fertilizer specified by the soil analysis over all planting areas.
- B. Blend the soil mix uniformly to evenly incorporate the amendments into the soil.

3.05 FINE GRADING

- A. Adjust finish grading with screened soil as necessary. Grades shall be smooth and even on a uniform plane with no abrupt changes or pockets and shall slope away from all buildings. Verify the surface drainage of all planting areas, and notify the State Engineer of any discrepancies, obstructions, or other conditions considered detrimental to proper execution of the work.
- B. Landscape work shall be tied to existing conditions and controls such as existing trees and landscape features, utility lines, pavement, and curbs, etc. Finished grades shall bear proper relationship to such controls. Adjust all new work as necessary to meet the conditions and fulfill the intention of the drawings.
- C. After initial settlement, the finish grade shall be lower than adjacent walks, curbs, and headers:
1. Shrubs and Groundcovers: 1 inch through 1-1/2 inch.
- D. Immediately prior to planting operations, all planting areas shall be cleaned of weeds, debris, rocks over 1/2 inch in diameter, and clumps of earth that will not break up.

3.06 SOIL AND DRAINAGE CONDITIONS

- A. Apply soil retention material on all slopes greater than 2:1 after planting operations. Assure that mulching machinery used to apply soil retainer is sterile and free of all seed.
- B. Notify State Engineer in writing of all soil or drainage conditions encountered during planting operations which the Contractor considers detrimental to growth of plant material. Include a cost proposal for the correction of the problem for approval before proceeding with work.
- C. If drainage conditions of plant pits appear unsatisfactory, test drainage by filling with water. Conditions permitting the retention of water in planting pit for an excessive period of time shall be brought to the attention of the State Engineer.

3.07 CONCRETE BRICK HEADERS

- A. Install headers between all groundcover and grass areas, and all gravel maintenance strips and grass areas, where shown. The header shall smoothly follow the finish grade with even radii and straight runs. Headers shall meet walkway edges or other features at a 90 degree angle unless otherwise directed by the State Engineer.

3.08 PLANTING OPERATIONS

- A. Handling Plants:
 - 1. Handle plants in a manner to avoid any damage to the plant.
 - 2. Protect plants at all times from sun or drying winds. Plants that cannot be planted immediately on delivery shall be kept in the shade, well protected and adequately watered.
 - 3. All specimen, field grown and field stock trees and palms shall be planted the same day they are delivered to the site.
- B. Plant Pits: All trees, palms and shrubs shall be installed in round pits with vertical sides, twice the diameter and 1-1/2 times the depth of the rootball or container.
- C. Setting Container and Larger Plant:
 - 1. Plants shall be centered and set on the appropriate compacted backfill mix that has been puddled and settled.
 - 2. Plants shall be set with the soil level even with the finish grade and planted to give the best appearance in relationship to adjacent structure or surroundings.
 - 3. Use appropriate backfill mix to continue filling plant pits. Set plant plumb and brace rigidly in position until backfill mix has been tamped solidly

around rootball. When three-fourths of the pit is backfilled, water thoroughly, saturating the rootball.

4. Evenly distribute planting tablets per manufacturer's instructions. Continue filling pit to finish grade with backfill mix.
5. When the plant pit is filled, form saucer berm around plants as noted on details.
6. Water all plants immediately after planting.

D. Staking and Guying: Immediately after planting, stake all 15 gallon and smaller trees. Guy all larger trees as detailed.

3.09 GROUND COVER

A. Install plant material in moist soil in the areas and at the spacings shown, in neat rows, ensuring complete coverage of all planting areas including under and around trees and shrubs. Spacings shown in the plant list or on the drawings are triangular spacing, unless otherwise noted.

3.10 PRE-EMERGENT WEED CONTROL

A. Immediately after planting, apply pre-emergent weed control materials to all planted areas which will not be sprigged.

3.11 MAINTENANCE PERIOD

- A. Maintain all plants and planted areas in optimum growing condition and appearance.
- B. Maintenance, as specified below, shall coincide with the delivery of the first plant materials to the site and shall continue two years after commencement of the formal maintenance period or until the acceptance of the final inspection. Care of plant materials during installation is not considered part of the formal maintenance period.
- C. Maintenance shall include, but is not limited to:
1. Protect areas susceptible to traffic by erecting barricades immediately after planting.
 2. Irrigate planting areas as required to insure active growth keeping areas moist but not saturated. Regulate irrigation as necessary to avoid erosion and gullyng.
 3. Fertilize as needed in accordance with the soil analysis recommendations and five (5) days prior to final inspection. Exercise proper caution and take measures necessary to avoid plant burn.
 4. Keep planting areas free of weeds and undesirable grasses through daily weeding, if required. Remove the entire root system. Dispose of all weeds in appropriate trash containers.

5. Inspect all plants, including lawn, for disease or insect damage weekly. Treat affected material immediately.
6. Remove damaged or diseased growth from trees and shrubs. Treat cuts larger than 1/2 inch diameter with specified tree paint.
7. Immediately remove any dead or dying plants not in a vigorous thriving condition. Replacement shall be the same species and size as originally planted.
8. Restake, tighten, repair guys and reset to proper grades or upright position any plants that are not in their proper growing position.
9. As it becomes evident that certain groundcovers have not uniformly or properly established, replant the areas immediately with the same plants and quantity as specified for the initial planting and maintain as specified for 90% coverage of healthy, actively growing grass and groundcovers for approval during the final inspection.

PART 4 – MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
02950.1	Landscape Planting	Lump Sum
02950.2	Landscape Planting - Operations & Maintenance Service	Month

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This section includes, but is not limited to, all of the design, shop drawings, materials, labor, construction, placement and finishing of all regular reinforced concrete necessary to complete the project.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
1. Product data:
Materials for curing concrete
Joint sealant
Joint filler
 2. Design Data:
Concrete mix design
 3. Certificates:
Cement mill certificates for all cement to be supplied
Material Safety Data Sheets
 4. Shop Drawings: Reinforcing steel shop drawings with details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement prepared in sufficient detail to permit installation without reference to the Contract Drawings.
- B. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 REFERENCES

All work shall conform to the latest edition of the following, unless otherwise noted or specified on the structural drawings or in these specifications.

1. ACI 301, "Specifications for Structural Concrete Buildings"
2. ACI 318, "Building Code Requirements for Reinforced Concrete"

3. ACI 247, "Recommended Practice for Concrete Formwork"
4. CRSI MSP-2, "Manual of Standard Practice" IBC, "International Building Code."
5. ASTM E 1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
6. ASTM E 154/E154M Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
7. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials
8. ASTM E 1643 Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
9. American Concrete Institute (ACI)

1.05 STORAGE OF MATERIALS

Cement and aggregates shall be stored in such a manner as to prevent their deterioration or the intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete and shall be promptly removed from the site.

1.06 TESTS

- A. Slump: Standard slump tests as described in ASTM C143 (Modification: Sampling of concrete for slump test shall be taken after at least 1/4 cubic yard of concrete has been discharged) will be made periodically during the placement of concrete by the testing laboratory to ensure that the slump for which the concrete has been designed is met. Slump test shall be performed prior to the addition of superplasticizer or other site workability additive. Any concrete batch tested and showing slumps exceeding the specified tolerance shall be rejected. Any concrete placed prior to slump testing shall be the sole responsibility of the Contractor and shall be rejected should the subsequent slump test of the batch in question indicate that the slump tolerance is being exceeded. All rejected concrete shall be promptly removed and properly replaced. All costs resulting there from shall be borne by the Contractor.
- B. Compressive Strength: During the progress of the work compressive strength tests of concrete shall be made in accordance with ASTM C39 by a testing laboratory hired by the State. 6-inch x 12-inch cylinders shall be taken from each major pour at the rate of 4 cylinders for regular reinforced concrete, for each 100 cubic yards. Notwithstanding this established rate, take concrete cylinders in whatever quantity is deemed fit and/or necessary from any concrete pour. For pours of less than 15 cubic yards not used for structural purposes, cylinders may be omitted.
- C. The testing laboratory will make and identify all test cylinders. The Contractor shall provide assistance to the laboratory technician to make the cylinders. The testing laboratory shall provide the labor and equipment to deliver the cylinders

to the testing laboratory.

- D. The standard age for testing the cylinders shall be 28 days.
- E. All cylinders shall be made and cured in accordance with ASTM C31.
- F. In all cases where the strength of any group of cylinders falls below the minimum compressive strength specified, the State Engineer shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by the State Engineer from the location in the structure represented by the test specimen or specimens, which failed. Specimens shall be secured, prepared, and tested in accordance with ASTM C42 within a period of 60 days after placing the concrete.

The testing shall be done by a laboratory approved by the State Engineer. Concrete in the area represented by the core tests will be considered structurally adequate if the average strength of 3 cores is no less than 85% and the strength of a single core is no less than 75% of the 28-days strength specified. Should laboratory analysis indicate, however, that the proper concrete mix has not been used by the Contractor, all such concrete placed using the improper mix shall be subject to rejection. The cost of cutting specimens from the structure, patching the resulting holes, and making the analysis, including laboratory and consultation costs, shall be borne by the Contractor.

- G. The holes from which the cored samples are taken shall be packed solid with no-slump concrete proportioned in accordance with the ACI 211.3 "Standard Practice for Selecting Proportions of No-Slump Concrete". The patching concrete shall have an "extremely dry" consistency and the same design strength as the specified concrete.
- H. If the strength of the specimens cut from the structure falls below the requirements stipulated above, the State Engineer shall have the right to require any and all defective concrete to be replaced, and all costs resulting there from shall be borne by the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Portland Cement shall conform to the requirements of ASTM C150, Type I, for all concrete work.
- B. Concrete Aggregates:
 - 1. Fine Aggregates shall be calcareous or basalt sands, or a combination thereof. They shall meet the grading requirements of ASTM C33 unless the concrete producer can provide past data that shows that a proposed non-conforming gradation will produce concrete with the required strength and suitable workability.

2. If manufactured sands are used in the concrete mix, the Contractor may select and use a water-reducing and/or an air-entraining admixture as specified hereinafter to provide satisfactory workability in the concrete. The cement content of a mix shall be as specified hereinafter, and the use of an admixture shall in no way result in the reduction of the cement factor.
 3. Coarse Aggregates shall be crushed close-grained, blue lava rock meeting the grading requirements of sizes 57 or 67 (ASTM D448) or both. The maximum size of aggregate shall not be larger than 1/5 of the narrowest dimensions between sides of the forms of the member for which the concrete is to be used nor larger than 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars.
 4. Use locally manufactured, extracted, harvested, or recovered aggregate material if feasible to support the local economy and reduce transportation cost and environmental impact from using overseas material.
- C. Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to concrete or reinforcement. Non-potable water shall not be used.
- D. Concrete Admixtures:
1. General:
 - a. Compatibility: Where more than one type of admixture is utilized in any mix, the admixtures shall be compatible with each other as certified in writing by each Admixture Manufacturer.
 - b. Prohibited Admixtures: Admixtures are not allowed where containing any calcium chloride thiocyanates or containing more than 0.1% chloride ions.
 2. Air Entraining Admixture: ASTM C 260.
 3. Water-Reducing Admixture: ASTM C 494, Type A.
 4. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G.
 5. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E.
 6. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
 7. Shrinkage Reducing Admixture: ASTM C-494, Type S. Tetraguard AS20 by BASF Construction Chemicals, LLC, Eclipse Plus by Grace Construction Products or approved equal. Dosage: 128 ounces per cubic yard and as recommended by manufacturer.
- E. Expansion Joint Filler: A pre-molded material of 1/2" thickness, unless otherwise noted, composed of fiberboard impregnated with asphalt conforming to ASTM D 1751.

- F. Joint Sealing Compound shall be a polysulfide or urethane compound conforming to ASTM C 920 or other approved equal, compatible with the floor finish to be applied. Color to be selected by the State Engineer.
- G. Bond-Break Filler: Mineral-surfaced roofing cap sheet or coated asphalt felt.
- H. Curing Compound shall be compatible with the floor finish to be applied.
- I. Pervious Sheeting shall be burlap or other acceptable absorbent material, free from substances that will harm the concrete or cause discoloration.
- J. Vapor Barrier: Low permeance vapor barrier with the following performance:
 - 1. Maximum WVTR as tested by ASTM E 96 of 0.008.
 - 2. Water Vapor Barrier as tested by ASTM E-1745: Meets or exceeds Class A.
 - 3. Vapor Barriers:
 - a. Stego Wrap (15 mil) Vapor Barrier by STEGO INDUSTRIES LLC, San Juan Capistrano, CA (877) 464-7834, www.stegoindustries.com. Distributed in Hawaii by OK Hardware, 671-2886.
 - b. W.R. Meadows® Premoulded Membrane with Plasmatic Core
 - c. Zero-Perm® by Alumiseal®
 - 4. Accessories: Provide sealing and joining accessories necessary to produce a vapor tight installation.
- K. "Keyed Kold Joint" shall be galvanized.
- L. Cementitious Coatings shall be cement based polymer modified cement finishing materials ("Pro-Finish" by Bonded Materials Company, "Polycoat" by Tremcrete Systems Incorporated, "Durus" by Durus High Tech Cement, or approved equal).
- M. Slab Protection Sheets: Water repellent, vapor permeable sheets.
- N. Reinforcing steel shall be deformed bars conforming to ASTM A615, grade as shown on plans. Material shall contain recycled content when feasible.
- O. Accessories such as spacers, chairs, ties, and other devices necessary for properly placing, supporting and fastening reinforcement in place shall be provided. Annealed steel wire of not less than 16 gauge shall be used to secure reinforcement.
- P. Plywood shall be commercial-standard Douglas Fir, moisture resistant concrete form plywood not less than 5 ply and at least 5/8 inch thick.

- Q. Metal clamps and ties shall be used. Form ties for exposed concrete shall be removable either completely or to a minimum depth of one-inch from the face of the concrete.

PART 3 - EXECUTION

3.01 DESIGN OF CONCRETE MIXES

- A. Ingredients for concrete shall be Portland cement, fine and coarse aggregates and water.
- B. Normal weight concrete shall meet the requirements outlined in Subsection below.
- C. Concrete shall be designed so that the concrete materials will not segregate nor cause excessive bleeding. Slump shall be 4 inches. A tolerance of 1" above the indicated slump will be allowed for individual batches.
- D. For concrete used in ramps or other sloping construction, the slump tolerance shall be waived.
- E. For each class of concrete, the test results for 28-day compressive strength shall meet the following requirements:
- F. 28-Day-Compressive-Strength-Test-Results (psi)

	Min. Average for 3 Cylinders	Min. Average for 2 Cylinders
5,000	5,000	4,750
4,500	4,500	4,250
4,000	4,000	3,750
3,000	3,000	2,750

- G. Slabs-on-grade shall have a maximum water-cement-ratio of 0.45 or as indicated and shall contain 4% to 1-1/2% entrained air.
- H. The Contractor shall submit for approval by the State Engineer the mixes he intends to use at least 14 days before the actual concrete placing operations.
- I. The Contractor shall use only approved mixes.
- J. Concrete strength for various elements shall be as indicated.
- K. For slabs-on-grade, the contractor may use a mix design other than that indicated provided the vapor emission rate is equal or less than 5 lbs. per 1000 s.f. at the time of the finished flooring installation. If the vapor emission rate exceeds this limit, the Contractor shall be responsible to take the measures necessary to reduce

the emission to an acceptable level without delaying the project.

3.02 JOINTS

- A. Construction joints shall be provided as detailed at locations indicated on the plans. Construction joints not shown on the plans shall be so made as to least impair the strength of the structure and shall be approved by the State Engineer. In general, they shall be located near the middle of the spans of slabs, beams and girders unless a beam intersects a girder at this point, in which case the construction joints in the girders shall be offset a distance equal to twice the width of the beam. Joints in columns and walls shall be at the underside of floors, slabs, beams or girders and at the top of footings or floor slabs. Beams, girders, brackets, column capitals, haunches and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.
- B. All reinforcing steel shall be continuous across construction joints. Keys and/or inclined dowels shall be provided as required. Longitudinal keys at least 1-1/2" deep shall be provided in all joints in walls and between walls and slabs or footings. Unless otherwise indicated, joints shall be sealed with joint sealing compound.
- C. Expansion joints shall be provided as detailed at locations indicated on the plans. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors or walls bonded on only one side of joint) shall not be permitted to extend continuously through any expansion joint. Joints shall be sealed with expansion joint filler and sealing compound at least 3/8" deep.
- D. Contraction/control joints shall be provided where shown or called for on the plans and shall be 1/4 the depth of the slab or a minimum of 1" deep. Unless otherwise indicated on the plans, joints may either be tooled, formed-in-place or sawcut. When saw-cut joints are provided, cutting shall be timed properly with the set of the concrete so that it is firm enough not to be torn or damaged by the cutting blade and before random shrinkage cracking can form in the slab. In any case, cutting shall be completed not later than 12 hours after the concrete is placed and finished. Unless otherwise indicated on the plans, joints shall be sealed with joint sealing compound.

3.03 MIXING CONCRETE

- A. All concrete throughout shall be either job or plant mixture in an approved type of power operated mixer that will ensure uniformity and homogeneity of the concrete produced. The Contractor shall provide a sufficient number of mixers to continuously carry on the work.

B. Mixing at jobsite shall be done in accordance with ACI 304 and as follows:

1. Concrete shall be thoroughly mixed in a batch mixer of an approved type and size which will insure a uniform distribution of materials throughout the mass. The machine shall have a control device to prevent materials from being discharged until they have been mixed for the specified minimum time.
2. The entire contents of the drum shall be discharged before materials of the succeeding batch are placed therein. No mixer shall be used which has a rated capacity of less than a 1-sack batch and no mixer shall be charged in excess of its rated capacity.
3. The first batch of materials placed in the mixer after the machine has been cleaned shall contain a sufficient excess of cement, sand and water to coat the inside of the drum without reducing the required mortar content of the mix. Upon cessation of mixing, the mixer shall be thoroughly cleaned.

C. Ready Mixed and Mixed-In-Transit Concrete shall be mixed to conform to the provisions of ASTM C94 and as follows:

1. The plant shall have sufficient capacity and transportation equipment to deliver concrete at the rate desired. The interval between batches for a pour shall not exceed 30 minutes.
2. The time elapsed between the introduction of the mixing water to the cement and aggregates or the cement to the aggregates, and the placing of concrete in its final position shall not exceed 90 minutes.
3. In hot weather (more than 90 degrees Fahrenheit ambient temperature) or under conditions contributing to quick stiffening of the concrete, the elapsed time in 2 shall not exceed 60 minutes, if no retarding admixture is used. If an ASTM C494 Type B or D admixture is added to the concrete, the elapsed time in 2 shall remain at 90 minutes.
4. Concrete shall be mixed only in such quantity as is required for immediate use. No retempering will be permitted and concrete that has started to harden shall be discarded and promptly removed from the job.
5. Admixtures conforming to item entitled "MATERIALS" paragraph E. hereinabove may be used in the concrete as recommended by the supplier and approved by the State Engineer.

D. Hand mixing of concrete will not be permitted except to make up shortages for fence post footings, sidewalks, thresholds, flag pole foundations, curbs and gutters, and thrust blocks.

3.04 PLACING CONCRETE

- A. No concrete shall be placed in the absence of the Special Inspector or his representative who shall be given one day advance notice of starting time of concrete pour.
- B. Place no concrete until foundation, forms, reinforcing steel, pipes, conduits,

sleeves, hangers, anchors, inserts, waterproofing, termite treatment and other work required to be built into or placed ahead of concrete placing have been inspected and approved by the Special Inspector. Concrete placed without such notice and approval shall be rejected.

C. Preparation:

1. All sawdust, chips and other construction debris and extraneous matter shall be removed from interior of forms. Struts, stays, bracing, or blocking serving temporarily to hold forms in correct shape or alignment shall be removed when the concrete placing has reached an elevation rendering their services unnecessary.
2. Concrete shall be placed upon clean, damp surfaces with no free water, or upon properly compacted fills but never upon soft mud or dry, porous earth. Before pouring footings or foundations, bottoms of excavations shall be properly leveled off and tamped.
3. Before depositing new concrete on or against concrete which has set, all accumulations of mortar splashed upon reinforcing steel and the surfaces of forms shall be removed and the forms shall be retightened. The surfaces of previously set concrete shall be thoroughly roughened and cleaned of all foreign matter and laitance, saturated with water and slushed with a coat of cement grout. New concrete shall be placed before the grout has attained its initial set.

D. Conveying:

1. Concrete shall be conveyed from mixer to forms as rapidly as practicable by methods that will prevent segregation.
2. Concrete shall be deposited as nearly as practicable in its final position. Extensive spading as a means of transportation shall be avoided and in no case shall vibrators be used to transport concrete inside the forms.
3. Open troughs and chutes shall have a slope not to exceed 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 ft. long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.
4. The concrete shall not be allowed to drop freely more than 6 feet except where specifically authorized by the State Engineer. When placing operations would involve the dropping of concrete from a height of more than 6 feet, it shall be conveyed through pipes or flexible drop chutes.
5. If any appreciable segregation occurs through the conveying methods employed, their use shall be ordered discontinued by the State Engineer and some other satisfactory method of placing concrete shall be used.
6. All chutes, troughs, pipes and other means of conveyances shall be kept clean and free from coatings of hardened cement or concrete by thoroughly cleaning with water and chipping after each pour. Water used for flushing shall be discharged away from the vicinity of the concrete or forms already in place.

E. Depositing:

1. Unless adequate protection is provided, concrete shall not be placed during rain. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish. Fresh concrete that has been deposited but has not attained its initial set shall be protected in the event of rain.
 2. Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcing. As nearly as practicable, the concrete shall be dropped vertically without hitting reinforcement, sleeves or forms into its final position in order to avoid separation of coarse aggregates from concrete. After the initial set of concrete, the forms shall not be jarred and no strain shall be placed on the projecting reinforcing.
 3. Formed concrete shall be deposited in horizontal layers not deeper than 2 feet avoiding inclined layers and inclined construction joints. The depth of layers shall be shallow enough so that the succeeding layer will be placed before the previous layer has attained its initial set.
 4. Concrete shall not be allowed nor shall it be caused to flow horizontally or on slopes in the form. Concrete placing on a slope shall begin at the lower end of the slope and progress upward.
- F. Construction joints shall be made only where located on the plans unless approved otherwise by the State Engineer. Pours shall be planned to provide for the continuous placing of concrete from one construction joint to another. The face edges of all joints that are exposed to view shall be carefully finished true to line and elevation.
- G. In slab construction, placing of the concrete shall be started at the far end of the work so that each batch will be dumped against previously placed concrete, not away from it. The concrete shall not be dumped in separate piles and the piles then leveled and worked together. For floor slabs on earth, additional requirements in item entitled "MIXING CONCRETE" hereinabove shall apply.
- H. Beams and girders shall not be placed at the same time as the supporting columns or walls. At least 2 hours must elapse after columns or walls are placed before placing beams and girders supported thereon.
- I. Columns shall be placed in approximately 4-foot sections, with each section being vibrated and compacted as placed.
- J. In placing a deck of slabs and beams, the beams shall be placed first up to the height of the bottom of the floor slab. This placement shall extend in bay modules and end at the midspan, midpoint between columns. The length of this placement shall be determined by the time it takes to return to the slab and the top layer of the beams before the top of the first pour has started to harden and form a cold joint.
- K. If depositing of concrete must be stopped short of a full placement, it shall be leveled to a horizontal plane or stopped against a vertical bulkhead. Such bulkhead or horizontal plane shall be located only as approved by the State

Engineer.

L. Compaction:

1. All concrete shall be consolidated by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. All compaction shall be done by use of high frequency internal vibrators. Where the vibrator cannot be inserted into the concrete, compaction shall be done by spading, rodding or forking.
2. Frequency of vibrator shall be not less than 7,000 impulses per minute. The Contractor shall provide a sufficient number of vibrators to properly consolidate all concrete immediately after placing. At least one standby vibrator shall be on hand at all times during placement of the concrete.
3. Vibration shall not be applied through contact with reinforcement of forms. Vibration shall penetrate previously deposited concrete sufficiently to prevent pockets or voids or construction joints from occurring between pours, but must not be applied to concrete which has set up sufficiently to cease to be plastic under vibration.

3.05 FLOOR SLABS ON EARTH

- A. Concrete floor slabs on grade, with the exception of sidewalks, shall be placed directly over a vapor barrier, and a minimum of 4 inches of gravel cushion fill (ASTM C33, No. 67). The edges of the vapor barrier shall be lapped and sealed as required by vapor barrier manufacturer to assure barrier performance. For slabs which will receive vehicular traffic, the slab shall be placed over a 6-inch layer of gravel cushion fill. The gravel cushion fill shall consist of crushed basaltic aggregate compacted to a minimum of 95% relative compaction.

Repair holes in the vapor barrier created by screeds, formwork or other temporary construction prior to coverage with concrete.

- B. All earth-supported slabs, with the exception of sidewalks, shall be reinforced with a minimum of Grade 60 #3 steel reinforcing bars at 15 inches o.c. each way unless otherwise shown or called for on the plans. Plain bar dowels shall be provided as detailed for construction and expansion joints. Such dowels shall be wrapped or greased on one side of the joints to prevent bonding.
- C. Care shall be taken in handling and placing the reinforcement. Reinforcement shall be positively set to the level required within the slab(s) as indicated on the plans.
- D. Floor slabs shall be placed in alternate panels, long strip pattern, following construction or expansion joints. Narrow contraction/control joints shall be provided transverse to the length of the cast strips. There shall be an interval of at least 2 days between the placing of the initial panels and that of the adjacent ones. "Keyed Kold Joint" may be used in lieu of placement in alternate panels in

areas where floor covering is specified provided all shrinkage cracks are sealed prior to installation of floor covering. As an option, slabs may be placed in alternate panel checkerboard pattern. Where slabs are placed in a checkerboard pattern, no panel shall be placed in excess of 500 square feet in area nor exceed 32 feet in its longest dimension.

- E. A bond-break filler shall be provided where edge of slab abuts any vertical surface and where indicated on plans. Width of filler strips shall equal depth of floor slab.
- F. Prior to concrete placement, small mounds of concrete shall be placed at random rebar intersections during the pour to provide support in addition to the chairs or blocks. Reinforcing bars shall be lifted as necessary to ensure proper placement within the slab.

3.06 CONCRETE SIDEWALKS ON GROUND

- A. Concrete walks shall be of one lift construction, 4 inches in thickness with thickened edge, and reinforced with synthetic fiber reinforcement. Keys and /or plain bar dowels shall be provided as detailed for construction and expansion joints. Such dowels shall be wrapped or greased on one side of the joint to prevent bonding.
- B. Expansion joints shall be provided as detailed, not more than 32 feet apart; at junctions with curbs; where walks abut buildings, platforms and other fixed structures; and elsewhere as shown in the plans. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors or walls bonded on only one side of joint) shall not be permitted to extend continuously through any expansion joint. Joints shall be sealed with expansion joint filler and sealing compound at least 3/8" deep.
- C. Contraction/control joints shall be provided where shown on the plans and shall be 1/4 the depth of the slab or a minimum of 1" deep. Unless otherwise indicated on the plans, joints may either be tooled, formed-in-place or sawcut. When saw-cut joints are provided, cutting shall be timed properly with the set of the concrete so that it is firm enough not to be torn or damaged by the cutting blade and before random shrinkage cracking can form in the slab. In any case, cutting shall be completed not later than 12 hours after the concrete is placed and finished. Unless otherwise indicated on the plans, joints shall be sealed with joint sealing compound.
- D. Concrete shall be tamped and screeded true to grade and section, sufficient mortar brought to the surface for finishing, and the required finish given as specified hereinafter before the concrete sets. Steps in connection with walks shall have same finish as walks. All edges except for those at saw-cut control joints shall be rounded to 1/8" radius. Cross slope for sloped or crowned walks shall be 5/32" per foot. No pedestrian traffic shall be permitted on concrete walks for a period of 3 days after placing.

- E. Walks shall be finished as indicated hereinafter and scored where shown or called for on the plans.

3.07 FINISHING OF SLABS

- A. Finish A - Scratched Finish. After the concrete has been placed, struck off, consolidated and leveled, the surfaces shall be roughened with stiff brushes or rakes (cross-scratched) before final set.
- B. Finish B - Light Trowelled Finish. After the concrete has been placed, struck off, consolidated and leveled, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared and/or when the mix has stiffened sufficiently to permit the proper operation of a power-driven float. The surface shall then be consolidated with power-drive floats of the impact type except in thin sections. Hand floating with wood or cork-faced floats shall be used in locations inaccessible to the power-driven machine. The slab shall then be steel trowelled to a uniform, smooth texture.
- C. Finish C - Trowelled Finish. The surface shall be finished first with impact power floats, as specified above for Finish B, then with power trowels and finally with steel hand trowels. The first trowelling after power floating shall be done by a power trowel and shall produce a smooth surface which is relatively free of defects but which may still contain some trowel marks.
- D. Additional trowelling shall be done by hand after the surface has hardened sufficiently. The final trowelling shall be done to a point when a ringing sound is produced as the trowel is moved over the surface. The finished surface shall be free of any trowel marks and shall be uniform in texture and appearance. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.
- E. Finish D - Broom Finish. The concrete slab shall be given a coarse transverse scored texture by drawing a broom across the surface. The operation shall follow immediately after steel-trowelling performed under Finish B above.
- F. Finish F - Non-Slip Finish. The surface shall be given a dust-on application of non-slip grit abrasive aggregates. Finish with steel trowel but avoid over-trowelling. The rate of application of abrasive aggregates shall be not less than 25 pounds per 100 square feet or application shall be in strict accordance with the manufacturer's recommendations.
- G. Finish G - Swirled Finish. After the concrete surface has been struck off, darbied, power floated and steel troweled, the surface shall be given a swirl float finish. The float should be worked flat on the surface in semi-circular or fan-like motion.

3.08 FINISHING TOLERANCES FOR SLABS

- A. Finish shall be true planes within plus or minus 0.5 inch in 10 feet, as determined

by a 10-foot straightedge placed anywhere on the slab in any direction.

- B. Unless otherwise shown on the plans, all slabs shall meet this tolerance. The tolerances will be checked prior to removing of forms or shores.

3.09 SELECTION OF FLOOR FINISHES

Unless otherwise indicated on the plans, the following floor finishes shall be used:

1. Finish A - Scratched Finish. For surfaces intended to receive bonded applied cementitious applications (such as setting beds for ceramic tile or quarry tile on the first floor, where no membrane is called for).
2. Finish B - Light Trowelled Finish. For surfaces intended to receive roofing, waterproofing and membrane (such as setting beds on membranes, second floor and above).
3. Finish C - Trowelled Finish. For interior floors and floors intended to receive floor coverings.
4. Finish D - Broom Finish. For walks.
5. Finish F - Non-Slip Finish. For platforms, interior and exterior steps, landings and ramps.
6. Finish G - Swirled Finish. Not used.

3.10 REPAIR OF DEFECTS

- A. After forms have been removed, any concrete which is not constructed as shown on the plans or is out of alignment or level beyond required tolerances or which shows a defective surface which in the opinion of the State Engineer cannot be properly repaired or patched shall be removed.
- B. Where cast-in-place concrete which is exposed to view or designated as sandblasted requires repairing or patching, the texture of the surface of such repair or patch shall closely match that of the surrounding surface. If the concrete is to remain unpainted, the surface color shall also be closely matched to that of the surrounding surface.
- C. All tie holes and all repairable defective areas shall be patched immediately after form removal as follows:
 1. All honeycombed concrete shall be chipped out to sound concrete but in no case to a depth of less than 1 inch. If possible, edges of the chipped-out areas shall be undercut.
 2. Rock pockets, form tie holes, deep holes not too large in area, other holes with relatively high ratio of depth to area, and similarly confined areas shall be dry packed.
 3. After the area to be patched has been thoroughly cleaned and dampened, mortar, which shall consist of 1 part cement, 2-1/2 parts sand passing a #16 screen, and only enough water to produce a mortar that will stick together upon being molded into a ball by slight pressure of the hands, shall be placed in the holes in layers having a compacted

- thickness of about 3/8". Each such layer shall be solidly rammed over its entire surface using a hardwood stick and a hammer.
4. Shallow depressions where lateral restraint cannot be obtained, voids behind reinforcement, and holes extending through concrete sections shall be patched using a commercially prepared bonding agent, a stiff mortar mix of 1 part cement and not more than 2-1/2 parts sand.
 5. For filling holes in exterior surfaces, an epoxy-bonding agent shall be used. Application of the bonding agent shall be in strict conformance with the manufacturer's instructions.
 6. An epoxy-and-sand mixture may be used in lieu of the mortar-and-bonding agent mixture for any of the patching above. The preparation of the surface to receive the patch, as well as the mixture proportions of the epoxy-and-sand, shall be in strict conformance with the manufacturer's instructions.
- D. Except for concrete required to be removed under Paragraph 3.10, any concrete which is not constructed as shown on the plans or is out of alignment and/or level beyond allowable tolerances may be patched using an epoxy-and-sand mixture.
1. The proportions of the mix and the preparation of the surface to receive the patch shall be in strict conformance with the manufacturer's instructions except as or unless otherwise specified herein. The minimum thickness of the patch shall be 1/4". No "feathering" to a lesser thickness will be permitted.
- E. Misalignment which requires correction more than 1 inch thickness shall be repaired in the following manner:
1. The surface of the affected area shall be chipped, etched, or otherwise cleaned and roughened to provide a sound surface for bonding;
 2. Concrete nails or other fasteners which can provide positive mechanical bonding of the patch shall be set into the surface at about 18 inches o.c. in all directions with a minimum of 2 rows;
 3. Wire mesh reinforcement as approved by the State Engineer shall be installed in those portions of the patch which exceed 2-inch thickness;
 4. A bonding agent suitable for use in the repair location (epoxy required for exterior use) shall be applied over the entire surface to be patched;
 5. Formwork to the true lines called for shall be installed over the area requiring the patch; and
 6. Concrete or grout with aggregate sized appropriately for the cavity and which will provide strength equivalent to that of the base surface shall be placed in the form, properly compacted and suitably cured.

3.11 SURFACE FINISHES

- A. Rough Concrete Finish. Rough concrete finish surfaces shall be reasonably true to line and plane with no specific requirements for selected facing materials. Tie holes, honeycombing and defects shall be patched in accordance with item entitled "REPAIR OF DEFECTS" hereinabove except that the patches for concealed surfaces need not be matched in color and texture with adjacent surfaces. Fins exceeding 1/4 inch in height shall be removed. Otherwise, surfaces shall be left with the texture imparted by the forms
- B. Sandblasted Finish:
1. All sandblasting shall be done at a consistent point in cure age for sake of uniformity. Upon completion of sandblasting and prior to application of finish treatment, thoroughly remove all residue sand from blasted surfaces by water.
 2. Form ties shall be broken back from the surface and washers removed prior to blasting the surface.
 3. During sandblasting operation, protect surfaces not to be sandblasted by masking with wood, metal, rubber, or tape. Concrete shall receive a medium sandblast (by wet method). Provide samples for approval and selection, using beach sand, crush basalt, silica sand, or a combination of them for the samples.
 4. Prepare one 4 feet x 4 feet sample with the specified mix for final approval. Approved sample shall remain on jobsite during period of sandblasting and shall be labeled with the following information.
 - a. Age of concrete when sandblasted.
 - b. Type of nozzle used.
 - c. Type of sand used.
- C. Plywood Finish. Finish of all exposed surfaces cast against forms constructed of plywood or lined with "Plyform" shall be true to line and plane within the tolerances in item entitled "FORMWORK TOLERANCES" herein below.
- D. Joint marks and fins shall be removed and surfaces left smooth, dense and free from prominent grain markings.
- E. The surface shall be scrubbed to remove any laitance or loose particles and to expose any defects.
- F. Tie holes, honeycombing and defects shall be repaired in accordance with item entitled "REPAIR OF DEFECTS" hereinabove.

- G. The surface shall be thoroughly wetted. Then, as the concrete approaches surface dryness, a mortar consisting of 1 part Portland cement, 2 parts well-graded sand passing a No. 30 sieve, and enough water to provide the consistency of thick paint shall be vigorously and thoroughly rubbed over the area with clean burlap pads so as to fill all voids.
- H. While the mortar is still plastic but partially set so that it cannot be easily pulled from the voids, the surface shall be rubbed again with a dry (no water) mortar mix of the same proportions as above. Burlap pads, stretched tightly around a board to prevent dishing the mortar in the voids, shall be used for this operation. There shall be no discernible thickness of mortar on the surface, except in the voids, when this operation is concluded.
- I. Immediately following the rubbing treatment, the surface shall be continuously moist-cured for 72 hours.

3.12 LOCATION OF SURFACE FINISHES

- A. Unless otherwise indicated on the plans, the location of formed surface finishes shall be as follows:
- B. Rough Concrete Finish - All concealed concrete surfaces such as behind ceramic tile, furring, acoustical tile, etc.
- C. Plywood Finish with Cement Wash - All exposed concrete surfaces.

3.13 CURING AND PROTECTION

- A. All concrete shall be cured for a period of not less than 7 days. During this curing period, the concrete shall be maintained with minimal moisture loss at a relatively constant temperature. Fresh concrete shall be protected from heavy rains, flowing water, mechanical injury, and injurious action of the sun. Acceptable curing methods:
 - 1. Slabs-on-grade: Water cure or pervious sheeting or curing compound membrane.
 - 2. Other slabs: Cure by one of the methods listed below. Curing method selected must be compatible with the finish to be applied to the concrete.
- B. Curing shall immediately follow the finishing operation.
- C. To promote drying of slabs on grade to receive floor finish and avoid moisture related flooring problems, once drying of the slab has started, if not sheltered by roofs or other floors it shall be protected by slab protection sheets from getting wet for a minimum of 90 days immediately prior to the placement of the floor finish. If the slab cannot be adequately protected, mechanical drying or other means shall be employed to reduce the vapor emission level to 3 lbs. per 1000 s.f. or less prior to placement of the floor finish.

- D. Water Curing - If cured with water, concrete shall be kept wet by mechanical sprinklers, by ponding, or by any other method which will keep the surfaces continuously wet.
- E. Pervious Sheeting - Overlap sheeting edges approximately 6 inches and keep sheets continuously wet throughout the curing period.
- F. Curing Compounds - Curing compounds used on concrete surfaces that are to receive floor covering, paint or colored finish shall be as recommended by the manufacturer to be compatible with the applied finish.
 - 1. The Contractor shall submit to the State Engineer a letter certifying that the curing compound is compatible with the applied finish. Application shall be in accordance with the manufacturer's recommendations. If curing, sealing or other compounds are used which are incompatible with applied finish, such compound shall be thoroughly removed by grinding with a terrazzo grinder or other means approved by the State Engineer.

3.14 FORMWORK TOLERANCES

- A. Forms shall be constructed so that the concrete surfaces do not deviate from established lines, grades and dimensions in excess of the tolerances listed below:
 - 1. Variations from plumb:
 - a. In the lines and surfaces of columns, piers, walls, and in arises:

In any 10 ft. of ht.:	1/4-inch
Max. for the entire ht. of structure:	1/2-inch
 - b. For exposed corner columns, control-joint grooves, and other conspicuous lines:

In any 20 ft. of length	1/4-inch
Max. for the entire length	1/2-inch
 - 2. Variation from the level or from the grades specified in the contract documents:
 - a. In slab soffits, ceilings, beam soffits and in arises, measured before removal of supporting shores:

In any 10 ft. of length	3/16-inch
In any bay or in any 20 ft. length	3/8-inch
Max. for the entire length	1/2-inch
 - b. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

In any bay or in 20 ft. length	1/4-inch
Max. for the entire length	1/2-inch

3. Variation of the linear building lines from established position in plan and related position of columns, walls and partitions:

In any bay	1/2-inch
In any 20 ft. of length	1/2-inch
Max. for the entire length	one-inch

4. Variation in the sizes and location of sleeves, floor openings, and wall openings:

Plus or Minus	1/4-inch
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5. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:

Minus	1/4-inch
Plus	1/2-inch

6. Footings: Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items:
 - a. Variations in dimensions in plan:

Minus	1/2-inch
Plus	2 inches
 - b. Misplacement or eccentricity:

2 percent of the footing width in the direction of misplacement but not more than 2 inches
 - c. Thickness:

Decrease in specified thickness	5 percent
Increase in specified thickness	No Limit

7. Variation in steps: The largest tread run within any flight of stairs shall not exceed the smallest by more than 1/4-inch. The greatest riser height shall not exceed the smallest by more than 1/4-inch.

3.15 INSERTS, FASTENING DEVICES AND CONDUITS

- A. Install inserts, reglet strips, hangers, metal ties, anchors, bolts, nailing strips, blocking, grounds and other fastening devices as required for attachment of other work. Properly locate all embedded items in cooperation with other trades and secure in position before concrete is placed.

- B. All electrical and mechanical conduits and fittings shall be located such that they do not impair the strength of the concrete member and shall be subject to acceptance by the Owner.

3.16 CONSTRUCTION OF FORMS

- A. All concrete forms shall be placed with metal clamps and ties. Locate ties level and plumb in horizontal rows and vertical tiers.

- B. Temporary access openings to forms for cleaning prior to depositing of concrete shall be provided.
- C. Forms for concrete surfaces or on exposed surfaces which are to receive a finishing material shall be either wetted thoroughly immediately before placing concrete or coated with a bond-breaking material compatible with the finishing material and/or its adhesive prior to the placement of reinforcing steel. Forms for unexposed surfaces may be coated with form oil. However, any surplus oil on the form surfaces and any oil on the reinforcing steel shall be removed by wiping with dry rags.
- D. Forms shall not be removed before the expiration of the minimum lapsed time from concrete pour shown below unless information and/or data justifying a request for a shorter period is submitted to and approved by the Owner. Even with such approval, however, the Contractor shall be fully responsible to repair any damages which may result from the early removal.
- Walls, columns and side forms of beams 3 days
 - Footing side forms 24 hours
 - Bottom forms of cast-in-place slabs 14 days
 - Bottom forms of post-tensioned slabs 7 days
- E. No construction loads exceeding the structural design live loads shall be supported upon any unshored portion of the structure under construction. No construction load shall be supported upon, nor any shoring removed from any part of the structure under construction until the portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon. This strength may be demonstrated by job cured test specimens and by a structural analysis considering the proposed loads in relation to this test strength. Such analysis and test data shall be furnished by the Contractor to the Owner.
- F. Edge forms and intermediate screed strips shall be set accurately to produce the designated elevations and contours of the finished surface, and shall be sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment. The concrete surface shall be aligned to the contours of screed strips by the use of strike-off templates or approved compacting type screeds. Screeds shall be set adjacent to all walls and in parallel rows not to exceed 8 feet on centers. Penetrations of the moisture barrier shall be held to a minimum.
- G. At walks, screeds shall be set at the sides to serve as forms and additional screeds, if required, shall be spaced not exceeding 8 feet on centers.

3.17 REINFORCEMENT TOLERANCES

- A. Bars used for concrete reinforcement shall meet the following requirements for

fabricating tolerances:

Sheared length: One-inch
Depth of truss bars: +0, -1/2 inch
Overall dimensions of stirrups, ties: 1/2 inch
All other bends: One-inch

- B. Bars shall be accurately placed and adequately supported before the concrete is placed and shall be secured against displacement within the following tolerances:

Clear distance to formed soffits (exposed underside of beams and slabs):
-1/4 inch

Minimum distance between bars: -1/4 inch

Tolerance on d: 3/8 inch

Tolerance on the minimum concrete cover: -3/8 inch.

Note: The tolerance for cover shall not exceed minus one third the minimum concrete cover.

d = Distance from the extreme compression fiber to the centroid of tension reinforcement.

Longitudinal location of bends and ends of reinforcement: 2 inches except at discontinuous ends of members where tolerance shall be 1/2 inch.

Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be subject to approval by the Owner.

3.18 REINFORCEMENT

- A. Reinforcing steel bars, wire and wire fabric shall be provided in the sizes, lengths and configurations as indicated on plans and shall be thoroughly cleaned, before placing, of loose mill scale, loose flaky rust, oil, and all coatings that will destroy or reduce bond. If necessary, they shall be cleaned again before placing of concrete. All items shall be fabricated, positioned and secured in place as indicated in the plans and as herein specified. Annealed steel wire shall be used to secure reinforcement. Reinforcement shall be placed in specified positions not exceeding the tolerances listed in Sub-section 3.01. Unless otherwise noted, cleaning, bending and placing of reinforcement shall be done in accordance with the standard practice of the Concrete Reinforcing Steel Institute.
- B. Concrete or plastic coated support and spacers shall be used to secure the proper spacing of reinforcement over formwork. Stirrups shall be accurately and securely wired to the bars at both top and bottom. At slabs, footings and beams in contact with earth, pre-cast concrete blocks (not bricks or hollow tile) or chairs shall be used to hold reinforcement at a proper distance above earth.

- C. Bars shall be tied at all intersections, and distances from forms shall be maintained by means of pre-cast concrete blocks, ties, hangers, chairs or other approved supports.
- D. Bars shall be bent cold to the shapes shown on the plans. Bends shall be made around a pin having a diameter not less than 6 times the bar diameter except that for bars of larger than one inch diameter the pin diameter shall be 8 times the bar diameter. If required, bars may be bent in the field using a "hickey" bar.
- E. All reinforcing steel bars shall be furnished in the lengths indicated on the plans. Splicing of bars, except where shown, will not be permitted without the approval of the Owner. Splices where permitted shall be staggered as far as possible, wired together in such a manner as to maintain the clear depth of the member and the minimum clear distance to the surface of concrete. Unless otherwise shown on the plans, splices shall be lapped 48 bar diameters or 24 inches, whichever is larger.
- F. Unless permitted by the Owner, reinforcement shall not be bent after being partially embedded in hardened concrete. Improperly and/or excessively bent bars shall be replaced.
- G. Unless shown in plan, the minimum concrete protective covering for reinforcement, except for extremely corrosive atmosphere, other severe exposures, or fire protective covering shall be as follows:
 - 1. Concrete deposited against the ground: 3 inches (except 6 inches where deposited below water table).
 - 2. Formed surfaces exposed to weather or in contact with the ground: 2 inches for reinforcing bars #6 or larger; 1-1/2 inch for reinforcing bars less than #6; except not less than 1-1/2 times maximum size of aggregate for column spirals or ties.
 - 3. Interior surfaces: 1-1/2 inch for beams, girders, and columns; 3/4 inch for slabs, walls and joists with #11 bars or smaller, and 1-1/2 inch with #14 and #18 bars.
- H. Dowels (minimum #3 @ 24 inches o.c. unless otherwise shown in the plans) shall be installed in all concrete to which masonry walls abut.
- I. Inserts, reglet strips, hangers, metal ties, anchors, bolts, nailing strips, blocking, grounds and other fastening devices as required for attachment of other work. Properly locate all embedded items in cooperation with other trades and secure in position before concrete is placed.
- J. All electrical and mechanical conduits and fittings shall be located such that they do not impair the strength of the concrete member and shall be subject to acceptance by the Owner.

3.19 CONCRETE FOR ELECTRICAL WORK

- A. Unless otherwise noted on plans, concrete for handholes and manholes shall be 3,000 psi strength at 28 days. Concrete for encased ducts shall be 2,500 psi strength at 28 days. Maximum size of aggregates for concrete encased duct shall be 3/4".
- B. All ducts shall have a minimum cover of 3 inches of concrete. Spacers shall be used for placing ducts and for rigidly holding the ducts during the concrete pour. Provide minimum earth cover of 18 inches over top of concrete encasement unless otherwise shown on plans.
- C. The encased section of ducts to which a future connection is to be made shall end with a coupling. An unencased 1-foot section of duct and end cap shall constitute the terminus of such ducts.

3.20 CONCRETE FOR DRAINAGE, SEWER AND PLUMBING SYSTEMS

- A. Unless otherwise noted on plans, all concrete required for construction of manholes, catch basins, valve boxes, etc., which are required for plumbing and drainage installations shall be 3,000 psi strength at 28 days.
- B. Normal weight concrete containing calcareous coarse aggregates shall not be used in sewerage structures and/or components.
- C. Sewer manholes shall be constructed in accordance with Civil drawings and specifications.

3.21 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified independent testing and inspecting agency to perform concrete testing and special inspections.
- B. All reinforcement shall be inspected by the Special Inspector prior to the closing of forms. This approval, however, shall not be construed to relieve the Contractor of his responsibility to place all reinforcement in accordance with the plans.
- C. Flatness and Levelness of Floors: Floors shall be measured for levelness and flatness as indicated below. Measurements shall be made within 24 hrs following placement of the slab and shall be reported to the State Engineer as soon as possible and not later than 72 hours following installation. All tests are to be performed prior to removing shoring. Proposed sectional boundaries for taking measurements shall be submitted to the State Engineer for review and approval prior to pouring the slabs. In general, use one-half bay spacings, control and cold joint locations for sectional boundaries.
 - 1. Concrete Slab Over Metal Deck: Use a minimum F_f value of 20.
 - 2. Poured in Place and Shored Slabs: Use a minimum F_f/F_i value of 20/17.

F_r and F_i values shall be defined per ACI 302.1R-26. Where these tolerances are not met it shall be immediately be brought to the State Engineer's attention. Remedial measures can be performed with approval of the State Engineer but should remedial measures not be possible, the contractor shall remove and replace the portions of the slab that are not in conformance at the contractor's expense.

3.22 CLEAN UP

Contractor shall clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work and upon completion of the entire concrete and related work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
03300	Cast-In-Place Concrete	Lump Sum

END OF SECTION

SECTION 03340 - CONCRETE FLOOR FINISHES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes: Liquid floor treatments for Polished Concrete (CN-01) finish.
- B. Related Sections include Section 03300 "Cast-in-Place Concrete" for general building applications of concrete.

1.03 REFERENCES

- A. American Society for Testing and Materials:
 - 1. ASTM-C779, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
 - 2. ASTM G23-81, Ultraviolet Light & Water Spray.
 - 3. ASTM C805, Impact Strength.
- B. American Concrete Institute: ACI 302. 1R-89, Guide for Concrete Floor and Slab Construction.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Special concrete finishes manufacturer's specifications and test data.
 - 2. Special concrete finishes describing products provided, giving manufacturer's name, and product name for the specified material to be provided under this section.
 - 3. Special concrete finishes manufacturer's recommended installation procedures; which when approved by the State Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.
 - 4. Special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
 - 5. Material Safety Data Sheets (MSDS)
 - 6. Preparation and concrete grinding procedures.

- B. Shop Drawings: Indicate information on shop drawings as follows:
 - 1. Typical layout including dimensions and floor grinding schedule.
 - 2. Plan view of floor and joint pattern layout.
 - 3. Hardener, sealer, densifier identified in notes.
- C. Test Reports: Certified test reports, prepared by an independent testing laboratory, confirming compliance with specified performance criteria.
- D. Qualification Data: For product manufacturer.
- E. Qualification Data: For installer. Data to include references from five, similar completed projects.
- F. Maintenance Data: Submit manufacturer's instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under intended use. Instructions should contain precautions against cleaning products and methods, which may be detrimental to finishes and performance.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals:

1.05 QUALITY ASSURANCE

- A. Product Manufacturer's Qualifications: Manufacturer of product in use for not less than five years, with successfully completed installations during that period.
- B. Installer Qualifications: Certified by product manufacturer as being familiar with proper procedures and installation requirements required by the manufacturer.
- C. Source Limitations: Obtain material of the same brand from the same manufacturer's plant.
- D. Mockups: Apply finish at location indicated to demonstrate surface finish, floor treatments, and standard of workmanship. Mockup to be installed using the same Installer personnel who will perform work. Approved mockup may become part of the completed Work if undisturbed at time of Substantial Completion. Comply with the following:
 - 1. Apply mock-up of finish to demonstrate typical joints, surface finish, color variation (if any), and standard of workmanship including patching technique.
 - 2. If the State Engineer determines that mock-up do not meet requirements, demolish and remove from the site and cast others until mock-ups are approved.
 - 3. Maintain mock-up during construction in an undisturbed condition as a

standard for judging the completed work.

E. Protection:

1. Diaper all hydraulic powered equipment to avoid staining of the concrete.
2. Do not park vehicles on inside slab. If necessary to complete their scope of work, place drop cloths under vehicles at all times.
3. Do not use pipe cutting machines on the inside floor slab.
4. Do not be place or store metals on interior slab to.
5. Avoid contact of acids and acidic detergents with slab.
6. Protect slab at all times.

1.06 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For concrete surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028 (under wet conditions):

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver the products in original, unopened containers, seals unbroken, with legible manufacturer's identification and information.
- B. Store products in conditions recommended by manufacturer.
- C. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

1.08 PROJECT CONDITIONS

- A. Environmental Conditions: Maintain an ambient temperature of between 50° and 90° F during application and at least 48 hours after application.
- B. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
- C. Close areas to traffic during floor application and after application, for time period recommended in writing by manufacturer.
- D. Protection: Precautions shall be taken to avoid damage or contamination of any surfaces near the work zone. Protect completed work from moisture or contamination.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cementitious Material: Refer to Division 03 Section "Cast-in-Place Concrete" for concrete materials, accessories, installation, and finishing:

2.02 LIQUID FLOOR FINISHES – (CN-01)

- A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Products: Provide one of the following:
 - a. Basis of Design: L&M Construction Chemical, Inc., FGS Hardener Plus
 - b. ChemMasters; Chemisil Plus.
 - c. Meadows, W. R., Inc.; LIQUI-HARD.
 - d. Or approved equal.
- C. Joint Filler: Semi-rigid, 2-component, self-leveling. 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.
- D. Oil Repellant Sealer: Ready to use, silane, siloxane and fluoropolymer lended water baed solution sealer, quick drying, low-odor, VOC compliant and compatible with chemically hardened floors.
- E. Finish: Standard high gloss (HG-1), 1500 grit.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine areas and conditions under which work will be performed and identify conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Compliance with Manufacturer's Instructions: Obtain, understand, and comply with the current versions of the manufacturer's technical data sheets and installation instructions.

3.02 PREPARATION

A. General:

1. Newly placed concrete shall be sufficiently cured to allow concrete to become reactive; minimum number of days as recommended by product manufacturer, but not less than 28 days.
2. Do not use liquid curing materials. Cure concrete flatwork with new, unwrinkled, non-staining, high quality curing paper. Do not overlap curing paper.
3. Prepare substrate surfaces in accordance with product manufacturer's written recommendations. Prepare the concrete mechanically via scarification, shot blasting or other means, including diamond grinding to remove all contaminants and provide a sound concrete surface free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants.
4. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation and other conditions affecting the floor finish.

3.03 INSTALLATION, LIQUID FLOOR FINISHES

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days' old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Floor Surface Polishing and Treatment

1. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Provide consistent finish in all contiguous areas.
2. Diamond polish concrete floor surfaces with power disc machine recommended by floor finish manufacturer. Sequence with coarse to fine grit. Installer to determine the optimum starting grit in order to achieve the specified aggregate exposure.

3.04 PROTECTION OF FLOOR FINISHES

- #### A. Protect floor finishes from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by floor treatments installer.

- B. Protective Cover: Product: EZ Cover, or equal. Do not apply tape materials directly to polished concrete surface.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
03340	Concrete Floor Finishes	Lump Sum

END OF SECTION

SECTION 03450 - ARCHITECTURAL PRECAST CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

1. Architectural Precast Concrete Items:
 - a. Outdoor bench tops.
2. Accessories.
3. Grout materials.

1.02 RELATED SECTIONS

- A. Section 04200 - Unit Masonry. For use in combination with Architectural Precast Concrete.
- B. Section 05511 – Metal Stair. For Precast Concrete treads and risers specified in that section.

1.03 REFERENCES

- A. ASTM International (ASTM):
 1. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
 2. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
 3. ASTM C150/C150M - Standard Specification for Portland Cement.
 4. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
 5. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete.
 6. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 7. ASTM A615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Reinforced Concrete.
 8. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 9. ASTM C1194 - Standard Test Method for Compressive Strength of Architectural Cast Stone.
- B. Precast/Prestressed Concrete Institute (PCI)
 1. PCI MNL 117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
 2. PCI MNL 120 - PCI Design Handbook - Precast and Prestressed Concrete.

1.04 DEFINITIONS

- A. Architectural Precast Concrete: Precast concrete that is structural as well as decorative in function.

1.05 SUBMITTALS

- A. Product Data: For each product.
 - 1. Architectural precast design mixes.
 - 2. Manufacturer's data sheets on each product to be used.
 - a. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- B. Shop Drawings: Detail fabrication and installation of architectural precast concrete units.
 - 1. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.
 - 2. Indicate joints, reveals, and extent and location of each surface finish.
 - 3. Reinforcement details.
 - 4. Finishes.
 - 5. Joint and attachment details.
 - 6. Indicate type, size, and length of welded connections by AWS standard symbols.
 - 7. Detail loose and cast-in hardware and connections.
 - 8. Location and details of connection hardware attached to structure.
 - 9. Items cast into stones.
 - 10. Erection sequences.
 - 11. Relationship to adjacent materials.
 - 12. Loose, cast-in, and field hardware.
- C. Verification Samples: 12 by 12 inches (305 by 305 mm). For expose surface finishes. Representative of finish, color, and texture expected.
- D. Test Reports:
 - 1. Inserts and embeds.
 - 2. Cementitious materials.
 - 3. Admixtures.
 - 4. Reinforcing materials.
 - 5. Structural steel shapes and hollow sections.
- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals:

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the governing jurisdiction of the Project.
 - 1. Designated an APA-certified plant for production of architectural precast concrete products.
- B. Quality-Control Standard: For manufacturing procedures and testing

requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

- C. Installer Qualifications: Company specializing in performing Work of this section with minimum ten years documented experience with projects of similar scope and complexity.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D.1.1M, "Structural Welding Code - Steel"; and AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."
- E. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- F. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Demonstrate aesthetic effects and set quality standards for fabrication and installation along with reviewing interaction of other construction materials.
 - 1. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
 - 2. Retain mock-up during construction as a standard for comparison with completed work.
 - 3. Do not alter or remove mock-up until work is completed or removal is authorized.
 - 4. Approved Mockups: May become part of the completed project.

1.07 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work.
- B. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle and transport Precast Architectural Concrete on protective material and with protective spacers between units.
- B. Support units at designated points to prevent distortion, cracking, warping or other damage while stored.
- C. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.
- D. Store Architectural Precast Concrete units off ground on adequate dunnage with bracing as required, support with protective non-staining spacers between units if stacked.
- E. Place stored stones so identification marks are clearly visible.

- F. Prevent prolonged contact of materials that retain moisture.
- G. Lift and support units only at designated points indicated on shop drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. Empire Precast
 - 2. DeVinci PreCast,
 - 3. Or Approved Equal.

2.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Architectural Precast units must withstand design loads and dimensional changes due to thermal and moisture extreme, as governed by applicable codes and standards.

2.03 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Galvanized Reinforcing Bars: ASTM A615/A615M, Grade 60 / ASTM A706/A706M, deformed bars, with ASTM A767/A767M, Class II zinc coating and chromate treatment.
- C. Epoxy-Coated Reinforcing Bars: ASTM A615/A615M, Grade 60- ASTM A706/A706M, deformed bars, ASTM A775/A775M or ASTM A934/A934M epoxy coated.
- D. Low-Alloy-Steel Reinforcing Bars: ASTM A706/A706M, deformed.
- E. Steel Bar Mats: ASTM A184/A184M, fabricated from ASTM A615/A615M, Grade 60 ASTM A706/A706M, deformed bars, assembled with clips.
- F. Deformed-Steel Welded Wire Reinforcement: ASTM A497/A497M, flat sheet.
- G. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.04 ARCHITECTURAL PRECAST CONCRETE MATERIALS

- A. Portland Cement: ASTM C150/C150M; Type I, II, or III. Surfaces Exposed to View in Finished Structure: Use white of same type, brand, and source throughout Architectural Precast Concrete production.
- B. Coarse Aggregates: ASTM C33, except for gradation.
- C. Fine Aggregates: Manufactured or natural sands, ASTM C33, except for gradation.

- D. Air Entraining Admixtures: Conforming to ASTM C260.
- E. Water: Potable.
- F. Coloring Admixture: ASTM C979/C979M, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
 - 1. Color: As determined by the State Engineer. Provide full selection of standard colors for final selection.
- G. Potable Water: No material affecting color stability, setting, or strength.
- H. Chemical Admixtures: ASTM C494/C494M, containing 0.1 percent or less chloride ions.
 - 1. Admixture: To be determined by the precast manufacturer.
- I. Architectural Precast Concrete Physical Material Properties as Follows:
 - 1. Compressive Strength per ASTM C1194: 6,500 psi (44.82 MPa) at 28 days.
 - 2. Air Content per ASTM C231: 4 to 8 percent for freeze thaw protection.
 - 3. Absorption: 6 percent maximum; cold water method.
 - 4. Freeze-thaw: CPWL less than 5 percent after 300 cycles.

2.05 STEEL CONNECTION MATERIALS

- A. Carbon-Steel-Headed Studs: ASTM A108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1 M, Type A or Type B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.
- B. Zinc-Coated Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A123/A123M or ASTM A153/A153M electrodeposition according to ASTM B633, SC 3, Types 1 and 2.
 - 1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.
 - 2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight and complying with DOD-P-21035B or SSPC-Paint 20.

2.06 ACCESSORIES

- A. Precast Accessories: Clips, hangers, high-density plastic or steel shims, and other accessories required to install architectural precast concrete units.

2.07 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C150/C150M, Type I, and clean, natural sand, ASTM C144 or ASTM C404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06

percent by weight of cement when tested according to ASTM C1218/C1218M.

2.08 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of Architectural Precast Concrete material required.
- B. Design mixtures shall be prepared by qualified plant personnel or may be formulated by independent outside qualified laboratories.
- C. Compressive Strength (28 Days): 6500 psi (44.8 MPa) minimum.
- D. Maximum Water-Cementitious Materials Ratio: 0.45.
- E. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C1218/C1218M.
- F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C642, except for boiling requirement.
- G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.
- H. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.09 ARCHITECTURAL PRECAST CONCRETE FABRICATION

- A. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.
 - 1. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
 - 2. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
 - 3. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.
- B. Embedded Anchors and Miscellaneous Hardware:
 - 1. Material: Steel complying with ASTM A36/A36M and hot-dip galvanized complying with ASTM A123/A123M.
- C. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

- D. Unit Identification: Mark stones with identification marks on Shop Drawings. Mark casting date on each piece.

2.10 FABRICATION TOLERANCES

- A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

2.11 FINISHES

- A. Exposed Faces: Free of joint marks, grain, and obvious defects.
- B. Corners Including False Joints: Uniform, straight, and defined.
- C. Finish exposed-face surfaces of Architectural Precast Concrete to match approved design reference sample. Match Empire Precast, "Shale" Finish.

2.12 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, ASTM C1610/C1610M, ASTM C1611/C1611M, ASTM C1621/C1621M, and ASTM C1712.
- B. Strength of precast concrete units is considered deficient if units fail to comply with ACI 318 requirements for concrete strength.
- C. Testing: If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, pre-caster will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C42/C42M and ACI 318.
- D. Defective Units: Discard and replace recast architectural concrete units that do not comply with acceptability requirements in PCI MNL 117, including concrete strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups. Replace unacceptable units with precast concrete units that comply with requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 ERECTION

- A. Install clips, hangers, and other accessories required for connecting Architectural Precast Concrete units to supporting members and backup materials.
- B. Erect Architectural precast concrete units level, plumb, square, and in alignment. Provide temporary supports and bracing as required.
 - 1. Maintain horizontal and vertical joint alignment and uniform joint width.
 - 2. Grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
- C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
- D. Grouting or Dry-Packing Connections and Joints: Grout connections where required or indicated.
 - 1. Retain flowable grout in place until hard enough to support itself.
 - 2. Pack spaces with stiff dry-pack grout material, tamping until voids are filled.
 - 3. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces.
 - 4. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for not less than 24 hours after initial set.

3.04 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.
- B. Comply with Noncumulative Tolerances:
 - 1. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
 - 2. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
 - 3. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width,

- whichever is less.
4. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch (1.5 mm), except where variation is due to warpage of units within tolerances specified.

3.05 REPAIRS

- A. Maintain structural adequacy of panel do not impair appearance. Must be approved by Architect.
- B. Patches must blend with color, texture, and uniformity of adjacent exposed surfaces.
- C. Remove and replace damaged Architectural Precast units if repairs do not comply with requirements.
- D. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A780/A780M.
- E. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

3.06 CLEANING AND PROTECTION

- A. Clean per Architectural Precast Concrete manufacturer's written instructions.
 1. Soiled Surfaces: Clean with detergent and water, with soft fiber brushes and sponges. Rinse with clean water.
 2. Prevent damage to Architectural Precast Concrete surfaces.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
03450	Architectural Precast Concrete	Lump Sum

END OF SECTION

DIVISION 4 - MASONRY

SECTION 04200 – UNIT MASONRY

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

A. Section Includes: Reinforced Concrete Masonry Units (CMU).

B. Related Sections:

1. Section 03300 - CAST-IN-PLACE CONCRETE
2. Section 05120 - STRUCTURAL STEEL
3. DIVISION 8 – DOORS AND WINDOWS

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS
- B. Product Data: Submit manufacturer's product data for each type of masonry unit accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- C. Reinforcing Steel Mill Certificates: Submit steel producer's certificates of mill analysis, and tensile and bend tests for reinforcement steel required for project.
- D. Grout Mix Design: Strength as indicated.
- E. Submit reinforcing steel shop drawings with details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement prepared in sufficient detail to permit installation without reference to the Contract Drawings.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

A. Standards:

1. ACI 530: Building Code Requirements for Masonry Structures and Commentary
2. ACI 530.1: Specifications for Masonry Structures and Commentary
3. Masonry Institute of America Publications
4. National Concrete Masonry Association Publications

B. Manufacturer: Obtain masonry from a single source.

1.05 PROJECT/SITE CONDITIONS

Protection of New Work:

1. Covers: Cover tops of construction with heavy waterproof sheeting. Cover tops of partially completed structures when work is not in progress. Extend covers a minimum of 24" down each side and secure in place.
2. Staining: prevent grout, mortar, soil, and other staining materials from the faces of units to be left exposed or painted. Remove all stains immediately from such surfaces.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Hollow Load Bearing Units: ASTM C 90, as follows.

1. Size: Nominal 8" x 8" x 16" (7-5/8" x 7-5/8" x 15-5/8" Actual), unless otherwise indicated. Where masonry is installed with an exterior exposure, use solid grouted, double open end bond beam units with epoxy coated reinforcing steel and tie wire.
2. Grade: N, minimum 1,900 psi on net area.
3. Type: II.
4. Weight Classification: Normal Weight.
5. Assemblage: ASTM 2270, f'm (prism strength at 28 days) = 1,500 psi minimum
6. Exposed Face: Split face one side, gray.
7. Moisture Control: Cure units by atmospheric drying for not less than 30 days before installation to comply with ASTM C 90, Type II.

- B. Special Shapes: Comply with requirements for primary CMU units, except provide special shapes as indicated or required by installation for lintels, corners, jambs, sash, control joints, headers, bond beams, and other special conditions.

2.02 MORTAR/GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type 1 or Type II.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.
- D. Aggregate for Grout: ASTM C 404.
- E. Water: Clean and potable with no deleterious substances to mix.
- F. Use of masonry cement is not allowed. Call out mortar proportions.

2.03 REINFORCING

- A. Reinforcing Bars: ASTM A 615, deformed, minimum yield strength of 60,000 psi.
- B. Epoxy-Coated Reinforcing Bars: ASTM A 775 where masonry has an exterior exposure.

2.04 MORTAR AND GROUT MIXES

- A. Mortar: Portland Cement Lime, with proportions complying with ASTM C 270, Table 1. Types as follows.

Type S: For units in contact with grade and where indicated.

- B. Grout: ASTM C 476, fine or coarse as required herein.

PART 3 – EXECUTION

3.01 CONSTRUCTION TOLERANCES:

- A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arrises do not exceed 1/4 inch in 10 feet, or 3/8 inch in a story height not to exceed 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4 inch in any story or 20 feet maximum, nor 1/2 inch in 40 feet or more. For vertical alignment of hear joints do not exceed plus or minus 1/4 inch in 10 feet, 1/2 inch maximum.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4 inch in any bay or 20 feet maximum, nor 1/2 inch in 40 feet or more. For top surface of

bearing walls do not exceed 1/8 inch between adjacent floor elements in 10 feet' or 1/16 inch within width of a single unit.

- C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2 inch in any bay or 20 feet maximum, nor 3/4 inch in 40 feet or more.
- D. Variation in Cross Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/2 inch nor plus 1/2 inch.
- E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not exceed head joint thickness indicated by more than plus or minus 1/8 inch.

3.02 INSTALLATION, GENERAL

- A. Construction: Comply with specified construction tolerances, with courses accurately spaced and coordinated with either work. Maintain core (cell) continuity to ensure proper clearances for reinforcement.
- B. Pattern Bond: Lay in "running bond". Pattern, unless otherwise indicated. Bond and interlock each course of each wythe at corners.
- C. Joints: Provide vertical control and expansion joints in walls, spaced and detailed in accordance with industry standards to minimize cracking.

3.03 PLACING REINFORCEMENT

A. General:

1. Cleaning: Clean reinforcement of loose rust, mill scale, earth, and other materials which will reduce bond to mortar or grout.
2. Positioning: Position reinforcement accurately at the spacing indicated. Support and secure against displacement from required positions.
3. Defects: Do not use reinforcement with defects, including any knicks or beds on reinforcement bars not shown on drawings or final shop drawings, or reinforcement with reduced cross-section due to excessive rusting or other causes. Repair damaged epoxy coating per manufacturer's recommendations.

B. Reinforcement Bars:

1. Proximity Between Vertical Bars: Where vertical bars are in close proximity, provide a clear distance between bars of not less than nominal bar diameter or 1" (whichever is greater); except for columns, piers and

pilasters, provide a clear distance between vertical bars indicated, but not less than 1-1/2 times the nominal bar diameter or 1-1/2", whichever is greater. Provide lateral ties as indicated.

2. Splicing: Splice reinforcement bars where shown; do not splice at other points unless acceptable to the State Engineer. Provide lapped splices of laps not less than indicated or required by governing code. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.

3.04 FIELD QUALITY CONTROL

- A. Special Inspection- All masonry work requires special inspection. Special Inspector will be hired by the State.
- B. Testing: State Engineer may require testing of masonry work. Where required, provide appropriate notifications of State Engineer and Testing Service. Allow proper access to work by testing service personnel.
- C. Testing Service: The State will employ separate testing laboratory to perform field quality control testing, if required.
- D. Types of Testing: When required, types of tests may include following and such other tests as the testing agency may require.
 1. Unit Tests:
 - a. Concrete Masonry: ASTM C 140.
 - b. Mortar Tests: ASTM C 780.
 2. Prism Test Method: ASTM E 447, Method B.
- E. Reports: Test reports will be made available to State Engineer.
- F. Test Evaluation/Action: masonry work, in absence of other indications of noncompliance with requirements, will be considered satisfactory if results from construction quality control tests comply with requirements indicated. Where work does not comply, Contractor to remove defective work, replace with new work at no cost to the State, and pay for additional testing to ensure compliance with requirements.

3.05 REPAIR, POINTING, AND CLEANING

Defective Work: Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

3.06 PROTECTION

Final Protection: Institute appropriate protection measures as required and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of substantial completion.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
04200	Unit Masonry	Lump Sum

END OF SECTION

DIVISION 5 - METALS

SECTION 05120 – STRUCTURAL STEEL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This section includes, but not limited to, all the design, shop drawings, materials, labor, construction, placement and finishing of all structural steel necessary to complete the project.
- B. Related Sections:
 - 1. Section 05210 – STEEL JOIST FRAMING
 - 2. Section 05300 – METAL DECK
 - 3. Section 09911 – EXTERIOR PAINTING
 - 4. Section 09912 – INTERIOR PAINTING

1.03 SUMMARY

- A. This Section includes the following:
 - 1. Structural steel.
 - 2. Grout.

1.04 DEFINITIONS

- A. Structural Steel: Elements of structural steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.
- B. Architecturally Exposed Structural Steel: Structural steel designated as architecturally exposed structural steel in the Contract Documents.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 -SUBMITTALS.

- B. Product Data: For each type of product indicated.
- C. Shop Drawings:
 - 1. Show fabrication of structural-steel components.
 - 2. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 3. Include embedment drawings.
 - 4. Include erection plans.
 - 5. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 6. Indicate type, size, and length of bolts, distinguishing between shop and field bolts.
 - 7. Identify pretensioned and slip-critical high-strength bolted connections.
- D. Welding certificates.
- E. Qualification Data: For Installer
- F. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Shop primers.
 - 4. Non-shrink grout.
- G. Source quality control test reports.
- H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator who has a minimum of 10 years in business and certified under the AISC Certification Program for Structural Steel Fabricators.
- B. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and LRFD Design."
4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
5. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
6. AISC Certification Program for Structural Steel Fabricators

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.08 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.01 STRUCTURAL STEEL MATERIALS

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels and Angles: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

- F. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
- B. Unheaded Anchor Rods: ASTM A 307, Grade A
 - 1. Configuration: Hooked
 - 2. Nuts: ASTM A 563 heavy hex carbon steel.
 - 3. Plate Washers: ASTM A 36/A 36M carbon steel
 - 4. Washers: ASTM F 436 hardened carbon steel.
 - 5. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- C. Headed Anchor Rods: ASTM A 307, Grade A, straight.
 - 1. Nuts: ASTM A 563 hex carbon steel.
 - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 3. Washers: ASTM F 436 hardened carbon steel.
- D. Threaded Rods: ASTM A 307, Grade A
 - 1. Nuts: ASTM A 563 hex carbon steel.
 - 2. Washers: ASTM F 436 hardened carbon steel.
 - 3. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.03 PRIMER

- A. Primer: SSPC-Paint 20, Type I, Inorganic zinc-rich shop primer. Provide primers that are VOC compliant for building location.
- B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- C. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.04 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.05 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and LRFD Design
- B. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 - 1. Mark and match-mark materials for field assembly.
 - 2. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- D. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

2.06 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

Joint Type: Snug tightened unless indicated on drawings.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.07 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials
 - 5. Galvanized surfaces.
- B. Painting: Apply a 1-coat, primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.08 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.
 - 1. Fill vent holes and grind smooth after galvanizing.
 - 2. Galvanize all exposed structural steel.

2.09 SOURCE QUALITY CONTROL

- A. The State will engage an independent testing and inspecting agency to perform inspections and prepare test reports. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and LRFD Design".
- B. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base plates. Clean bottom surface of base plates.
 - 1. Set base plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of base plate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and base plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform

necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure.

- E. Do not use thermal cutting during erection.
- F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

- A. High-Strength Bolts: Field install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

Joint Type: Snug tightened unless indicated on drawings.

- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and LRFD Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

3.05 FIELD QUALITY CONTROL

- A. Testing Agency: The State will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Field-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the follow inspection procedures per paragraph 2.09. D.
- D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.06 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Touchup Painting: Cleaning and touchup painting are specified in Section 09911 – EXTERIOR PAINTING and Section 09912 – INTERIOR PAINTING.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05120.1	Structural Steel	Lump Sum
05120.2	Structural Steel - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 05210 – STEEL JOIST FRAMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This Section Includes: Steel joist framing and accessories for open web steel joints.
- B. Related Sections:
 - 1. Section 05120 – STRUCTURAL STEEL
 - 2. Section 05300 – METAL DECK
 - 3. Section 09911 – EXTERIOR PAINTING
 - 4. Section 09912 – INTERIOR PAINTING

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Product Data: Submit manufacturer's specifications and installation instructions for each type of joist.
- C. Shop Drawings: Submit detailed shop drawings showing member, type, location, spacing, method of attachment to supporting members and all necessary erection details. Indicate supplemental bracing, framing at openings, bridging, accessories, requirements for field welding and details required for proper installation.
- D. Submit joist drawings, sealed and signed by a registered Professional Structural Engineer licensed in the State of Hawaii, verifying joist capacity and performance to meet local code and design requirements. Include:
 - 1. Description of design criteria.
 - 2. Engineering calculations with member stresses and joist deflection.
 - 3. Joist member sizes and connections at joist supports.
 - 4. Joist support reactions.
 - 5. Top chord, bottom chord and web bracing requirements.
- E. Certification of compliance for Steel Joist Institute Member Fabricator.

- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 DELIVERY AND STORAGE

- A. Care shall be taken during handling, delivery and erection. Handle, transport, and store joists in a manner to prevent damage affecting their structural integrity. Verify piece count of all joist products upon delivery and inspect all joists products for damage. Report any damage to the joist supplier.
- B. Store all items off the ground in a well-drained location protected from the weather and easily accessible for inspection and handling. Store joists with top chord down and with joists in a vertical position.
- C. Protect joists and accessories from corrosion, deformation, damage and deterioration when stored at job site. Keep joists free of dirt and other foreign matter

1.05 QUALITY ASSURANCE

- A. Standards: Comply with applicable requirements of following.
 - 1. AWS D1.1 “Structural Welding Code - Steel.”
 - 2. ASTM A36 “Standard Specification for Carbon Structural Steel.”
 - 3. Steel Joist Institute “Code of Standard Practice for Steel Joists and Joist Girders.”
 - 4. Steel Joist Institute “Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders.”
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1.
- C. Structural Performance: Design, engineer, fabricate and erect steel joists to withstand specified design loads within limits and under conditions required.
 - 1. Design Loads: As specified.
 - 2. Deflections: Live load deflection meeting the following (unless otherwise specified):
Roof Joists: Vertical deflection less than or equal to 1/240 of the span.
 - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors or other detrimental effects when subject to a maximum ambient temperature change (range) of 120 degrees F.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with the requirements, any of following may be incorporated into the Work.
 - 1. Vulcraft.
 - 2. Canam Steel Corp.
 - 3. Valley Joist Inc.
 - 4. Or approved equal.
- B. Provide manufacturer's standard steel joist members, bracing, bridging, blocking, reinforcements, fasteners and accessories with each type of steel framing required, as recommended by the manufacturer for the applications indicated and as needed to provide a complete steel joist system.
- C. Fabrication shall be performed by a steel joist fabricator with experience designing and fabricating steel joist systems equal in material, design, and extent to the systems required for this Project.

2.02 MATERIALS

- A. Bracing, Bridging and Blocking Members: Fabricate components of commercial quality steel.
- B. Shop Paint: SSPC Paint 15.
- C. Fastenings:
 - 1. Welding: Comply with AWS D1.1 when applicable and AWS D1.3 for welding base metals less than 1/8 inch thick.
 - 2. Other fasteners as accepted by joist engineer.

2.03 FABRICATION

- A. Factory fabricate steel joists plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section.
 - 1. Fabricate joist assemblies in jig templates.
 - 2. Cut joist members by sawing or shearing or plasma cutting.
 - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

- b. Locate mechanical fasteners and install according to steel joist component manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.
- B. Fabrication Tolerances: Fabricate joists to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Spacing: Space individual joists no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Squareness: Fabricate each steel joist to a maximum out-of-square tolerance of 1/8 inch.
- C. Fabricate steel bearing plates from ASTM A36/A36M steel of size and thickness indicated.
- D. Shop prime joists, except as modified herein, in accordance with SSPC PA 1. Clean joists in accordance with SSPC SP 2 before priming. Do not prime joists to receive sprayed-on fireproofing. If flash rusting occurs, re-clean the surface prior to application of primer. For joists which require finish painting under Section 09911 – EXTERIOR PAINTING and Section 09912 – INTERIOR PAINTING, the primer paint must be compatible with the finish.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine structure, substrates and installation conditions. Do not proceed with steel joist installation until unsatisfactory conditions have been corrected.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

- A. General:
 - 1. Erection of joists, including proper handling, safety precautions, temporary bracing and other safeguards or procedures are the responsibility of the Contractor and Contractor's installer.
 - 2. Exercise care and provide erection bracing required to prevent toppling of joists during erection.
- B. Erect joists with plane of joist webs vertical and parallel to each other, accurately located at design spacing indicated.

- C. Provide proper lifting equipment suited to sizes and types of joists required, applied at lift points recommended by joist fabricator. Exercise care to avoid damage to joist members during erection and to keep horizontal bending of the joists to a minimum.
- D. Provide framing anchors as indicated or accepted on the engineering design drawing or erection drawings. Anchor joists securely at bearing points.
- E. Install roof framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations.
 - 1. DO NOT cut joist members without prior approval of joist engineer.
 - 2. Fasten steel roof framing by welding or bolt fastening, as standard with fabricator. Wire tying of roof framing is not permitted.
 - a. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to roof framing manufacturer's instructions.
 - c. Install roof framing in one-piece lengths, unless splice connections are indicated.
 - d. Provide temporary bracing and leave in place until joists are permanently stabilized.
- E. Erection Tolerances: Install joists to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960) and as follows:

Space individual joists no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
- F. Install, bridge and brace joists according to manufacturer's recommendations and requirements of this Section.
- G. Do not alter, cut, or remove joist members or connections of joist members.
- H. Erect joists with plane of joist webs plumb and parallel to each other, align, and accurately position at spacing indicated.
- I. Provide bearing plates to accept full bearing after the supporting members have been plumbed and properly positioned, but prior to placing superimposed loads. The area under the plate must be damp-packed solidly with bedding mortar, except where non-shrink grout is indicated on the drawings.
- J. Align joist bottom chords with load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor joists securely at all bearing points.
- K. Provide bridging of material, size, and type required by SJI LOAD TABLES for type of joist, chord size, spacing and span. Furnish additional erection bridging if

required for stability. Install continuous bridging and permanent joist bracing per joist design requirements.

- L. Furnish ceiling extensions, either bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated.

3.03 REPAIRS AND PROTECTION

After erection of joists, touch-up connections and areas of abraded shop coat with paint of the same type used for the shop coat. Paint joists requiring a finish coat in conformance with the requirements of Section 09911 – EXTERIOR PAINTING and Section 09912 – INTERIOR PAINTING.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05210	Steel Joist Framing	Lump Sum

END OF SECTION

SECTION 05300 - METAL DECK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This Section Includes: Steel decks.
- B. Related Sections:
 - 1. Section 05120 – STRUCTURAL STEEL
 - 2. Section 05210 – STEEL JOIST FRAMING

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include ICC Evaluation Service evaluation reports for proposed products.
- C. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, welding, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories.
- D. Welding Certificates: copies of certificates for welding procedures and personnel.
- E. Product Test Reports: Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
 - 1. Mechanical fasteners.
- F. Research/Evaluation Reports: Evidence of steel deck's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Standards: Comply with applicable requirements of following.
 - 1. AISI "Specification for the Design of Cold-Formed Steel Structural members".
 - 2. AWS D1.3 "Structural Welding Code - Sheet Steel".
 - 3. SDI "Design Manual for Composite Decks, Form Decks, Roof Decks and Cellular Metal Floor Deck with Electrical Distribution".
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS D1.1 and AWS D1.3, "Structural Welding Code--Sheet Steel."
- C. Fire Rated Assemblies: Provide metal floor deck units listed in Underwriters' Laboratories "Fire Resistance Directory", with each deck unit bearing the UL label and marking for specific system detailed; or provide such other tested assembly information which is acceptable to the local Authorities.
- D. Structure Loading: Do not overload adjacent structures. Coordinate temporary loads with affected other Installers.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with the requirements, any of following may be incorporated into the Work.
 - 1. H.H. Robertson Co.
 - 2. Verco Manufacturing Co.
 - 3. Vulcraft, Division of Nucor Corp.
 - 4. ASC Pacific

2.02 MATERIALS / COMPONENTS / ACOUSTIC DATA

- A. Metal Deck Unit:
 - 1. B-36 Roof Deck.
 - 2. 1-1/2 inch profile. Gage as required. Reference Structural drawings and specifications.
 - 3. Zinc coated in accordance with ASTM A653 G-90.
 - 4. Exposed bottom surface shall be factory primed.
- B. Related Materials:
 - 1. Shear Connectors: Headed stud type, ASTM A 108, Grade 1015 or 1020.
 - 2. Miscellaneous Steel Shapes: ASTM A 36.

3. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.
4. Galvanizing Repair Paint: High zinc-dust content paint for repair of damaged galvanized surfaces complying with Military Specifications MIL-P-21035 (Ships).
5. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 29 for overhang and slab depth.
6. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

2.03 FABRICATION

A. Deck Units:

1. General:

- a. Gage: As indicated or required. Reference structural drawings and specifications.
- b. Configuration: Depth and width as indicated.
- c. Span: Lengths to span 3 or more supports.
- d. Laps: Unless otherwise indicated, as follows.

(1) End: 2 inches telescoped or nested.

(2) Side: Interlocking or nested.

- B. Metal Joint Cover Plates: Fabricate metal cover plates for end abutting deck units of not less than same thickness as decking. Form to match contour of deck units and 6-inch wide minimum.
- C. Metal Closure Strips: Fabricate metal closure strips for openings between decking and other construction, of not less than 0.045-inch min. (18-gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.
- D. Roof Sump Pans: Fabricate from single piece of 0.071-inch min. (14-gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3-inch wide. Recess pans not less than 1-1/2-inch below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

2.04 FINISHES

- A. Galvanized – G90.
- B. Exposed surfaces (bottom face) factory primed.

PART 3 - EXECUTION

3.01 INSTALLATION

General: Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05300.1	Metal Deck	Lump Sum
05300.2	Metal Deck – Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Exterior non-load-bearing wall framing.
2. Interior non-load-bearing wall framing exceeding height limitations of standard, nonstructural metal framing.
3. Ceiling joist framing.

B. Related Requirements:

1. Section 01352 – LEED REQUIREMENTS.
2. Section 05500 – METAL FABRICATION for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
3. Section 09221 – NON-STRUCTURAL METAL FRAMING for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – SUBMITTALS.

B. Product Data: For each type of product.

C. Shop Drawings:

1. Include layout, spacing, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

- D. Delegated-Design Submittal: For cold-formed steel framing, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data
- F. Welding certificates
- G. Product Certificates: For each type of code-compliance certification for studs and tracks.
- H. Product Test Reports
- I. Evaluation Reports
- J. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Code Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program the Steel Stud Manufacturers Association.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- D. Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" or "Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design Responsibility: Provide structural design of complete system, including all components. Engineer licensed in State of Hawaii shall perform engineering analysis.

- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on Drawings.
 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of $1/360$ of the wall height.
 - b. Ceiling Joist Framing: Vertical deflection of $1/360$ of the span for live loads and $1/240$ for total loads of the span.
 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of 1 inch inches.
 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
1. Wall Studs: AISI S211.
 2. Headers: AISI S212.
 3. Lateral Design: AISI S213.
- D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

2.02 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance
2. Coating: G90 or equivalent.

2.03 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955. Minimum 16 gauge.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, complying with ASTM C 955. Minimum 16 gauge.

2.04 CEILING JOIST FRAMING

- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges.

2.05 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories of same grade and coating used for framing members with a minimum yield strength of 33,000 psi.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated.

2.06 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet and as follows:
 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.03 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 07210 "Thermal Insulation," in framing assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.04 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16-inches O.C.
- C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect drift clips to cold-formed steel framing and anchor to building structure.
- E. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 18-inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
1. Install solid blocking at centers indicated on Shop Drawings.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.05 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
 2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.
- C. Space joists not more than 2 inches from abutting walls, and as follows:
1. Joist Spacing: As indicated on Drawings.
- D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.
1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:

1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
 2. Combination Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
- G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.06 ERECTION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.07 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05400.1	Cold-Formed Metal Framing	Lump Sum
05400.2	Cold-Formed Metal Framing - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 05500 - METAL FABRICATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:

1. Steel framing and supports for overhead doors.
2. Steel tube reinforcement for low partitions.
3. Steel framing and supports for mechanical and electrical equipment.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
5. Metal ladders, roof access and elevator pit.
6. Miscellaneous steel trim including steel angle corner guards and steel edgings.
7. Metal bollards.
8. Wire mesh divider screen in Elevator
9. Loose bearing and leveling plates for applications where they are not specified in other Sections.

- B. Products furnished, but not installed, under this Section include the following:

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

- C. Related Requirements:

1. Section 03300 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 05120 "Structural Steel."

1.03 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For the following:
 - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 - 2. Paint products.
 - 3. Grout.
- C. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 - 1. Steel framing and supports for overhead doors.
 - 2. Steel tube reinforcement for low partitions.
 - 3. Steel framing and supports for mechanical and electrical equipment.
 - 4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 5. Metal ladders, roof access and elevator pit.
 - 6. Miscellaneous steel trim including steel angle corner guards and steel edgings.
 - 7. Metal bollards.
 - 8. Wire mesh divider screen in Elevator
 - 9. Loose bearing and leveling plates for applications where they are not specified in other Sections.
- D. Samples for Verification: For each type and finish of extruded nosing.
- E. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Qualification Data: For professional engineer.
- G. Welding certificates.
- H. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- I. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

- J. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.06 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

- D. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 316L.
- E. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
- F. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- G. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- H. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- I. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches.
 - 2. Material: Galvanized steel, ASTM A 653/A 653M, commercial steel, Type B, with G90 coating; 0.079-inch nominal thickness.
- J. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- K. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- L. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- M. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- N. Metal Mesh: Woven-Wire Mesh, Steel: Intermediate-crimp, rectangle pattern, 2-inch by 1-inch woven-wire mesh, made from 0.212-inch nominal-diameter steel wire complying with ASTM A510/A510M. Basis of Design Product: Subject to compliance with requirements, provide Banker Wire, Pattern FPZ-46 Pre-Galvanized

2.03 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.

- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 2.
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.04 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09911 "Exterior Painting," Section 09912 Interior Painting," and Section 09960 "High-Performance Coatings."
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 03300 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.05 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.06 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.

2.07 METAL LADDERS

- A. General: Comply with ANSI A14.3.
- B. Steel Ladders:
 - 1. Space siderails 18 inches apart unless otherwise indicated.
 - 2. Siderails: Continuous, 3/8-by-2-inch steel flat bars, with eased edges.
 - 3. Rungs: 3/4-inch-diameter steel bars.
 - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
 - 5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
 - 6. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 1/2 inch in least dimension.
 - 7. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
 - 8. Galvanize and prime exterior ladders, including brackets.
 - 9. Provide minimum 72-inch-high, hinged security door with padlock hasp at foot of ladder to prevent unauthorized ladder use.

2.08 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize and prime exterior miscellaneous steel trim.

2.09 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
- B. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.

2.10 WIRE MESH IN DIVIDER SCREEN IN ELEVATOR

- A. Fabricate railings and guards to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of member, post spacings, wall bracket spacing, and anchorage, but not less than that needed to withstand indicated loads.
- B. Mesh Infill: Woven-wire mesh crimped into 2-by-2-by-1/4-inch steel angle frames. Orient wire mesh with wires horizontal and vertical.

2.11 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.
- C. Prime plates with zinc-rich primer.

2.12 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.13 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.

- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.14 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated. Shop prime with primers specified in Section 09911 "Exterior Painting" primers specified in Section 09912 "Interior Painting" unless primers specified in Section 09960 "High-Performance Coatings" are indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.15 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
1. Cast Aluminum: Heavy coat of bituminous paint.
 2. Extruded Aluminum: Two coats of clear lacquer.

3.02 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 6 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.

3.03 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.04 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05500.1	Metal Fabrication	Lump Sum
05500.2	Metal Fabrication - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 05511 - METAL STAIR

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Steel stairs with precast concrete treads. (Stair #1)
2. Steel stairs with metal treads and risers. (Stair #3)
3. Steel stairs with concrete-filled pan treads. (Stair #2)
4. Steel bar railings and guards attached to metal stairs.

1.02 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal stairs, railings, and guards.
1. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, blocking for attachment of wall-mounted handrails, and items with integral anchors, that are to be embedded in concrete or masonry.
 2. Deliver such items to Project site in time for installation.
- C. Coordinate locations of hanger rods and struts with other work so they do not encroach on required stair width and are within fire-resistance-rated stair enclosure.
- D. Schedule installation of railings and guards so wall attachments are made only to completed walls.
1. Do not support railings and guards temporarily by any means that do not satisfy structural performance requirements.

1.03 SUBMITTALS

A. Product Data: For metal pan stairs and the following:

1. Shop primer products.
2. Abrasive-coating finish to formed-metal stairs.
3. Precast concrete treads.
4. Handrail wall brackets.
5. Grout.

- B. Shop Drawings:
 1. Include plans, elevations, sections, details, and attachments to other work.
 2. Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.
 3. Include plan at each level.
 4. Indicate locations of anchors, weld plates, and blocking for attachment of wall-mounted handrails.
 5. Indicate profile and dimensions of precast treads.
- C. Samples for Verification: For each type and finish of precast tread. Provide manufacturer's full selection of colors to final selection.
- D. Delegated Design Submittal: For stairs, railings and guards, and precast treads,, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data: For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that engineer is licensed in the State in which Project is located.
- F. Welding certificates.
- G. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification.
 1. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.

2. Protect steel members and packaged materials from corrosion and deterioration.
3. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01400 "Contractor Quality Control Program," to design stairs, railings and guards, and precast treads,, including attachment to building construction.
- B. Structural Performance of Stairs: Metal stairs withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 1. Uniform Load: 100 lbf/sq. ft..
 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.
- C. Structural Performance of Railings and Guards: Railings and guards, including attachment to building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
 3. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

- D. Seismic Performance of Stairs: Metal stairs withstand the effects of earthquake motions determined according to applicable Code Component Importance Factor: As indicated on Drawings.

2.02 METALS

- A. Metal Surfaces: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing for Railings and Guards: ASTM A500/A500M (cold formed).
- D. Uncoated, Cold-Rolled Steel Sheet: ASTM A1008/A1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.
- E. Stainless steel tube: ASTM A269.

2.03 FASTENERS

- A. Fasteners for Anchoring Railings and Guards to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings and guards to other types of construction indicated and capable of withstanding design loads.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.04 MISCELLANEOUS MATERIALS

- A. Handrail Wall Brackets: Cast stainless steel, center of rail 2-1/2 inches from face of wall.

- B. Welding Electrodes: Comply with AWS requirements.
- C. Shop Primers: Provide primers that comply with Section 09960 "High-Performance Coatings."
- D. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; recommended by manufacturer for exterior use; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.

2.05 PRECAST CONCRETE TREADS

- A. Concrete Materials and Properties: Comply with requirements in Section 03300 "Cast-in-Place Concrete" for normal-weight, ready-mixed concrete with a minimum 28-day compressive strength of 5000 psi and a total air content of not less than 4 percent or more than 6 percent.
- B. Reinforcement: Galvanized, welded-wire reinforcement, 2 by 2 inches by 0.062-inch-diameter steel wire; comply with ASTM A1064/A1064M, except for minimum wire size.
- C. Basis of Design Product: Subject to compliance with requirements, provide treads and risers manufactured by Empire Precast, or equal.
 - 1. Integral Treads and Risers, Empire Precast, Style: Bluff ST-10, Shale finish TH-30 with 2" ADA contrasting stripe with abrasive fill each tread. Color to be selected from manufacturer's full selection.

2.06 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings and guards, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- B. Assemble stairs, railings, and guards in shop to greatest extent possible.
 - 1. Disassemble units only as necessary for shipping and handling limitations.
 - 2. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately.
 - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.

2. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - E. Form exposed work with accurate angles and surfaces and straight edges.
 - F. Weld connections to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Weld exposed corners and seams continuously unless otherwise indicated.
 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 - No evidence of welded joint.
 - G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
 1. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated.
 2. Locate joints where least conspicuous.
 3. Fabricate joints that will be exposed to weather in a manner to exclude water.
 4. Provide weep holes where water may accumulate internally.

2.07 FABRICATION OF STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Architectural Class, unless more stringent requirements are indicated.
- B. Stair Framing:
 1. Stringers: Fabricate of as indicated on Drawings.
 - a. Stringer Size: As required to comply with "Performance Requirements" Article.
 - b. Provide closures for exposed ends of channel and rectangular tube stringers.
 - c. Finish: Painted.
 2. Weld stringers to headers; weld framing members to stringers and headers.

2.08 FABRICATION OF STAIR RAILINGS AND GUARDS

- A. Comply with applicable requirements in Section 05521 "Pipe and Tube Railings."
- B. Fabricate railings and guards to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of member, post spacings, wall bracket spacing, and anchorage, but not less than that needed to withstand indicated loads.
 - 1. Rails and Posts: As indicated on Drawings.
- C. Welded Connections: Fabricate railings and guards with welded connections.
 - 1. Fabricate connections in a manner that excludes water. Provide weep holes where water may accumulate internally.
 - 2. Cope components at connections to provide close fit, or use fittings designed for this purpose.
 - 3. Weld all around at connections, including at fittings.
 - 4. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 5. Obtain fusion without undercut or overlap.
 - 6. Remove flux immediately.
 - 7. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 - No evidence of a welded joint as shown in NAAMM AMP 521.
- D. Form changes in direction of railings and guards as follows: As detailed.
- E. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- F. Close exposed ends of railing and guard members with prefabricated end fittings.
- G. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- H. Connect posts to stair framing by direct welding unless otherwise indicated.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
- J. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to

structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.09 FINISHES

- A. Finish metal stairs after assembly.
- B. Preparation for Shop Priming: Prepare uncoated, ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify elevations of floors, bearing surfaces and locations of bearing plates, and other embedments for compliance with requirements. For wall-mounted railings, verify locations of concealed reinforcement within gypsum board and plaster assemblies.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF STAIRS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
 - 1. Grouted Baseplates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates.

- a. Clean bottom surface of plates.
 - b. Set plates for structural members on wedges, shims, or setting nuts.
 - c. Tighten anchor bolts after supported members have been positioned and plumbed.
 - d. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - e. Promptly pack grout solidly between bearing surfaces and plates so no voids remain.
 - 1) Neatly finish exposed surfaces; protect grout and allow to cure.
 - 2) Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints.
 - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
 - 2. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
 - 3. Comply with requirements for welding in "Fabrication, General" Article.
- F. Install precast concrete treads by welding to brackets.

3.03 INSTALLATION OF RAILINGS AND GUARDS

- A. Adjust railing and guard systems before anchoring to ensure matching alignment at abutting joints with tight, hairline joints.
 - 1. Space posts at spacing indicated or, if not indicated, as required by design loads.
 - 2. Plumb posts in each direction, within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails and guards so variations from level for horizontal members and variations from parallel with rake of stairs for sloping members do not exceed 1/4 inch in 12 feet.
 - 4. Secure posts, rail ends, and guard ends to building construction as follows:
 - a. Anchor posts to steel by welding to steel supporting members.
 - b. Anchor handrail and guard ends to concrete and masonry with steel round flanges welded to rail and guard ends and anchored with post-installed anchors and bolts.
- B. Attach handrails to wall with wall brackets.

1. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
2. Secure wall brackets to building construction as required to comply with performance requirements.

3.04 REPAIR

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09960 "High-Performance Coatings."

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05511	Metal Stair	Lump Sum

END OF SECTION

SECTION 05521 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Steel pipe railings.
 - 2. Stainless steel tube railings.

1.03 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For the following:
 - 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and paint products.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

- D. Samples: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
 - 2. Fittings and brackets.
 - 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height. Show method of connecting and finishing members at intersections.
- E. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Qualification Data: For testing agency.
- G. Welding certificates.
- H. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- I. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- J. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
- K. Evaluation Reports: For post-installed anchors, from ICC-ES.
- L. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.07 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, licensed in the State of Hawaii to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.03 STEEL AND IRON

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads. Provide galvanized finish for exterior installations and where indicated.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Stainless Steel Tube: ASTM A268

2.04 FASTENERS

- A. General: Provide the following:
 - 1. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
 - 2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - 1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.05 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded. For stainless-steel railings, provide type and alloy as

recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

- B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Shop Primers: Provide primers that comply with Section 09911 "Exterior Painting," and Section 09912 "Interior Painting."
- E. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- F. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- I. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Water-Resistant Product: At exterior locations and provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.06 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Form Changes in Direction as Follows:
 - 1. As detailed.
 - 2. By bending.
- J. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- O. For railing posts set in concrete, provide steel sleeves not less than than length indicated with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

2.07 STEEL AND IRON FINISHES

- A. Galvanized Railings:
1. Hot-dip galvanize indicated steel railings, including hardware, after fabrication.
 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
 4. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
 5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, galvanize anchors to be embedded in exterior concrete or masonry.
- E. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- F. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
1. Shop prime uncoated railings with primers specified in Section 09911 "Exterior Painting" and Section 09912 "Interior Painting" unless primers specified in Section 09960 "High-Performance Coatings" are indicated.
 2. Do not apply primer to galvanized surfaces.
- G. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.02 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.03 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.04 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post.
- C. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.05 ATTACHING RAILINGS

- A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends.
- B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.
- C. Attach railings to wall with wall brackets. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- D. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.
 - 3. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.

3.06 ADJUSTING AND CLEANING

- A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

3.07 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05521	Pipe and Tube Railings	Lump Sum

SECTION 05581 - COLUMN COVERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes metal column covers with metal base.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product, including finishing materials.
- C. Shop Drawings: Show fabrication and installation details for column covers.
- D. Samples for Verification: For each type of exposed finish required, prepared on 6-inch-square Samples of metal of same thickness and material indicated for the Work.
- E. Mill Certificates: Signed by stainless-steel manufacturers certifying that products furnished comply with requirements.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing column covers similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockups of typical column covers.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver column covers wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.

PART 2 - PRODUCTS

2.01 SNAP-TOGETHER COLUMN COVERS

- A. Basis of Design Product: Subject to compliance with requirements, provide Metalwerks "Metal-Lok Column Covers", or approved equal.
- B. Form column covers to shapes indicated from metal of type and minimum thickness indicated below. Return vertical edges and bend to form hook that engages continuous mounting clips.
 1. Aluminum Sheet: ASTM B 209, with not less than strength and durability properties of Alloy 5005-H32, 0.0.125 inch thick.
 - a. Finish: High Performance Organic Finish (SPEC-01 and SPEC-02 on drawings.
 - b. Color: Match PPG Duranar UC55026, Bright White. (SPEC-02)
 - c. Color: Match PPG Duranar UC109855, Seawolf. (SPEC-01)
 - d. See drawings for locations.
 2. Stainless-Steel Sheet Base: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.120 inch thick. Finish: No. 4.
 3. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide flat surfaces where indicated.
 4. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.
 5. Form returns at vertical joints to provide hairline V-joints.
 6. Fabricate column covers without horizontal joints.
 7. Fabricate ceiling ring to match column covers.
 8. Apply manufacturer's recommended sound-deadening mastic to backs of column covers.

2.02 MISCELLANEOUS MATERIALS

- A. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined.
- B. Provide concealed fasteners for interconnecting column covers and for attaching them to other work unless otherwise indicated. Sound-Deadening Materials: Mastic: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- C. Backing Materials: Provided or recommended by column cover manufacturer.

2.03 PAINTS AND COATINGS

- A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.04 FABRICATION, GENERAL

- A. Coordinate dimensions and attachment methods of column covers with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- B. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends.

2.05 GENERAL FINISH REQUIREMENTS

- A. Complete mechanical finishes of flat sheet metal surfaces before fabrication where possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Apply finishes to formed metal after fabrication unless otherwise indicated.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.06 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2.07 STAINLESS-STEEL FINISHES – SST-01

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- C. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of column covers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Locate and place column covers plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install column covers. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
- B. Use concealed anchorages where possible.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers as indicated.

- D. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.

3.03 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean abraded areas of shop paint and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

3.04 PROTECTION

- A. Protect finishes from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05581	Column Covers	Lump Sum

END OF SECTION

SECTION 05731 - GLAZED DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Glazed decorative metal railings.

1.03 DEFINITIONS

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor and exterior deck areas and for pedestrian guidance and support, visual separation, or wall protection.

1.04 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.05 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.06 SUBMITTALS

- A. Product Data:
 - 1. Metal railings assembled from standard components.
 - 2. Glass products.
 - 3. Glazing cement and accessories for structural glass railings.
 - 4. Sealant and accessories for structural glass railings.
 - 5. Fasteners.
 - 6. Shop primer.
 - 7. Bituminous paint.

- 8. Nonshrink, nonmetallic grout.
 - 9. Anchoring cement.
- B. Shop Drawings: Include plans, elevations, sections, and attachment details.
 - C. Samples for Verification: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 - 2. Base channel.
 - 3. Each type of glass and glass edge required.
 - 4. Fittings and brackets.
 - 5. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, glass-infill panels. Show method of finishing members at intersections. Samples need not be full height.
 - D. Delegated Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed in the State of Hawaii, responsible for their preparation.
 - E. Qualification Data: For professional engineer.
 - F. Mill Certificates: Signed by manufacturers of stainless steel products, certifying that products furnished comply with requirements.
 - G. Product Test Reports: For tests performed by a qualified testing agency, in accordance with ASTM E894, ASTM E935, ASTM E2353, and ASTM E2358.
 - H. Evaluation Reports: From ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
 - 1. For glazed decorative metal railings.
 - 2. For post-installed anchors.
 - I. Preconstruction test reports.
 - J. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.07 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockups for each form and finish of structural glass railing consisting of top rail, structural glass, base channel, and anchorage system components that are full height and are not less than 24 inches in length.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.09 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Glazed decorative metal railing manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design glazed decorative metal railings, including attachment to building construction.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 1. Aluminum: The lesser of minimum yield strength divided by 1.65, or minimum ultimate tensile strength divided by 1.95.
 2. Stainless Steel: 60 percent of minimum yield strength.
 3. Steel: 72 percent of minimum yield strength.
 4. Glass: 25 percent of mean modulus of rupture (50 percent probability of breakage), as listed in "Mechanical Properties" in AAMA CW-12, "Structural Properties of Glass."

- C. Structural Performance: Railings, including attachment to building construction, are to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Structural Glass Railings and Glass-Infill Panels:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - b. Infill load and other loads need not be assumed to act concurrently.
 3. For structural glass railings, support each section of top rail and handrail by a minimum of three glass panels or by other means so railings will remain in place if any one glass panel fails. Support top rail and handrail ends such that railings remains in place if end glass panel fails.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 GLAZED DECORATIVE METAL RAILINGS

- A. Basis of Design Manufacturer: Subject to compliance with requirements, provide products by Greco; CSW Industrials Inc. or equal
- B. Source Limitations for Decorative Metal Railing Components: Obtain from single source from single manufacturer for each component and installation method.
- C. Product Options: Information on Drawings and in the Specifications establishes requirements for railing system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

2.03 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.04 ALUMINUM

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
- B. Extruded Bars and Shapes, Including Extruded Tube: ASTM B221, Alloy 6063-T5/T52.

2.05 STAINLESS STEEL

- A. Tubing: ASTM A554, Grade MT 304.
- B. Castings: ASTM A743/A743M, Grade CF 8 or Grade CF 20.
- C. Sheet, Strip, Plate, and Flat Bar: ASTM A666 or ASTM A240/A240M, Type 304.
- D. Bars and Shapes: ASTM A276, Type 304.

2.06 GLASS AND GLAZING PRODUCTS, GENERAL

- A. Glazing Publications: Comply with written instructions of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards. NGA/GANA Publications: "GANA Laminated Glazing Reference Manual" and "GANA Glazing Manual."
- B. Safety Glazing: Glazing is to comply with 16 CFR 1201, Category II.
- C. Safety Glazing Labeling: Permanently mark glass with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label is to indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- D. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

- E. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Class 1 and low-iron clear, or Class 2 (tinted) as indicated, Quality-Q3.
- F. Glazing Cement and Accessories for Structural Glass Railings: Glazing cement, setting blocks, shims, and related accessories as recommended or supplied by railing manufacturer for installing structural glazing in metal base channels.
- G. Sealant and Accessories for Structural Glass Railings: Sealant, gaskets, setting blocks, shims, and related accessories as recommended or supplied by railing manufacturer for installing structural glazing in metal base channels.
- H. Glazing Gaskets for Glass-Infill Panels: Glazing gaskets and related accessories as recommended or supplied by railing manufacturer for installing glass-infill panels in post-supported railings.

2.07 GLASS HANDRAILS AND GUARDS

- A. Laminated Glass Handrails and Guards: ASTM C1172, Type II with two plies of glass bonded together by an interlayer.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer or ionoplast polymer interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: 0.030 inch.
 - 3. Kind: LHS (laminated heat strengthened).
 - 4. Glass Color: Inner-ply clear; outer-ply clear.
 - 5. Ceramic Coating Color and Pattern: , applied to glass ply.
 - 6. Interlayer Color: Clear.
 - 7. Glass Plies for Structural Glass Balusters: Thickness required by structural loads, but not less than 6.0 mm thick each.

2.08 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Aluminum Components: Type 304 stainless steel fasteners.
 - 2. Stainless Steel Components: Type 304 stainless steel fasteners.
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/ASTM F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.09 MISCELLANEOUS MATERIALS

- A. Handrail Brackets: Cast stainless steel, center of rail 3-1/8 inches from face of structural glass balusters.
- B. Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.10 FABRICATION OF METAL RAILINGS

- A. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.

- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- H. Form changes in direction as detailed.
- I. Close exposed ends of hollow railing members with prefabricated end fittings.
- J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, handrail brackets, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.
- K. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.11 FABRICATION OF GLASS PANELS AND BALUSTERS

- A. Fabricate glass to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.
- B. Structural Glass Balusters: Provide laminated, heat-strengthened structural glass balusters.
 - 1. Edge Finish: Grind smooth and flat polish exposed edges of glass, including those at open joints, to produce smooth, square edges with glass edge finishes.
 - 2. Factory-bond structural glass balusters to aluminum base and top-rail channels in railing manufacturer's plant using glazing cement to comply with manufacturer's written instructions.
 - 3. Fabricate structural glass balusters to maintain equal length glass widths and uniform spacing of 1/2 inch between glass balusters.

2.12 METAL FINISH REQUIREMENTS, GENERAL

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within

the range of approved Samples and are assembled or installed to minimize contrast.

- C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.13 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- C. Stainless Steel Tubing Finishes: 180-Grit Polished Finish: Uniform, directionally textured finish.
- D. Stainless Steel Sheet, Strip, Plate, and Bar Finishes: Directional Satin Finish: ASTM A480/A480M, No. 4.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Comply with Drawings and manufacturer's written instructions for installing glazed decorative metal railings, accessories, and other components.
- B. Perform cutting, drilling, and fitting required for installing metal railings.
 - 1. Fit exposed connections together to form tight, hairline joints.
 - 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
 - 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 - 4. Do not weld, cut, or abrade surfaces of metal railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 5. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with shop primer.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.02 METAL RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components.
- B. Expansion Joints: Install expansion joints at locations indicated, but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.03 INSTALLATION OF GLASS BALUSTERS

- A. Structural Glass Railings:
 - 1. Install assembly to comply with railing manufacturer's written instructions.
 - 2. Adjust spacing of glass balusters so gaps between balusters are equal before securing in position.
 - 3. Erect glass railings under direct supervision of manufacturer's authorized technical personnel.

3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports. Payment for these services will be made by Owner.
- B. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings in accordance with ASTM E894, ASTM E935, ASTM E2353, and ASTM E2358 for compliance with performance requirements.
- C. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.

- D. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.05 CLEANING

- A. Clean stainless steel by washing thoroughly with water and soap, rinsing with clean water, and wiping dry.
- B. Clean and polish glass as recommended in writing by manufacturer. Wash both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion.

3.06 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05731	Glazed Decorative Metal Railings	Lump Sum

END OF SECTION

SECTION 05750 - DECORATIVE FORMED METAL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Metal base.
 - 2. Metal cladding panels at escalator.

1.02 COORDINATION

- A. Coordinate installation of anchorages for decorative formed metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
- B. Coordinate installation of decorative formed metal with adjacent construction to ensure that wall assemblies, flashings, trim, and joint sealants, are protected against damage from the effects of weather, age, corrosion, and other causes of deterioration.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.04 SUBMITTALS

- A. Product Data: For each type of product, including finishing materials.
- B. Shop Drawings: Show fabrication and installation details for decorative formed metal.
 - 1. Include plans, elevations, component details, and attachment details.
 - 2. Indicate materials and profiles of each decorative formed metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.
- C. Samples for Verification: For each type of exposed finish required, prepared on 6-inch-square Samples of metal of same thickness and material indicated for the Work.
- D. Coordination Drawings: For decorative formed metal elements that house items specified in other Sections. Show dimensions of housed items, including locations of housing penetrations and attachments, and necessary clearances.

- E. Mill Certificates: Signed by stainless steel manufacturers certifying that products furnished comply with requirements.
- F. Maintenance Data: For stainless steel base to include in maintenance manuals.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing decorative formed metal similar to that indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce required units.
- B. Installer Qualifications: Fabricator of products.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver decorative formed metal products wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.
- B. Store products on elevated platforms in a dry location.

1.07 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, columns, beams, and other construction contiguous with decorative formed metal by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 SOURCE LIMITATIONS

- A. For decorative metal items, obtain each color, grade, finish, type, and variety of metal from single source with resources to provide products of consistent quality in appearance and physical properties.

2.02 SHEET METAL

- A. General: Fabricate products from sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.
- B. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.

2.03 MISCELLANEOUS MATERIALS

- A. Sealants, Interior: Nonsag, paintable sealant complying with Section 07920 "Joint Sealants" and as recommended in writing by decorative formed metal manufacturer.
- B. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined.
 - 1. Provide concealed fasteners for interconnecting decorative formed metal items and for attaching them to other work unless otherwise indicated.
 - 2. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.
- C. Anchor Materials: Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
- D. Backing Materials: Provided or recommended by decorative formed metal manufacturer.
- E. Laminating Adhesive: Adhesive recommended by metal fabricator that will fully bond metal to metal, will prevent telegraphing and oil-canning, and is compatible with substrate and noncombustible after curing.

2.04 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble decorative formed metal items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Coordinate dimensions and attachment methods of decorative formed metal items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.
- C. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch-wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.
- D. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.
- E. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce decorative formed metal items as needed to attach and support other construction.
- F. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install decorative formed metal items.
- G. Where welding or brazing is indicated, weld or braze joints and seams continuously. Grind, fill, and dress to produce smooth, flush, exposed surfaces in which joints are not visible after finishing is completed. Use welding and brazing procedures that will blend with and not cause discoloration of metal being joined.

2.05 METAL BASE

- A. Form metal base from metal of type and thickness indicated: Stainless Steel Sheet: 18 gauge. Finish: No. 4. Laminate to MDF.

2.06 METAL CLADDING AT ESCALATORS

- A. Form metal panels from metal of type and thickness indicated: Stainless Steel Sheet: 18 gauge. Finish: No. 4. Attach with clip system to metal framing.

2.07 GENERAL FINISH REQUIREMENTS

- A. Complete mechanical finishes of flat sheet metal surfaces before fabrication where possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.08 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches. Run grain of directional finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4.
- D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of decorative formed metal.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Locate and place decorative formed metal items level and plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install decorative formed metal. Do not cut or abrade finishes that

cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where needed to protect metal surfaces and to make a weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers as indicated.
- D. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.

3.03 ADJUSTING AND CLEANING

- A. Unless otherwise indicated, clean metals by washing thoroughly with water and soap, rinsing with clean water, and drying with soft cloths.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

3.04 PROTECTION

- A. Protect finishes of decorative formed metal items from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
05750	Decorative Formed Metal	Lump Sum

END OF SECTION

DIVISION 6 – WOOD AND PLASTICS

SECTION 06105 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Wood blocking and nailers.
 - 2. Plywood backing panels.
 - 3. Raised podium at STSO podium

1.03 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on

testing by a qualified independent testing agency according to ASTM D 5664.

4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- C. Evaluation Reports: For the following, from ICC-ES:
1. Preservative-treated wood.
 2. Fire-retardant-treated wood.
 3. Power-driven fasteners.
 4. Post-installed anchors.
 5. Metal framing anchors.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
- B. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood blocking, stripping, and similar concealed members in contact with masonry or concrete.

2.03 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
 - 1. Concealed blocking.
 - 2. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
 - 3. Plywood backing panels.

2.04 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Raised podium at STSO podium
- B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any species.
- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.05 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.06 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. Nails, Brads, and Staples: ASTM F 1667.

- C. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC58 as appropriate for the substrate.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- G. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

- H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.

3.02 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.03 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.04 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
06105.1	Miscellaneous Rough Carpentry	Lump Sum
06105.2	Miscellaneous Rough Carpentry - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 06160 - SHEATHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Parapet and roof deck sheathing.
- B. Related Requirements:
 - 1. Section 06105 "Miscellaneous Rough Carpentry" for plywood backing panels.
 - 2. Section 07271 "Modified Bituminous Sheet Air Barriers" for water-resistive barrier applied over wall sheathing.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Evaluation Reports: For the following, from ICC-ES: Product Data: For each product required.
- C. Glass-mat gypsum sheathing.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of air-barrier and water-resistant glass-mat gypsum sheathing.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.02 WALL SHEATHING (at non-conditioned spaces)

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. "DensGlass Gold", Georgia-Pacific Corp (Basis of Design).
 - b. "Securock" glass-mat sheathing panels, USG.
 - c. "GlasRoc", CertainTeed.
 - d. Or approved equal.
 - 2. Type and Thickness: Type X, 5/8 inch thick.

2.03 PARAPET & ROOF DECK SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C 1177/1177M.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. "DensGlass Gold", Georgia-Pacific Corp (Basis of Design).
 - b. "Securock" glass-mat sheathing panels, USG.
 - c. "GlasRoc", CertainTeed.
 - d. Or approved equal.
 - 2. Type and Thickness: Type X, 5/8 inch thick.

2.04 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. For parapet and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
 - 1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
 - 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall and parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.03 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
06160.1	Sheathing	Lump Sum
06160.2	Sheathing - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 06202 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Interior trim (board and batten).
 - 2. Wall Paneling.
- B. Related Requirements: Section 09912 "Interior Painting" for priming and backpriming of interior finish carpentry.

1.03 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.

1.04 SUBMITTALS

- A. Product Data:
 - 1. Interior trim.
 - 2. Paneling.
- B. Product Data Submittals: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

- C. Samples for Verification:
 - 1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished; 50 sq. in. for lumber and 8 by 10 inches for panels.
 - 2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
 - 1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
 - 2. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.06 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
- B. Hardwood Plywood: HPVA HP-1.
- C. MDF: ANSI A208.2, Grade 130.
- D. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC1.
 - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent, respectively.
 - 2. Preservative Chemicals: Acceptable to authorities having jurisdiction.
 - 3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
 - 4. Do not use material that is warped or does not comply with requirements for untreated material.
 - 5. Mark lumber with treatment-quality mark of an inspection agency approved by the ALSC's Board of Review.
 - 6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.
 - 7. Application: Where indicated on Drawings.

2.03 INTERIOR TRIM

- A. Clear, kiln-dried Red Oak, selected for compatible grain and color.

2.04 PANELING

- A. Hardwood Veneer Plywood Paneling: Manufacturers stock panels complying with HPVA HP-1.
 - 1. Face Veneer Species: Plain Sliced Red Oak.
 - 2. Thickness: ¼ inch (6.4mm).

2.05 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- C. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.
- D. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

2.06 FABRICATION

- A. Back out or kerf backs of the following members, except those with ends exposed in finished work: Interior standing and running trim, except shoe and crown molds.
- B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.03 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 - 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.04 INSTALLATION OF INTERIOR TRIM

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
 - 1. Do not use pieces less than 24 inches long, except where necessary.
 - 2. Stagger joints in adjacent and related standing and running trim.
 - 3. Cope at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 - 4. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 - 5. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
 - 6. Install trim after gypsum-board joint finishing operations are completed.
 - 7. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
 - 8. Fasten to prevent movement or warping.
 - 9. Countersink fastener heads on exposed carpentry work and fill holes.

3.05 INSTALLATION OF PANELING

- A. Wall (Plywood) Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels.
 - 1. Leave 1/4-inch gap to be covered with trim at top, bottom, and openings.
 - 2. Install with uniform tight joints between panels.
 - 3. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners.
 - 4. Space fasteners and adhesive as recommended by panel manufacturer.
 - 5. Conceal fasteners to greatest practical extent.
- B. Wall Paneling PNL-01: Secure wall paneling to substrate utilizing panel manufacturer's Fix Profis TS45 Rail system. Comply with manufacturer's installation manual and technical details.

3.06 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

3.07 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.
- B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.08 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials 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

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
06202	Interior Finish Carpentry	Lump Sum

END OF SECTION

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Countertops (work surfaces).
 - 2. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.

1.03 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
 - 1. Wood-Preservative Treatment: Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material and manufacturer's written warranty.
 - 2. Fire-Retardant Treatment: Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 - 3. Waterborne Treatments: For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

- C. Shop Drawings: For interior architectural woodwork.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.
 - 4. Apply WI Certified Compliance Program label to Shop Drawings.
- D. Samples: For each exposed product and for each color and finish specified, in manufacturer's or fabricator's standard size. Plastic Laminate samples.
- E. Product Certificates: For the following:
 - 1. Composite wood and agrifiber products.
 - 2. Adhesives.
- F. Quality Standard Compliance Certificates: WI Certified Compliance Program.
- G. Evaluation Reports: For preservative-treated and fire-retardant-treated wood materials, from ICC-ES.
- H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: WI's Certified Compliance Program licensee.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is

operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

- B. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.01 INTERIOR ARCHITECTURAL WOODWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 - 1. Provide inspections of fabrication and installation together with labels and certificates from WI certification program indicating that woodwork complies with requirements of grades specified.
 - 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

2.02 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of interior architectural woodwork and quality grade specified unless otherwise indicated. Wood Moisture Content: 8 to 13 percent.
 - 1. Recycled Content of Medium-Density Fiberboard and Particleboard: Provide products with an average recycled content so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 20 percent.
 - 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
 - 3. Certified Wood: Lumber and plywood shall be produced from wood obtained from forests certified by an FSC-accredited certification body to

comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

2.03 FIRE-RETARDANT-TREATED WOOD MATERIALS

- A. Fire-Retardant-Treated Wood Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
 - 1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 - 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
- C. Fire-Retardant Fiberboard: Medium-density fiberboard (MDF) panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.04 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following: Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.

2.05 SHOP PRIMING

- A. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.

2.06 PLASTIC LAMINATE

- A. Plastic Laminate, PL-01, as indicated on Finish Schedule.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Before installation, condition interior architectural woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.02 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.
- F. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- G. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind

nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with interior architectural woodwork. For shop-finished items, use filler matching finish of items being installed.

- H. Stairs: Securely anchor carriages to supporting substrates. Install stairs with treads and risers no more than 1/8 inch from indicated position.
- I. Touch up finishing work specified in this Section after installation of interior architectural woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.
- J. See Section 09912 "Interior Painting" for final finishing of installed interior architectural woodwork not indicated to be shop finished.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects. Where not possible to repair, replace interior architectural woodwork. Adjust joinery for uniform appearance.
- B. Clean interior architectural woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
06402	Interior Architectural Woodwork	Lump Sum

END OF SECTION

SECTION 06640 - PLASTIC PANELING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Plastic sheet paneling (FRP-01)
 - 2. Decorative high-pressure compact laminate with thickness of 6 mm or greater suitable for outdoor use. Wall panels in Elevator Cab (WP-01)

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Product Data: For each type of product.
- C. Samples: For plastic paneling, in manufacturer's standard sizes.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Testing Agency: Acceptable to authorities having jurisdiction.

1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.01 SOURCE LIMITATIONS

- A. Obtain plastic paneling and trim accessories from single manufacturer.

2.02 PLASTIC SHEET PANELING - FRP-01

- A. Plastic Paneling: Solid paneling made from homogenous, compression molded material composed of acrylic resins or polyester/acrylic resin blend, fire-retardant filler materials, fiber reinforcement, and coloring agents. resin with flame retardant and integral color.
 - 1. Basis of Design Product: Subject to compliance with requirements, provide product indicated in "Finish Legend" on "A Series" of Drawings or Approved Equal.
 - 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency in accordance with ASTM E84. Identify products with appropriate markings of applicable testing agency. Flame-Spread Index: 85 or less.
 - 3. Nominal Thickness: Not less than 0.090 inch.
 - 4. Surface Finish: Smooth texture.
 - 5. Color: As indicated on Finish Legend.

2.03 ACCESSORIES FOR FRP-01

- A. Adhesive: As recommended by plastic paneling manufacturer.
- B. Trim: Edge trim pieces matching the wall panel color.
- C. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07920 "Joint Sealants."

2.04 PLASTIC WALL PANELING - WP-01

- A. Plastic Paneling: Decorative high-pressure compact laminate according to EN 438-6:2016 with thickness of 6 mm or greater. Sheets consisting of natural fibers (paper and/or wood) impregnated with thermosetting resins and surface layers on one or both sides, having decorative colors or designs. A transparent topcoat is added to the surface layer(s) and cured. Provide in Fire-Retardant grade (EDF)..
 - 1. Basis of Design Product: Subject to compliance with requirements, provide product indicated in "Finish Legend" on "A Series" of Drawings. Trespa, "Meteon FR, or Approved Equal.

2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency in accordance with ASTM E84. Identify products with appropriate markings of applicable testing agency. Flame-Spread Index: 0-25.
3. Nominal Thickness: Not less than 6mm.
4. Surface Finish: Smooth texture.
5. Color: As indicated on Finish Legend.
6. Attachments: Supply with clip system.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove materials that might interfere with adhesive bond.
- B. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.
- C. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- D. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- E. Lay out paneling before installing. At WP-01, locate panel joints where indicated. At FRP-01, locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.
 1. Mark plumb lines on substrate at panel joint locations for accurate installation.
 2. Locate panel joints to allow clearance at panel edges according to manufacturer's written instructions.

3.03 INSTALLATION – FRP-01

- A. Install plastic paneling according to manufacturer's written instructions.

- B. Install panels in a full spread of adhesive
- C. Install manufacturer's edge trims.
- D. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- E. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

3.04 INSTALLATION – WP-01

- A. Install wall paneling according to manufacturer's written instructions.
- B. Coordinate installation with elevator cab interior.
- C. Install panels with clip system to elevator cab interior.
- D. Maintain uniform space between panels and wall fixtures.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
06640	Plastic Paneling	Lump Sum

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07111 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Cold-applied, emulsified-asphalt dampproofing.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.
- B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course and auxiliary materials recommended in writing by manufacturer of primary materials.

2.02 PERFORMANCE REQUIREMENTS

- A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise indicated.

2.03 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Product: Subject to compliance with requirements, provide one of the following dampproofing types:
 1. Trowel Coats: ASTM D 1227, Type II, Class 1.
 2. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
 3. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.04 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
- C. Asphalt-Coated Glass Fabric: ASTM D 1668/D 1668M, Type I.
- D. Patching Compound: Epoxy or latex-modified repair mortar of type recommended in writing by dampproofing manufacturer.
- E. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.
 1. Thickness: Nominal 1/8 inch.
 2. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer for protection course type.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the Work.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.
- B. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- C. Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.
- D. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections.

3.03 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
 - 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.04 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Concrete Foundations: Apply one fibered brush or spray coat at not less than 3 gal./100 sq. ft. or one trowel coat at not less than 4 gal./100 sq. ft.
- B. Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft..

- C. Interior Face of Exterior Concrete Walls: Where above grade and indicated to be furred and finished, apply one brush or spray coat at not less than 1 gal./100 sq. ft..
- D. Interior Face of Exterior Masonry Walls: Where above grade and indicated to be furred and finished, apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft..

3.05 PROTECTION COURSE INSTALLATION

- A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.
 - 1. Support protection course over cured coating with spot application of adhesive type recommended in writing by protection-board manufacturer.
 - 2. Install protection course on same day of dampproofing installation (while coating is tacky) to ensure adhesion.

3.06 PROTECTION

- A. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where panels are subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- B. Correct dampproofing that does not comply with requirements; repair substrates and reapply dampproofing.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07111	Bituminous Dampproofing	Lump Sum

END OF SECTION

SECTION 07210 - THERMAL INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Glass-fiber blanket.
 - 2. Extruded polystyrene rigid board (wall continuous insulation / sheathing).
- B. Related Requirements:
 - 1. Section 07541 "Polyvinyl-Chloride (PVC) Roofing" for insulation specified as part of roofing construction.
 - 2. Section 09290 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Insulation materials shall achieve an R- value as indicated on Drawings, or if not indicated, an R-value of not less than 13 for insulation batts in walls and R value of not less than 5 for continuous insulation board (sheathing) at walls.

2.02 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.03 EXTRUDED POLYSTYRENE BOARD

- A. Extruded Polystyrene Board: ASTM C 578, Type X; with laminated reinforced film on both side for extra strength, with maximum flame-spread and smoke-developed indexes of 10 and 175, respectively, per ASTM E 84. Compressive strength of 15 lb/sq. inch. minimum per ASTM D1621, Flexural Strength of 40 lb/sq inch per ASTM C203. 1" nominal depth.

2.04 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
 - 1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - 2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation. OR
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
 - 1. Angle: Formed from 0.030-inch-thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
 - 2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation. OR
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.05 ACCESSORIES

- A. Insulation for Miscellaneous Voids: Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.02 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.03 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..

3.04 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07210.1	Thermal Insulation	Lump Sum
07210.2	Thermal Insulation - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 07271 - MODIFIED BITUMINOUS SHEET AIR BARRIERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes self-adhering, vapor-retarding, modified bituminous sheet air barriers. Provide where Indicated as "Weather Barrier" on Drawings.
- B. Related Requirements: Section 06160 - SHEATHING.

1.03 DEFINITIONS

- A. Air Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; and tested physical and performance properties of products.
- C. Shop Drawings: For air-barrier assemblies.
 - 1. Show locations and extent of air barrier materials, accessories, and assemblies specific to Project conditions.
 - 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 3. Include details of interfaces with other materials that form part of air barrier.

- D. Qualification Data: For Installer.
- E. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with air barrier.
- F. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
- G. Field quality-control reports.
- H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.
 - 1. Protect substrates from environmental conditions that affect air-barrier performance.
 - 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.01 MATERIALS

Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Air Barrier Performance: Air barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

2.03 SELF-ADHERING SHEET AIR BARRIER

- A. Modified Bituminous Sheet: 40-mil-thick, self-adhering sheet consisting of 36 mils of rubberized asphalt laminated to a 4-mil-thick, cross-laminated polyethylene film with release liner on adhesive side and formulated for application with primer that complies with VOC limits.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 - b. GCP Applied Technologies Inc.
 - c. Henry Company.
 - d. Polyguard Products, Inc.
 - e. Soprema, Inc.
 - f. Tremco Incorporated.
 - g. W.R. Meadows, Inc.
 - h. Or approved equal.
 - 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
 - b. Tensile Strength: Minimum 250 psi; ASTM D 412, Die C.
 - c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
 - d. Puncture Resistance: Minimum 40 lbf; ASTM E 154/E 154M.
 - e. Water Absorption: Maximum 0.15 percent weight gain after 48-hour immersion at 70 deg F; ASTM D 570.
 - f. Vapor Permeance: Maximum 0.1 perm); ASTM E 96/E 96M, Desiccant Method.
 - g. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D 4541 as modified by ABAA.

- h. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- i. UV Resistance: Can be exposed to sunlight for 60 days according to manufacturer's written instructions.

2.04 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
 - 3. Verify that substrates are visibly dry and free of moisture.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge isolation joints, expansion joints, and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.
- I. Install materials according to air-barrier manufacturer's written instructions and details and according to recommendations in ASTM D 6135 to form a seal with adjacent construction and ensure continuity of air and water barrier.
 - 1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous air-barrier sheet produced for low-temperature application. Do not install low-temperature sheet if ambient or substrate temperature is higher than 60 deg F.
 - 2. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
- J. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.
- K. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.
- L. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.
 - 1. Apply sheets in a shingled manner to shed water.
 - 2. Roll sheets firmly to enhance adhesion to substrate.
- M. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and contraction joints.

- N. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch-wide, transition strip.
- O. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- P. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.
 - 1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
- Q. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- R. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.
- S. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- T. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact. Transition Strip: Roll firmly to enhance adhesion.
- U. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- V. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.
- W. Do not cover air barrier until it has been tested and inspected by testing agency.
- X. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.03 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Continuous structural support of air-barrier system has been provided.
 - 3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 - 4. Site conditions for application temperature and dryness of substrates have been maintained.
 - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 6. Surfaces have been primed.
 - 7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
 - 8. Termination mastic has been applied on cut edges.
 - 9. Air barrier has been firmly adhered to substrate.
 - 10. Compatible materials have been used.
 - 11. Transitions at changes in direction and structural support at gaps have been provided.
 - 12. Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 - 13. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
 - 1. Air-Leakage-Volume Testing: Air barrier assemblies will be tested for air-leakage rate according to ASTM E 783.
 - 2. Adhesion Testing: Air barrier assemblies will be tested for required adhesion to substrate according to ASTM D 4541 for each 600 sq. ft. of installed air barrier or part thereof.
- E. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.

- 2. Remove and replace deficient air-barrier components for retesting as specified above.
- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.

3.04 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07271.1	Modified Bituminous Sheet Air Barriers	Lump Sum
07271.2	Modified Bituminous Sheet Air Barriers - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 07421 – ALUMINUM FLAT PLATE PANELS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Concealed-fastener, aluminum flat plate panels.

1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.04 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:
 - 1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference: Test-Pressure Difference: 6.24 lbf/sq. ft..
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference: Test-Pressure Difference: 6.24 lbf/sq. ft..

- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.02 PANEL MATERIALS

- A. Aluminum Plate: ASTM B209. Alloy and temper as recommended by manufacturer for application.
- B. Panel Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal plate wall panels and remain weathertight; and as recommended in writing by panel manufacturer.

2.03 ALUMINUM FLAT PLATE PANELS

- A. Metal Plate Panels: Provide metal plate panels fabricated from single sheets of metal formed into profile for installation method indicated. Include attachment system components, panel stiffeners, and accessories required for weathertight system
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work, include, but are not limited to, the following:
 - 1. Protean Construction Products, Inc AP-2125.
 - 2. Approved equal.
- C. Material: Tension-leveled, smooth-aluminum sheet, ASTM B 209, 0.125 inch thick.
- D. Exterior Finish (see drawings for locations): Mica Fluoropolymer: AAMA 621: Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions.
 - 1. Color and Gloss: (SPEC-03) See Finish Legend.
- E. Exterior Finish (see drawings for locations): Fluoropolymer: AAMA 621: Two-coat fluoropolymer finish containing not less than 70 percent PVDF resin by

weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions.

1. Color and Gloss: (SPEC-01) See Finish Legend.

F. Exterior Finish (see drawings for locations): Anodic Finish all exposed areas of aluminum panel and components with electrolytically deposited color in accordance with Aluminum Association Designation AA-M10C2144, Architectural Class I (0.7 mils minimum).

1. Color and Gloss: (ANOD-01) See Finish Legend.

2.04 MISCELLANEOUS METAL FRAMING

A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A, G60 hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.

2.05 MISCELLANEOUS MATERIALS

A. Aluminum Extrusions: ASTM B 221.

B. Panel Fasteners: Self-tapping screws; bolts and nuts; self-locking rivets and bolts; end-welded studs; and other suitable fasteners designed to withstand design located. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers..

C. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

2.06 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

2.07 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous metal panel support members and anchorage according to ASTM C754 and panel manufacturers written instructions.

3.02 ALUMINUM FLAT PLATE PANEL INSTALLATION

- A. Attachment System, General: Install attachment system required to support metal plate wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
- B. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar material joinery, and panel-system joint seals.
- C. Flange-Attachment Installation: Attach metal plate panels, formed with extended perimeter flanges, to supports at locations, spacing, and with fasteners recommended by manufacturer.
- D. Seal horizontal and vertical joint between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 07920 "Joint Sealants".

3.03 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashing and other components.
- B. Install components required for a complete panel assembly including trim, copings, corners, seam covers, flashing, sealants, gaskets, fillers, closure strips and similar items.

3.04 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal plate wall panel unit withing installed tolerance of ¼ inch in 20 feet, nonaccumulative, on level, plumb, and location lines as indicated and within 1/8 inch offset of adjoining faces and of alignment of matching profiles.

3.05 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal plate panels are installed unless otherwise indicated in manufacturer's written instructions. On completion of installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.
- B. After panel installation, clear weep holes and drainage channels of obstructions , dirt, and sealant.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07421.1	Aluminum Flat Plate Panels	Lump Sum
07421.2	Aluminum Flat Plate Panels - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 07541 - POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Adhered polyvinyl chloride (PVC) roofing system.
 - 2. Roof insulation.
 - 3. Cover board.
 - 4. Walkways.
- B. Related Requirements:
 - 1. Section 06105 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
 - 2. Section 07620 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
 - 3. Section 07920 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
 - 4. Section 06160 "Sheathing" for metal roof deck substrate board.

1.03 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.04 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with State, State Engineer, State's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.
- C. Shop Drawings: Include roof plans, sections, details, and attachments to other work.
 1. Layout and thickness of insulation.
 2. Base flashings and membrane terminations.
 3. Flashing details at penetrations.
 4. Tapered insulation thickness and slopes.
 5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
 6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 7. Tie-in with air barrier.
- D. Samples for Verification: For the following products:
 1. Roof membrane and flashing, of color required.
 2. Walkway pads or rolls, of color required.
- E. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.
- F. Qualification Data: For Installer and manufacturer.

- G. Manufacturer Certificates:
 - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article. Submit evidence of compliance with performance requirements.
 - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- H. Product Test Reports: For roof membrane and insulation, tests performed by independent qualified testing agency indicating compliance with specified requirements.
- I. Evaluation Reports: For components of roofing system, from ICC-ES.
- J. Field quality-control reports.
- K. Sample Warranties: For manufacturer's special warranties.
- L. Maintenance Data: For roofing system to include in maintenance manuals.
- M. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed or listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight. Discard and

legally dispose of liquid material that cannot be applied within its stated shelf life.

- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.08 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.09 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, substrate board, and other components of roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period: Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
- D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
1. Fire/Windstorm Classification: Class 1A-105.
 2. Hail-Resistance Rating: SH.
- E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- F. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- G. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.02 POLYVINYL CHLORIDE (PVC) ROOFING

- A. PVC Sheet: ASTM D 4434/D 4434M, Type II, glass-fiber reinforced, felt backed.
1. Basis of Design Product: Subject to compliance with requirements, provide Sika Sarnafil; Sarnafil G410 roofing system, or comparable system from one of the following:
 - a. Carlisle Syntech.
 - b. GAF Materials Corp.
 - c. Or approved equal.
 2. Thickness: 80 mils.
 3. Exposed Face Color: Patina green (at existing checkpoint)

- 4. Exposed Face Color: Grey (at new construction).
- B. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.

2.03 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Bonding Adhesive: Manufacturer's standard, water based.
- E. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.04 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by PVC roof membrane manufacturer.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 2, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Compressive Strength: 24 psi.
 - 2. Size: 48 by 48 inches.
 - 3. Thickness:
 - a. Base Layer: 1-1/2 inches.
 - b. Upper Layers: Number as required to obtain achieve R-value of roof/ceiling assembly. Minimum R-30 required.
- C. Tapered Insulation: Provide factory-tapered insulation boards.

1. Material: Match roof insulation.
2. Minimum Thickness: 1/4 inch.
3. Slope:
 - a. Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

2.05 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

2.06 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to roofing system manufacturer.
 1. Size: Approximately 36 by 60 inches.
 2. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 05310 "Steel Decking."
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests according to roof system manufacturer's written instructions. Submit test result within 24 hours of performing tests. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.03 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.04 SUBSTRATE INSTALLATION

- A. See Specification Section 06160 "Sheathing" for rated sheathing applied over metal roof deck.

3.05 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Sheathing & Metal Decking:

1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.
 - a. Locate end joints over crests of decking.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches. Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch with insulation.
 - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - g. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
 - a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
 - b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - f. Trim insulation so that water flow is unrestricted.
 - g. Fill gaps exceeding 1/4 inch with insulation.
 - h. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - i. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows: Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.06 ADHERED ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel State's testing and inspection agency.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. Fabric-Backed Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.
- G. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- H. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- I. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- J. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.07 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.08 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products according to manufacturer's written instructions.
 - 1. Install flexible walkways at the following locations:
 - a. Top and bottom of each roof access ladder.
 - b. Locations indicated on Drawings.
 - c. As required by roof membrane manufacturer's warranty requirements.
 - 2. Provide 6-inch clearance between adjoining pads.
 - 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.09 FIELD QUALITY CONTROL

- A. Perform the following tests:
 - 1. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - a. Perform tests before overlying construction is placed.
 - b. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.
 - c. Flood each area for 24 hours.
 - d. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight. Cost of retesting is Contractor's responsibility.
 - e. Testing agency shall prepare survey report indicating locations of initial leaks, if any, and final survey report.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of the State Engineer, and to prepare inspection report.

- C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to the State Engineer and State.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a \condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07541.1	Polyvinyl-Chloride (PVC) Roofing	Lump Sum
07541.2	Polyvinyl-Chloride (PVC) Roofing - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Formed roof-drainage sheet metal fabrications.
 - 2. Formed low-slope roof sheet metal fabrications.
- B. Related Requirements:
 - 1. Section 06105 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Section 07541 "Polyvinyl Chloride (PVC) Roofing for sheet metal flashing and trim integral with sheet roofing.

1.03 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

- C. Shop Drawings: For sheet metal flashing and trim. Include plans, elevations, sections, and attachment details.
1. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 2. Include identification of material, thickness, weight, and finish for each item and location in Project.
 3. Include details for forming, including profiles, shapes, seams, and dimensions.
 4. Include details for joining, supporting, and securing, including layout, and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 5. Include details of termination points and assemblies.
 6. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
 7. Include details of roof-penetration flashing.
 8. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
 9. Include details of special conditions.
 10. Include details of connections to adjoining work.
 11. Detail formed flashing and trim at scale of not less than 3 inches per 12 inches.
- D. Samples for Verification: For each type of exposed finish.
1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
- E. Qualification Data: For fabricator.
- F. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- G. Sample Warranty: For special warranty.
- H. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.
- I. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.07 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

- B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-105. Identify materials with name of fabricator and design approved by FM Approvals.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 316, dead soft, fully annealed; with smooth, flat surface.
 - 1. Finish: 2D (dull, cold rolled)
 - 2. Minimum Thickness: 0.038 inches.
- C. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Minimum Thickness: 0.028 inches.
 - 2. Surface: Smooth, flat.
 - 3. Exposed Coil-Coated Finish: Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 4. Color: As indicated in "Finish Legend" on Drawings..
 - 5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.03 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 - b. Henry Company.
 - c. Or approved equal.
 - 2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
 - 3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.04 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Manufactured Reglets and Flashing: Fry-Reglet "STX" stucco reglet with "Springlok flashing or approved equal
- C. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: Stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- D. Solder:
1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.
- E. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- F. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.05 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 2. Obtain field measurements for accurate fit before shop fabrication.
 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines

indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints butted with expansion space and 6-inch-wide, concealed backup plate filled with elastomeric sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams: Form seams butted with expansion space and 6-inch-wide, concealed backup plate filled with elastomeric sealant concealed within joints.
- H. Do not use graphite pencils to mark metal surfaces.

2.06 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) : Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint backup plates. Shop fabricate interior and exterior corners.
 - 1. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate.
 - 2. Fabricate from the Following Materials: Stainless steel sheet: 0.025 inch thick.
- B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
 - 1. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate.
 - 2. Fabricate from the Following Materials:

- a. Metallic coated steel sheet: 0.036 inch thick (20 ga. Min.)
- C. Overflow Scuppers: Shop fabricate entire assembly. Fabricate from Metallic coated steel sheet, 0.036 inch thick (20 ga min.)
- D. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials: Stainless Steel: 0.025 inch thick.
- E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials: Stainless Steel: 0.025 inch thick.
- F. Flashing Receivers: Fabricate from the following materials: Stainless Steel: 0.025 inch thick.
- G. Penetration Flashing: Fabricate from the following materials: Stainless Steel: 0.025 inch thick.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in

shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

- C. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.03 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
 - 6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 - 1. Form expansion joints butted with expansion space and 6-inch-wide, concealed backup plate filled with elastomeric sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.

- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07920 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
 - 1. Do not solder metallic-coated steel sheet.
 - 2. Do not use torches for soldering.
 - 3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 - 4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3.04 ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

3.05 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
 - 1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.
 - 2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of interlocking folded seam or blind rivets and sealant unless otherwise indicated.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.06 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.07 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.08 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07620.1	Sheet Metal Flashing and Trim	Lump Sum
07620.2	Sheet Metal Flashing and Trim - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 07810 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes sprayed fire-resistive materials.

1.03 DEFINITIONS

- A. SFRM: Sprayed fire-resistive materials.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 SUBMITTALS.
- B. Product Data: For each type of product.
- C. Fireproofing Schedule. Provide a schedule of each steel member to receive fireproofing with the thickness of fireproofing to be applied for the rating required.
- D. Qualification Data: For Installer and testing agency.
- E. Product Certificates: For each type of fireproofing.
- F. Evaluation Reports: For fireproofing, from ICC-ES.
- G. Preconstruction Test Reports: For fireproofing.
- H. Field quality-control reports.
- I. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.06 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 44 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fireproofing from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Steel members are to be considered unrestrained unless specifically noted otherwise.
- D. Asbestos: Provide products containing no detectable asbestos.

2.02 SPRAYED FIRE-RESISTIVE MATERIALS

- A. Sprayed Fire-Resistive Material: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and conveyed in a dry state and mixed with atomized water at place of application.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carboline Company; a subsidiary of RPM International.

- b. GCP Applied Technologies Inc.
 - c. Isolatek International.
 - d. Or approved equal.
2. Bond Strength: Minimum 150-lbf/sq. ft. cohesive and adhesive strength based on field testing according to ASTM E 736.
 3. Density: Not less than density specified in the approved fire-resistance design, according to ASTM E 605.
 4. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than 0.375 inch.
 5. Combustion Characteristics: ASTM E 136.
 6. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 10 or less.
 7. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
 8. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
 9. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
 10. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours according to ASTM E 859.
 11. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G 21.
 12. Finish: Spray-textured finish.

2.03 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:
 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency

acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.

- C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.
 - 1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
 - 2. Verify that objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 3. Verify that substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Verify that concrete work on steel deck is complete before beginning fireproofing work.
- C. Verify that roof construction, installation of rooftop HVAC equipment, and other related work are complete before beginning fireproofing work.
- D. Conduct tests according to fireproofing manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.

- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.03 APPLICATION

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
 - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- D. Metal Decks:
 - 1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, is completed.
 - 2. Do not apply fireproofing to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fireproofing.
- E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- F. Spray apply fireproofing to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.
- G. Extend fireproofing in full thickness over entire area of each substrate to be protected.

- H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.
- I. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fireproofing that differs in color from that of encapsulant over which it is applied.
- J. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.
- K. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.
- L. Cure fireproofing according to fireproofing manufacturer's written instructions.
- M. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.
- N. Finishes: Where indicated, apply fireproofing to produce the following finishes: Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.

3.04 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections: Test and inspect as required by the IBC, Subsection 1705.14, "Sprayed Fire-Resistant Materials."
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- C. Fireproofing will be considered defective if it does not pass tests and inspections.
 - 1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
 - 2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- D. Prepare test and inspection reports.

3.05 CLEANING, PROTECTING, AND REPAIRING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing is without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07810	Applied Fireproofing	Lump Sum

END OF SECTION

SECTION 07841 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in smoke barriers.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Product Data: For each type of product.
- C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.
- D. Qualification Data: For Installer.
- E. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.
- F. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.06 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements: Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - a. UL in its "Fire Resistance Directory."
 - b. Intertek Group in its "Directory of Listed Building Products."
 - c. FM Global in its "Building Materials Approval Guide."

2.02 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. 3M Fire Protection Products.
 2. A/D Fire Protection Systems Inc.
 3. Construction Solutions.
 4. Hilti, Inc.
 5. Or approved equal.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
1. Permanent forming/damming/backing materials.
 2. Substrate primers.
 3. Collars.
 4. Steel sleeves.

2.03 FILL MATERIALS

- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

- B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- D. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.04 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.03 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.05 FIELD QUALITY CONTROL

- A. Engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.06 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07841.1	Penetration Firestopping	Lump Sum
07841.2	Penetration Firestopping - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 07844 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Joints in or between fire-resistance-rated constructions.
 - 2. Joints in smoke barriers.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Product Data: For each type of product.
- C. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- D. Qualification Data: For Installer.
- E. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.
- F. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.06 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements: Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - a. UL in its "Fire Resistance Directory."
 - b. Intertek Group in its "Directory of Listed Building Products."

2.02 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Grabber Construction Products.
 - d. Hilti, Inc.
 - e. Specified Technologies, Inc.
 - f. Or approved equal.
 - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems Inc.
 - c. Hilti, Inc.
 - d. Nelson Firestop; a brand of Emerson Industrial Automation.
 - e. NUCO Inc.
 - f. ROCKWOOL (ROXUL Inc.).
 - g. Specified Technologies, Inc.
 - h. Or approved equal.
 - 2. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.
- D. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by

joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.03 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
 - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.05 FIELD QUALITY CONTROL

- A. Inspecting Agency: Engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.06 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07844.1	Joint Firestopping	Lump Sum
07844.2	Joint Firestopping - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Nonstaining silicone joint sealants.
 - 3. Urethane joint sealants.
 - 4. Mildew-resistant joint sealants.
 - 5. Butyl joint sealants.
 - 6. Latex joint sealants.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each joint-sealant product.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- D. 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.
- E. Qualification Data: For qualified testing agency.
- F. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- G. Field-Adhesion-Test Reports: For each sealant application tested.
- H. Sample Warranties: For special warranties.

- I. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.05 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.06 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. Warranty Period: Two years from date of Substantial Completion.
- 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. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.01 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by the State Engineer from manufacturer's full range.

2.02 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
- B. Silicone, Acid Curing, S, NS, 25, NT: 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.

2.03 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

2.04 URETHANE JOINT SEALANTS

- A. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.

2.05 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.

2.06 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

2.07 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.08 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.09 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, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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 all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. 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 of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Glazed surfaces of ceramic tile.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants 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.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- 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 according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.04 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. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- 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.

3.05 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.06 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.07 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations: Isolation and contraction joints in cast-in-place concrete slabs.
 - 2. Joint Sealant: Urethane, M, P, 25, T, NT.
 - 3. Joint-Sealant Color: As selected by the State Engineer from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between plant-precast architectural concrete units.
 - c. Control and expansion joints in unit masonry.
 - d. Joints in stone cladding.
 - e. Joints between metal panels.
 - f. Joints between different materials listed above.
 - g. Perimeter joints between materials listed above and frames of doors, windows, and louvers.

- h. Control and expansion joints in ceilings and other overhead surfaces.
 - i. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Silicone, nonstaining, S, NS,100/ 50, NT.
 - 3. Joint-Sealant Color: As selected by the State Engineer from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, P, 25, T, NT.
 - 3. Joint-Sealant Color: As selected by the State Engineer from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
 - 1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Acrylic latex.
 - 3. Joint-Sealant Color: As selected by the State Engineer from manufacturer's full range of colors.
- E. 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.
 - 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 the State Engineer from manufacturer's full range of colors.

- F. Joint-Sealant Application: Concealed mastics.
 - 1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Butyl-rubber based.
 - 3. Joint-Sealant Color: As selected by the State Engineer from manufacturer's full range of colors.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07920.1	Joint Sealants	Lump Sum
07920.2	Joint Sealants Existing TSA Checkpoint (Phase 2)	Lump Sum

END OF SECTION

SECTION 07921 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes acoustical joint sealants.
- B. Related Requirements: Section 07920 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each acoustical joint sealant.
- C. Samples for Verification: For each kind and color of acoustical joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Acoustical-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.
- E. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by a qualified testing agency.
- F. Sample Warranties: For special warranties.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical 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. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

2.02 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834. Colors of Exposed Acoustical Joint Sealants: As selected by the State Engineer from manufacturer's full range of colors.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.

2.03 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.04 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.05 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07921	Acoustical Joint Sealants	Lump Sum

END OF SECTION

SECTION 07951 - EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes exterior and interior building expansion joint cover assemblies.

1.03 SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.
- B. Shop Drawings: For each expansion joint cover assembly.
 - 1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
 - 2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- C. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.
- D. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - 1. Manufacturer and model number for each expansion joint cover assembly.
 - 2. Expansion joint cover assembly location cross-referenced to Drawings.
 - 3. Nominal, minimum, and maximum joint width.
 - 4. Movement direction.
 - 5. Materials, colors, and finishes.
 - 6. Product options.
 - 7. Fire-resistance ratings.

- E. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by manufacturer and witnessed by a qualified testing agency.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockup of each expansion joint cover assembly.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless the State Engineer specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.01 ASSEMBLY DESCRIPTION

- A. Furnish units in longest practicable lengths to minimize field splicing.
- B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.02 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Expansion joint cover assemblies shall withstand the effects of earthquake motions determined according to 2018 IBC.
- B. Expansion Joint Design Criteria: Type of Movement: Seismic. Joint Movement: As indicated on Drawings.

2.03 EXPANSION JOINT COVERS

A. General.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Construction Specialties (C/S Group), Inc. Basis of Design
 - b. Architectural Art Manufacturing Inc.; a division of Pittcon Architectural Metals, LLC.
 - c. Balco; a CSW Industrials Company.
 - d. BASF Corp. - Watson Bowman Acme Corp.
 - e. MM Systems Corporation.
 - f. Nystrom.
 - g. Or approved equal.

B. Exterior Elastomeric-Seal Joint Cover: C/S Group model Series CS. Assembly consisting of elastomeric seal anchored to surface-mounted frames fixed to sides of joint gap.

1. Application: Wall to wall.
2. Installation: Recessed.
3. Exposed Metal:
 - a. Aluminum: Mill.
 - b. Stainless steel: No. 2B.
4. Seal: Preformed elastomeric membrane or extrusion.
 - a. Color: Selected from manufacturers full range.

C. Exterior Roof Joint Cover: C/S Group Model Series SRJ. Assembly consisting of aluminum coverplate, self-centering with turnbar and vapor barrier. Provide factory transitions for weather-tight assembly. Furnish with 1-hour rated Fire Barrier.

D. Interior Wall Joint Cover: C/S Group Model Series AFW. Assembly consisting of free-floating aluminum cover plate sliding between aluminum retainers.

E. Interior Ceiling Joint Cover: C/S Group Model Series AFW. Assembly consisting of free-floating aluminum cover plate sliding between aluminum retainers.

- F. Interior Floor Joint Cover: C/S Group Model Series SJP. Assembly consisting of surface-mounted aluminum coverplate, self-centering with turnbar. Provide factory transitions for weather-tight assembly. Furnish with 2-hour rated Fire Barrier.
- G. Fire Barrier: Third party listed for installation.

2.04 MATERIALS

- A. Aluminum: ASTM B221, Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304 for plates, sheet, and strips.
- C. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.
- D. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

2.05 ALUMINUM FINISHES

- A. Mill finish.

2.06 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.
- C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

2.07 ACCESSORIES

- A. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.

- B. Manufacturer's stainless-steel attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.
- B. Notify the State Engineer where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.03 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
 - 1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 - 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
 - 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 - 4. Install frames in continuous contact with adjacent surfaces. Shimming is not permitted.

5. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
 1. Provide in continuous lengths for straight sections.
 2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
 - D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
 - E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.
 - F. Moisture Barrier Drainage: Provide drainage fitting and connect to drains.

3.04 CONNECTIONS

- A. Transition to Roof Expansion Joint Covers: Coordinate installation of exterior wall and soffit expansion joint covers with roof." Install factory-fabricated units at transition between exterior walls and soffits and roof expansion joint cover assemblies.

3.05 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

Protect the installation from damage by work of other Sections.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
07951	Exterior Expansion Joint Cover Assemblies	Lump Sum

END OF SECTION

DIVISION 8 – DOOR AND WINDOWS

SECTION 08111 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes:
 - 1. Interior steel doors and frames.
 - 2. Exterior steel doors and frames.
- B. Related Requirements:
 - 1. Section 08710 "Door Hardware" for door hardware for hollow-metal doors.

1.03 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.04 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."

- B. Product Data: For each type of product. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
 - C. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - 7. Details of anchorages, joints, field splices, and connections.
 - 8. Details of accessories.
 - 9. Details of moldings, removable stops, and glazing.
 - D. Samples for Verification: Fabrication: Prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
 - 1. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - 2. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.
 - E. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.
 - F. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
 - G. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.
 - H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.
- 1.06 DELIVERY, STORAGE, AND HANDLING
- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented

- plastic. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
 - C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ceco Door; ASSA ABLOY.
 - 2. Curries Company; ASSA ABLOY.
 - 3. JR Metal Frames Manufacturing, Inc.
 - 4. Karpen Steel Custom Doors & Frames.
 - 5. Security Metal Products; a brand of ASSA ABLOY.
 - 6. Or approved equal.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Provide assemblies with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
 - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

- C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.40 deg Btu/F x h x sq. ft. when tested according to ASTM C 518.

2.03 INTERIOR STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A..
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Bevel lock edge 1/8 inch in 2 inches.
 - f. Core: Manufacturer's standard.
 - g. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
 - b. Construction: Full profile welded.
 - 3. Exposed Finish: Prime.

2.04 EXTERIOR STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A..
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Bevel lock edge 1/8 inch in 2 inches.

- f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Polyisocyanurate.
 - i. Fire-Rated Core: Manufacturer's standard core for fire-rated doors.
2. Frames:
- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
 - b. Construction: Full profile welded.
3. Exposed Finish: Prime.

2.05 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch.
- B. Construction: Full profile welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.06 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 - 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized. For anchors built into exterior walls, steel sheet

complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

2.07 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- F. Glazing: Comply with requirements in Section 08800 "Glazing."

2.08 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- B. Double-Door Frames: Drill stop in head jamb Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

- C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.09 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.10 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
 2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.02 INSTALLATION

- A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with SDI A250.11.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames according to NFPA 80.
 - 3. Floor Anchors: Secure with postinstalled expansion anchors. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fibe insulation inside frames.
 - 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

- b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
- 1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 08800 "Glazing" and with hollow-metal manufacturer's written instructions.

3.03 CLEANING AND TOUCHUP

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08111	Hollow Metal Doors and Frames	Lump Sum

END OF SECTION

SECTION 08311 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.
- B. Provide and install all access doors in walls and ceilings, whether shown on the Drawings or not, where required for access to Fire/Life Safety and/or MEP devices, valves and equipment. The door size must be appropriate for clear access, and the locations must be shown on the Coordination Drawings as approved by the State Engineer before installation.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings: Show fabrication and installation details of customized doors and frames. Include plans, elevations, sections, details, and attachment to other work. Provide coordination drawings indicating locations of access doors in reflected ceiling and floor plans.
- D. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.
- E. Product Schedule: For access doors and frames.. Provide complete schedule including types, general locations, sizes, construction details, latching or locking provisions, and other data pertinent to installations.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

2.02 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acudor Products, Inc.
 - b. Babcock-Davis.
 - c. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - d. Karp Associates, Inc.
 - e. Lane-Aire Manufacturing Corp.
 - f. Larsens Manufacturing Company.
 - g. Or approved equal.
 - 2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
 - 3. Locations: Wall and ceiling. At exterior locations, provide weatherproof assembly, with face of door fit flush with frame and with exposed frame. Include extruded door gaskets and minimum 2-inch-thick fiberglass insulation.
 - 4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed. Provide at all locations except as indicated otherwise.
 - 5. Stainless-Steel Sheet for Door: Nominal 0.062 inch, 16 gage, No. 4 finish. Provide at Restrooms and similar locations containing plumbing fixtures.
 - 6. Frame Material: Same material and thickness as door.
 - 7. Latch and Lock: Latch bolt, key operated.

2.03 FIRE-RATED ACCESS DOORS AND FRAMES

- A. Fire-Rated, Flush Access Doors with Concealed Flanges:
 - 1. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with concealed flange for gypsum board installation, self-closing door, and concealed hinge.
 - 2. Locations: Wall and ceiling.
 - 3. Fire-Resistance Rating: Not less than that of adjacent construction.

4. Uncoated Steel Sheet for Door: Nominal 0.036 inch, 20 gage, factory primed.
5. Stainless-Steel Sheet for Door: Nominal 0.038 inch, 20 gage, No. 4 finish.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Self-closing, self-latching door hardware, operated by key.

2.04 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316. Remove tool and die marks and stretch lines, or blend into finish.
- E. Frame Anchors: Same material as door face.
- F. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.05 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
- D. Latch and Lock Hardware:
 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 2. Keys: Furnish two keys per lock and key all locks alike.

2.06 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment. Primer shall be compatible with paint finishes specified in other Sections.
- E. Stainless-Steel Finishes:
 - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - 2. Polished Finish: No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - a. Run grain of directional finishes with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.03 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08311	Access Doors and Frames	Lump Sum

END OF SECTION

SECTION 08332 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Submit in accordance with Section 01300 "Submittals."
- B. Section Includes:
 - 1. Service doors.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type and size of overhead coiling door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include description of automatic-closing device and testing and resetting instructions.
- C. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
 - 5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
 - 6. Include diagrams for power, signal, and control wiring.

- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Curtain slats.
 - 2. Bottom bar with sensor edge.
 - 3. Guides.
 - 4. Brackets.
 - 5. Hood.
 - 6. Locking device(s).
 - 7. Include similar Samples of accessories involving color selection.
- E. Qualification Data: For Installer.
- F. Sample Warranty: For special warranty.
- G. Maintenance Data: For overhead coiling doors to include in maintenance manuals.
- H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Fire-Rated Door Assemblies: Complying with NFPA 80; listed and labeled by qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252 or UL 10B.
 - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
 - 2. Smoke Control: Where indicated, provide doors that are listed and labeled with the letter "S" on the fire-rating label by a qualified testing agency for smoke- and draft-control based on testing according to UL 1784; with maximum air-leakage rate of 3.0 cfm/sq. ft. of door opening at 0.10-inch wg for both ambient and elevated temperature tests.
- C. Accessibility Standard: Comply with applicable provisions in the ABA standards of the Federal agency having jurisdiction.

1.05 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer. Obtain operators and controls from overhead coiling-door manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.03 DOOR ASSEMBLY

- A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Clopay Building Products.
 - b. Cookson Company.
 - c. Cornell.
 - d. Lawrence Roll-Up Doors, Inc.
 - e. McKeon Rolling Steel Door Company, Inc.
 - f. Overhead Door Corporation.
 - g. Raynor.
 - h. Or approved equal.
- B. Operation Cycles: Door components and operators capable of operating for not less than 200,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Door Curtain Material: Aluminum, clear anodized.
- D. Door Curtain Slats: Flat profile slats of 1-7/8-inch center-to-center height.

- E. Bottom Bar: Extruded aluminum;.
- F. Curtain Jamb Guides: Aluminum or Stainless Steel angles with exposed finish matching curtain slats.
- G. Hood: Match curtain material and finish] Galvanized steel.
 - 1. Shape: Square.
 - 2. Mounting: Face of wall.
- H. Locking Devices: Equip door with locking device assembly and chain lock keeper. Locking Device Assembly: Single-jamb side locking bars, operable from inside and outside with cylinders.
- I. Electric Door Operator:
 - 1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
 - 2. Operator Location: As indicated on Drawings.
 - 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
 - 4. Motor Exposure: Interior.
 - 5. Motor Electrical Characteristics:
 - a. Horsepower: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second..
 - b. Voltage: As indicated, single phase, 60 Hz.
 - 6. Emergency Manual Operation: Chain type.
 - 7. Obstruction-Detection Device: Automatic photoelectric sensor.
 - 8. Control Station(s): Locate at STSO Podium. Connect to card reader to prevent unauthorized usage.
 - 9. Other Equipment: Audible and visual signals.
- J. Curtain Accessories: Equip door with weatherseals.
- K. Door Finish:
 - 1. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.04 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.05 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated.
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.06 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging. Galvanized Steel: Nominal 0.028-inch-thick, hot-dip galvanized-steel sheet with G90 zinc coating, complying with ASTM A 653/A 653M.

2.07 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks. Lock Cylinders: As specified in Section 08710 "Door Hardware" and keyed to building keying system.
- B. Chain Lock Keeper: Suitable for padlock.
- C. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.08 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.09 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
 - 1. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 - 2. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

- F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close." Connect to card reader.
 - 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.
- K. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.

2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.
- D. Power-Operated Doors: Install according to UL 325.

3.03 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.04 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion. Adjust exterior doors and components to be weather resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08332	Overhead Coiling Doors	Lump Sum

END OF SECTION

SECTION 08411 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Storefront framing.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed in the State of Hawaii, responsible for their preparation.

- F. Qualification Data: For Installer.
- G. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
- H. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- I. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
- J. Source quality-control reports.
- K. Field quality-control reports.
- L. Sample Warranties: For special warranties.
- M. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.
- N. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Do not change intended aesthetic effects, as judged solely by the State Engineer, except with the State Engineer's approval. If changes are proposed, submit comprehensive explanatory data to the State Engineer for review.

1.05 SPECIAL WARRANTY

- A. Special Warranty: Manufacturer and Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures, including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design Responsibility: Provide structural design of complete system, including all components. Prepare Shop Drawings, design calculations, and other structural data. Engineer licensed in State of Hawaii shall perform engineering analysis, and seal and sign documentation. When

required by jurisdiction having authority, submit engineering data and obtain separate permit for Work.

- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
- E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
 - 1. Fixed Framing and Glass Area: Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..
 - 2. Entrance Doors: Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
- F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows: No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..

- G. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
 2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- H. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to applicable Code.
- I. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.57 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
 2. Condensation Resistance: Fixed glazing and framing areas as a system shall have an NFRC-certified condensation resistance rating of no less than 55 as determined according to NFRC 500.
- J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.03 STOREFRONT SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Arcadia, Inc.
 2. EFCO Corporation.
 3. Kawneer North America, an Arconic company.
 4. Oldcastle BuildingEnvelope.
 5. Vistawall Architectural Products.
 6. Or approved equal.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Exterior Framing Construction: Nonthermal .

2. Glazing System: Retained mechanically with gaskets on four sides and Retained mechanically with gaskets on two sides and structural sealant on two sides, as indicated on Drawings.
 3. Glazing Plane: Front.
 4. Finish: High-performance organic finish. Color: As indicated in "Finish Legend" on Drawings
 5. Fabrication Method: Unitized system.
 6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 7. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Sill Pans: Manufacturer's standard.

2.04 GLAZING

- A. Glazing: Comply with Section 08800 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: Comply with Section 08800 "Glazing."
- D. Structural Glazing Sealants: ASTM C 1184 chemically curing silicone formulation that is compatible with system components with which it comes in contact; specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront system indicated. Color: Black.

2.05 MATERIALS

- A. Sheet and Plate: ASTM B 209.
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- D. Steel Reinforcement:
 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.06 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 2. Reinforce members as required to receive fastener threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, complying with ASTM A 240/A 240M, of type recommended by manufacturer.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.
- E. Rigid PVC Filler.

2.07 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 1. Profiles that are sharp, straight, and free of defects or deformations.
 2. Accurately fitted joints with ends coped or mitered.
 3. Physical and thermal isolation of glazing from framing members.

4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 5. Provisions for field replacement of glazing from exterior.
 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
 - E. Storefront Framing: Fabricate components for assembly using shear-block system.
 - F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.08 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Color and Gloss: SPEC-03, as indicated in "Finish Legend" on Drawings; (use at storefront doors in curtainwall at new security checkpoint building).
- B. Anodic Finish all exposed areas of aluminum panel and components with electrolytically deposited color in accordance with Aluminum Association Designation AA-M10C2144, Architectural Class I (0.7 mils minimum). Color and Gloss: ANOD-01, as indicated in "Finish Legend" on Drawings (storefront systems and storefront doors at existing security checkpoint).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions, to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.03 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed, as specified in Section 07920 "Joint Sealants," to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 08800 "Glazing."

F. Install weatherseal sealant according to Section 07920 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

3.04 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.

- c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.05 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by the State Engineer shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of three tests in areas as directed by the State Engineer.
 - b. Perform tests in each test area as directed by the State Engineer. Perform at least three tests, prior to 10, 35, and 70 percent completion.
- C. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.
 1. Test a minimum of six areas on each building facade.
 2. Repair installation areas damaged by testing.
- D. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08411.1	Aluminum-Framed Entrances and Storefronts	Lump Sum
08411.2	Aluminum-Framed Entrances and Storefronts - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 08422 - SLIDING AUTOMATIC ENTRANCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Sliding automatic entrances.
- B. Related Requirements: Section 03300 "Cast-in-Place Concrete" for forming recesses in concrete for recessed thresholds.

1.03 DEFINITIONS

- A. AAADM: American Association of Automatic Door Manufacturers.
- B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.
- C. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.
- D. For automatic door terminology, refer to BHMA A156.10 for definitions of terms.

1.04 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed sliding tracks that control automatic entrances. Concrete, reinforcement, and formwork requirements are specified elsewhere.
- B. Templates: Distribute for doors, frames, and other work specified to be factory prepared for installing automatic entrances.
- C. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Coordinate hardware for automatic entrances with hardware required for rest of Project.

- D. Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies and access-control system and remote activation devices.
- E. System Integration: Integrate sliding automatic entrances with other systems as required for a complete working installation.
 - 1. Provide electrical interface control capability for activation of sliding automatic entrances by security access system on doors with electric locking.
 - 2. Provide electrical interface to deactivate door operators on activation of fire alarm system.
 - 3. Provide electrical interface to allow for remote monitoring of automatic entrance door panel status.

1.05 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.06 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrances.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For sliding automatic entrances.
 - 1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
 - 2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.
 - 4. Indicate locations of activation and safety devices.
 - 5. Include hardware schedule and indicate hardware types, functions, quantities, and locations.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Qualification Data: For manufacturer.
- E. Product Certificates: For each type of automatic entrance. Include emergency-exit features of automatic entrances serving as a required means of egress.

- F. Product Test Reports: For each type of automatic entrance, for tests performed by a qualified testing agency.
- G. Field quality-control reports.
- H. Sample Warranties: For manufacturer's special warranties.
- I. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.
- J. Operation and Maintenance Data: For automatic entrances, safety devices, and control systems to include in operation and maintenance manuals.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer with Company Certificate issued by AAADM indicating that manufacturer has a Certified Inspector on staff.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- C. Certified Inspector Qualifications: Certified by AAADM.

1.08 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of automatic entrances that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Faulty operation of operators, controls, and hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 AUTOMATIC ENTRANCE ASSEMBLIES

- A. Source Limitations: Obtain sliding automatic entrances from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Power-Operated Door Standard: BHMA A156.10.

2.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Automatic entrances shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated in accordance with applicable Code.
 1. Seismic Loads: As indicated in "S" Series of Drawings.
 2. Wind Loads: As indicated in "S" Series of Drawings.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- C. Operating Temperature Range: Automatic entrances shall operate within minus 20 to plus 122 deg F.
- D. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 1.25 cfm/sq. ft. of fixed entrance-system area when tested in accordance with ASTM E283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft..
- E. Opening Force:

1. Power-Operated Doors: Not more than 50 lbf required to manually set door in motion if power fails, and not more than 15 lbf required to open door to minimum required width.
 2. Breakaway Device for Power-Operated Doors: Not more than 50 lbf required for a breakaway door or panel to open.
- F. Entrapment-Prevention Force: Power-Operated Sliding Doors: Not more than 30 lbf required to prevent stopped door from closing.

2.03 SLIDING AUTOMATIC ENTRANCES

- A. General: Provide manufacturer's standard automatic entrances, including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, controls, and accessories required for a complete installation.
- B. Basis of Design Product: Subject to compliance with requirements, provide Nabco Entrances, Inc. Automatic Sliding Glass door system or Approved Equal.
- C. Sliding, Power-Operated Automatic Entrances:
1. Biparting-Sliding Units:
 2. Configuration, Biparting-Sliding: Biparting-sliding doors with one sliding leave and one sidelite on each side.
 - a. Traffic Pattern: Two way.
 - b. Emergency Breakaway Capability: Sliding leaves only.
 - c. Mounting: Between jambs.
 3. Configuration, Telescoping Biparting-Sliding: Telescoping Biparting-sliding doors with two sliding leaves and one fixed sidelite on each side.
 - a. Traffic Pattern: One way.
 - b. Emergency Breakaway Capability: Sliding and fixed leaves.
 - c. Mounting: Between jambs.
 4. Operator Features:
 - a. Power opening and closing.
 - b. Drive System: belt.
 - c. Adjustable opening and closing speeds.
 - d. Adjustable hold-open time between zero and 30 seconds.
 - e. Obstruction recycle.
 - f. On-off/hold-open switch to control electric power to operator.
 5. Sliding-Door Carrier Assemblies and Overhead Roller Tracks: Carrier assembly that allows vertical adjustment; consisting of nylon- or delrin-covered, ball-bearing-center steel wheels operating on a continuous roller track, or ball-bearing-center steel wheels operating on a nylon- or delrin-

- covered, continuous roller track. Support doors from carrier assembly by cantilever and pivot assembly. Rollers: Minimum of two ball-bearing roller wheels and two antirise rollers for each active leaf.
6. Sliding-Door Threshold: Threshold members and bottom-guide-track system with stainless steel, ball-bearing-center roller wheels. Configuration, Threshold: Saddle-type threshold across door opening and recessed guide-track system at sidelites.
 7. Controls: Activation and safety devices in accordance with BHMA standards.
 - a. Activation Device, Motion Sensor: Mounted on each side of door header to detect pedestrians in activating zone and to open door.
 - b. Safety Device, Photoelectric Beams: Two photoelectric beams mounted in sidelite jambs on each side of door to detect pedestrians in presence zone and to prevent door from closing.
 - c. Opening-Width Control: Two-position switch that in the normal position allows sliding doors to travel to full opening width and in the alternate position reduces opening to a selected partial opening width.
 8. Finish: Finish framing, door(s), and header with high-performance organic finish (two-coat fluoropolymer with mica) finish matching adjacent curtain wall. SPEC-03, see door schedule for locations.
 9. Finish: Anodic Finish all exposed areas of aluminum panel and components with electrolytically deposited color in accordance with Aluminum Association Designation AA-M10C2144, Architectural Class I (0.7 mils minimum). ANOD-01, see door schedule for locations.

2.04 ENTRANCE COMPONENTS

- A. Framing Members: Extruded aluminum, minimum 0.125 inch thick and reinforced as required to support imposed loads.
- B. Stile and Rail Doors: 1-3/4-inch- (45-mm-) thick, glazed doors with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with reinforcing brackets that are welded, or incorporate concealed tie-rods that span full length of top and bottom rails. Sidelite(s): 1-3/4-inch-deep sidelite(s) with minimum 0.125-inch-thick, extruded-aluminum tubular stile and rail members matching door design.
- C. Glazing Stops and Gaskets: Same materials and design as for stile and rail door.
- D. Headers: Fabricated from minimum 0.125-inch-thick extruded aluminum and extending full width of automatic entrance units to conceal door operators and controls. Provide hinged or removable access panels for service and

adjustment of door operators and controls. Secure panels to prevent unauthorized access.

- E. Brackets and Reinforcements: High-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- F. Signage: As required by cited BHMA standard.

2.05 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extrusions: ASTM B221.
 - 2. Sheet: ASTM B209.
- B. Steel Reinforcement: Reinforcement with corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Use surface preparation methods in accordance with recommendations in SSPC-SP COM and prepare surfaces in accordance with applicable SSPC standard.
- C. Stainless Steel Bars: ASTM A276/A276M or ASTM A666, type 304.
- D. Stainless Steel Tubing: ASTM A554, Grade MT 304.
- E. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, type 304, stretcher-leveled standard of flatness, in entrance manufacturer's standard thickness.
- F. Glazing: As specified in Section 08800 "Glazing."
- G. Sealants and Joint Fillers: As specified in Section 07920 "Joint Sealants."
- H. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout; complying with ASTM C1107/C1107M; of consistency suitable for application.
- I. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- J. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
- K. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.06 DOOR OPERATORS AND CONTROLS

- A. General: Provide operators and controls, which include activation and safety devices, in accordance with BHMA standards, for condition of exposure, and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
- B. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement.
 - 1. Door Operator Performance: Door operators shall open and close doors and maintain them in fully closed position when subjected to Project's design wind loads.
 - 2. Electromechanical Operators: Concealed, self-contained, overhead units powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; complying with UL 325; and with manual operation with power off.
- C. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed by their plastic housings; adjustable to provide detection-field sizes and functions required by BHMA A156.10. Provide capability for switching between bi- and unidirectional detection.
- D. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.07 HARDWARE

- A. General: Provide units in sizes and types recommended by automatic entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish.
- B. Breakaway Device for Power-Operated Doors: Device that allows door to swing out in direction of egress to full 90 degrees from any operating position. Maximum force to open door shall be as stipulated in "Performance Requirements" Article. Interrupt powered operation of door operator while in breakaway mode.
- C. Access-Control Locking: Electrically controlled device mounted in header that automatically locks sliding door in closed position, preventing door panels from sliding manually. Provide fail- safe operation if power fails.
- D. Dustproof Strikes for All-Glass Sliding Doors: Recessed, floor type, BHMA A156.16, Grade 1, to receive deadbolt.

- E. Weather Stripping: Replaceable components. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

2.08 FABRICATION

- A. General: Factory fabricate automatic entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
 - 1. Form aluminum shapes before finishing.
 - 2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
 - 3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match framing.
 - a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 - b. Reinforce members as required to receive fastener threads.
 - 4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
- B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
 - 1. Fabricate tubular and channel frame assemblies with welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
 - 2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 - 3. Form profiles that are sharp, straight, and free of defects or deformations.
 - 4. Provide components with concealed fasteners and anchor and connection devices.
 - 5. Fabricate components with accurately fitted joints, with ends coped or mitered to produce hairline joints free of burrs and distortion.
 - 6. Fabricate exterior components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior. Provide anchorage and alignment brackets for concealed support of assembly from building structure.
 - 7. Allow for thermal expansion of exterior units.

- C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.
- D. Metal Cladding: Factory-fabricated and -installed metal cladding, completely covering all visible surfaces as part of prefabricated entrance assembly before shipment to Project site.
 - 1. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
 - 2. Form profiles that are sharp, straight, and free of defects or deformations.
 - 3. Provide components with concealed fasteners and anchor and connection devices.
 - 4. Fabricate components with accurately fitted joints, with ends coped or mitered to produce hairline joints free of burrs and distortion.
 - 5. Fabricate exterior components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior. Allow for thermal expansion at exterior entrances.
- E. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.
- F. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, in accordance with GANA's "Glazing Manual."
- G. Hardware: Factory install hardware to greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes. Provide sliding-type weather stripping, mortised into door, at perimeter of doors.
- H. Controls: General: Factory install activation and safety devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.

2.09 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 ALUMINUM FINISHES

- A. High-Performance Organic Finish, Two-Coat: Fluoropolymer finish with mica complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. .
- B. Anodic Finish all exposed areas of aluminum panel and components with electrolytically deposited color in accordance with Aluminum Association Designation AA-M10C2144, Architectural Class I (0.7 mils minimum).

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances.
- B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic entrance installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install automatic entrances according to manufacturer's written instructions and cited BHMA A156.10 for direction of pedestrian travel, including signage, controls, wiring, and connection to the building's power supply.
 - 1. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
 - 2. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 - 3. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous coating.
- B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.

1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
 2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
 3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
 4. Level recesses for recessed thresholds using nonshrink grout.
- C. Door Operators: Connect door operators to electrical power distribution system.
- D. Controls: Install and adjust activation and safety devices according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel. Connect control wiring in accordance with Section 16100 "Electrical Work."
- E. Guide Rails: Install rails in accordance with BHMA A156.10, including Appendix A, and manufacturer's written instructions unless otherwise indicated.
- F. Glazing: Install glazing as specified in Section 08800 "Glazing."
- G. Sealants: Comply with requirements specified in Section 07920 "Joint Sealants" to provide weathertight installation.
1. Set bottom-guide-track system, framing members and flashings in full sealant bed.
 2. Seal perimeter of framing members with sealant.
- H. Signage: Apply signage on both sides of each door, as required by cited BHMA standard for direction of pedestrian travel.
- I. Wiring within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.

3.03 FIELD QUALITY CONTROL

- A. Certified Inspector: Engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative: Test and inspect each automatic entrance, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.
- C. Automatic entrances will be considered defective if they do not pass tests and inspections.

- D. Prepare test and inspection reports.

3.04 ADJUSTING

- A. Adjust hardware, moving parts, door operators, and controls to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards. Adjust exterior doors for tight closure.
- B. Readjust door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).
- C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.05 CLEANING

- A. Clean glass and metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish. Comply with requirements in Section 08800 "Glazing" for cleaning and maintaining glass.

3.06 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 24 months' full maintenance by skilled employees of automatic entrance Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper automatic entrance operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
 - 2. Perform maintenance, including emergency callback service, during normal working hours.
 - 3. Include 24-hour-per-day, 7-day-per-week emergency callback service.

3.07 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08422.1	Sliding Automatic Entrances	Lump Sum
08422.2	Sliding Automatic Entrances - Existing TSA Checkpoint Work (Phase 2)	Lump Sum
08422.3	Sliding Automatic Entrances - Operations & Maintenance Service	Month

END OF SECTION

SECTION 08442 – STRUCTURAL-SEALANT-GLAZED CURTAINWALLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Field-glazed, two-sided structural-sealant-glazed curtain-wall assemblies.
2. Factory-glazed, four-sided structural-sealant-glazed curtain-wall assemblies.

B. Related Requirements:

1. See Section 07844 – JOINT FIRESTOPPING for perimeter fire-containment systems (safing insulation) field installed with glazed aluminum curtain walls.
2. See Section 07920 – JOINT SEALANTS for for installation of joint sealants installed with glazed aluminum curtain walls and for sealants to the extent not specified in this Section.
3. See Section 08411 – ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS for entrance doors integrated with curtainwall systems.
4. See Section 08800 – GLAZING for curtain wall glazing.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – SUBMITTALS.

B. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each type of vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.

- c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
- 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- F. Delegated-Design Submittal: For structural-selant-glazed aluminum curtain walls, including analysis data signed and sealed by the qualified professional engineer, licensed in the State of Hawaii, responsible for their preparation.
- G. Qualification Data:
 - 1. For Installer.
 - 2. For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the state in which Project is located.
- H. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components from manufacturer. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.
- I. Product Test Reports: For glazed aluminum curtain walls, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- J. Preconstruction sealant test reports
- K. Field quality-control reports.
- L. Sample Warranties: For special warranties.
- M. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.

- N. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Do not change intended aesthetic effects, as judged solely by State Engineer, except with State Engineer's approval. If changes are proposed, submit comprehensive explanatory data to State Engineer for review.
- C. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of structural-sealant-glazed curtain walls.

1.05 MOCKUPS

- A. Build in-place mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings, minimum 30 feet by one story.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless State Engineer specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 WARRANTY

- A. Special Assembly Warranty: Manufacturer and Installer agrees to repair or replace components of glazed aluminum curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.

- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.
- 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design Responsibility: Provide structural design of complete system, including all components. Prepare Shop Drawings, design calculations, and other structural data. Engineer licensed in State of Hawaii shall perform engineering analysis, and seal and sign documentation. When required by jurisdiction having authority, submit engineering data and obtain separate permit for Work.
- B. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Structural-sealant-glazed aluminum curtain walls shall withstand movements of supporting structure, including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.

- c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- C. Structural Loads:
- 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
- D. Deflection of Framing Members: At design wind pressure, as follows:
- 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans of greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
- E. Structural: Test according to ASTM E 330/E 330M as follows:
- 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows: Fixed Framing and Glass Area: Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows: No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
- H. Seismic Performance: Structural-sealant-glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to 2018 IBC.
- I. Energy Performance: Certify and label energy performance according to NFRC as follows:
- 1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.65 Btu/sq. ft. x h x deg F as determined according to NFRC 100.

2. Condensation Resistance: Fixed glazing and framing areas as a system shall have an NFRC-certified condensation resistance rating of no less than 55 as determined according to NFRC 500.
- J. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows:
1. Outdoor-Indoor Transmission Class: Minimum 26.
 2. Sound Transmission Class: Minimum 31.
- K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes: Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- L. Structural Sealant: Capable of withstanding tensile and shear stress imposed by structural-sealant-glazed curtain walls without failing adhesively or cohesively.
- M. Structural-Sealant Joints:
1. Designed to carry gravity loads of glazing.
 2. Designed to produce tensile or shear stress of less than 20psi (138kPa)
 3. Design reviewed and approved by structural-sealant manufacturer.
- N. Preconstruction Sealant Testing: Perform sealant manufacturer's standard tests for compatibility with and adhesion of each material that will come in contact with sealants and each condition.
1. Test a minimum five production-run samples each of metal, glazing, and other material.
 2. Prepare samples using techniques and primers required for installed assemblies.
 3. Perform tests under environmental conditions that duplicate those under which assemblies will be installed.
- O. Performance for Hurricane and Missile: Provide entrances and storefront systems, that complies with ASTM E 1996 and ASTM E1886. All glazing shall be impact-resistant or protected with an impact-resistant covering meeting the requirements of an approved impact-resisting standard or the requirements of Large Missile Test of ASTM E 1996.

2.02 SOURCE LIMITATIONS

Obtain all components of curtain-wall system and storefront system, including framing entrances and accessories, from single manufacturer.

2.03 STRUCTURAL-SEALANT-GLAZED ALUMINUM CURTAIN WALL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, products from one of the following are acceptable:
1. Kawneer North America, an Arconic company.
 2. Oldcastle, Inc.
 3. Vistawall Architectural Products
 4. Walters and Wolf.
 5. Arcadia, Inc.
 6. EFCO Corporation.
 7. U.S. Aluminum; a brand of C.R. Laurence.
 8. Wausau Window and Wall Systems; Apogee Wausau Group, Inc.
 9. Or approved equal.
- B. Framing Members: Manufacturer's extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four sides. and retained mechanically with gaskets on two sides and structural sealant on two sides, as indicated on Drawings.
 3. Glazing Plane: Front.
 4. Finish: Superior-performance organic finish. Color: Match PPG Duranar UC70092F, Sunstorm Silversmith.
 5. Fabrication Method: Factory-fabricated unitized system.
 6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 7. Steel Reinforcement: As required by manufacturer.
- C. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing. Include snap-on aluminum trim that conceals fasteners.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Glazing: As specified in Section 08800 - GLAZING.
- F. Entrance Door Systems: Comply with Section 08411 – ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.

2.04 GLAZING

- A. Glazing: Comply with Section 08800 – GLAZING.
- B. Glazing Gaskets: ASTM C 509 or ASTM C 864. Manufacturer's standard. Color: Black.

- C. Glazing Sealants: For structural-sealant glazed curtain walls, as recommended by manufacturer for joint type and as follows:
1. Structural glazing sealant: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly required.
 - a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - b. Colors: As selected by State Engineer from manufacturer's full range of colors.
 2. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes into contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed curtain-wall manufacturers for this use.
 - a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - b. Color: As selected by State Engineer from manufacturer's full range of colors.

2.05 MATERIALS

- A. Sheet and Plate: ASTM B 209.
- B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
- C. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
- D. Structural Profiles: ASTM B 308/B 308M.
- E. Steel Reinforcement:
 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
- F. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

2.06 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system , fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.
- E. Cleaning Agent and Cloth: As recommended by structural-sealant manufacturer.

2.07 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from exterior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

- D. Fabricate components to resist water penetration as follows: Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
- E. Curtain-Wall Framing: Fabricate components for assembly using shear-block system.
- F. Factory-Assembled Frame Units:
 - 1. Rigidly secure nonmovement joints.
 - 2. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions, to ensure compatibility and adhesion.
 - 3. Preparation includes, but is not limited to, cleaning and priming surfaces.
 - 4. Seal joints watertight unless otherwise indicated.
 - 5. Install glazing to comply with requirements in Section 08800 – GLAZING.
- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.08 ALUMINUM FINISHES

- A. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions for seacoast and severe environments.
 - 2. Color and Gloss: As indicated on the drawings.

2.09 SOURCE QUALITY CONTROL

Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations, including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions, to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.03 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
- G. Seal joints watertight unless otherwise indicated.
- H. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- I. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
- J. Install components plumb and true in alignment with established lines and grades.

3.04 INSTALLATION OF GLAZING

- A. Install glazing as specified in Section 08800 – GLAZING.

3.05 INSTALLATION OF WEATHERSEAL SEALANT

- A. Install weatherseal sealant according to Section 07920 – JOINT SEALANTS and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

3.06 ERECTION TOLERANCES

- A. Install glazed aluminum curtain walls to comply with the following maximum tolerances:
 - 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 - 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 - 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.07 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Test Area: Perform tests on representative areas of glazed aluminum curtain walls.
- C. Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain walls.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by State Engineer shall be tested according to AAMA 501.2 and shall not evidence water penetration. Perform tests in each test area as directed by State Engineer. Perform at least three tests, prior to 10, 35, and 70 percent completion.
 - a. Test area: a minimum of 75 feet (23 m) by one story of curtain wall.

2. Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
 - a. Test Area: 30 feet (9.1 m) , by one story of structural-sealant-glazed curtain wall.
 - b. Perform a minimum of three tests in areas as directed by State Engineer.
 - c. Perform at least three tests, prior to 10, 35, and 70 percent completion.
 3. Water Penetration: ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
 - a. Test Area: 30 feet (9.1 m) , by one story of structural-sealant-glazed curtain wall.
 - b. Perform a minimum of two tests per building in areas as directed by State Engineer.
 - c. Perform at least three tests, prior to 10, 35, and 70 percent completion.
 4. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.
 - a. Test a minimum of two areas on each building facade.
 - 1) Repair installation areas damaged by testing.
- D. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08442	Structural-Sealant-Glazed Curtainwalls	Lump Sum

END OF SECTION

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.
 - 2. Cylinders for door hardware specified in other Sections.
 - 3. Electrified door hardware.
- B. Related Requirements:
 - 1. Section 08111 "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.
 - 2. Section 08311 "Access Doors and Frames" for access door hardware, except cylinders.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings: For electrified door hardware.
 - 1. Include diagrams for power, signal, and control wiring.
 - 2. Include details of interface of electrified door hardware and building safety and security systems.
- D. Samples: For each exposed product in each finish specified, in manufacturer's standard size. Tag Samples with full product description to coordinate Samples with door hardware schedule.

- E. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - 2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
 - 3. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - e. Fastenings and other installation information.
 - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
 - g. Mounting locations for door hardware.
 - h. List of related door devices specified in other Sections for each door and frame.

- F. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing State's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

- G. Qualification Data: For Installer and Architectural Hardware Consultant.

- H. Product Certificates: For each type of electrified door hardware. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.

- I. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

- J. Field quality-control reports.

- K. Sample Warranty: For special warranty.

- L. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- M. Schedules: Final door hardware and keying schedule.
- N. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and State about door hardware and keying.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC).

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to State.
- D. Deliver keys and permanent cores to State by registered mail or overnight package service.

1.06 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion.

1.07 COORDINATION

- A. Floor-Recessed Door Hardware: Coordinate layout and installation with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with State's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain each type of door hardware from single manufacturer.
- B. Listed Acceptable Manufacturers: Submit for review products with equivalent function and features of scheduled products.

ITEMS:	MANUFACTURER	ACCEPTABLE SUB:
Hinges	(MCK) Mckinney	Ives, Bommer
Continuous Hinges	(PEM) Pemko	Ives, Mckinney
Key System	(SAR) Sargent	
Locks	(SAR) Sargent (Russwin cores)	
Exit Devices	(SAR) Sargent	Von Duprin
Closers	(SAR) Sargent	LCN, Airport Standard
Magnetic Hold Open	(LCN) LCN	Sargent
Kickplates	(ROC) Rockwood	Ives, Trimco
Stops	(ROC) Rockwood	Ives, Trimco
Thresholds	(PEM) Pemko	Zero, National Guard
Seals & Bottoms	(PEM) Pemko	Zero, National Guard
Armor Collar	(KEE) Keedex	Schlage, Adams Rite
Elec Horn/Strobe	(SCE) Schlage/Electronic Security	
Door Position Switch	(SCE) Schlage/Electronic Security	Sargent, BEA
Electronic Cipher	(LOM) Lockmaster	
Electronic Combo Lock	(MAH) Kaba Mas	
Electric Strike	(HAN) Hanchett Entry System	Adams Rite, HES
Lock Guard	(IVE) Ives	
Power Supply	(SEC) Securitron Magnalock	Von Duprin
Door Release	(SDC) Security Door Controls	Alarm Controls Corp.

2.02 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOT's "ADA Standards for Transportation Facilities" and the ABA standards of the Federal agency having jurisdiction.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.03 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements indicated in Part 2 and Door Hardware Schedule. Door hardware is scheduled on Drawings.

2.04 LOCKSETS, LATCHSETS, DEADBOLTS:

- A. Mortise Locksets and Latchsets: as scheduled.
 - a) Russwin, ML2000 Series, Grade 1 mortise, with lever style LS Standard – Lustra (cast)..

2.05 EXIT DEVICES / PANIC HARDWARE

- A. General features:
 1. Independent lab-tested 1,000,000 cycles.
 2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
 3. 0.75-inch throw deadlocking latchbolts.
 4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
 5. No exposed screws to show through glass doors.
 6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
 7. Releasable in normal operation with 15-lb. maximum operating force per UBC Standard 10-4, and with 32 lb. maximum pressure under 250-lb. load to the door.

8. Exterior doors scheduled with XP-series devices: Static load force resistance of at least 2000 pounds.
9. Flush end cap design as opposed to typical "bottle-cap" design end cap.
10. Comply with IBC Section 1010.1.10.

B. Specific features:

1. Non-Fire Rated Devices: cylinder dogging.
2. Lever Trim: breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
4. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
5. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
6. Battery alarm 99 ALK RX.

2.06 CLOSERS

A. Surface Closers:

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors.
7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
10. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
11. Non-flaming fluid, will not fuel door or floor covering fires.
12. Pressure Relief Valves (PRV) not permitted.

2.07 OTHER HARDWARE

- A. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

- B. Door Stops: Provide stops to protect walls, casework or other hardware.
1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
 2. Locate overhead stops for maximum possible opening. Consult with City for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- C. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.
1. Proposed substitutions: submit for approval.
 2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
 3. Non-corroding fasteners at in-swinging exterior doors.
 4. Sound control openings: Use components tested as a system using nationally accepted standards by independent laboratories. Ensure that the door leafs have the necessary sealed-in-place STC ratings. Fasten applied seals over bead of sealant.
 5. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
 6. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / UBC Standard 7-2. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required
- D. Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
- E. Thresholds: As scheduled and per details. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
1. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
 2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA

253. Use threshold unit as scheduled. If none scheduled, request direction from Construction Manager.
3. Fire-rated openings, 3hour duration: Thresholds, where scheduled, to extend full jamb depth.
 4. Acoustic openings: Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
 5. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
 6. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- F. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.
- G. Floor-mounted electromagnetic door holders: LCN's SEM series or approved equivalent. Incorporate into U.L. listed fire & life-safety system, doors release to allow closure and latching when door's zone is in alarm state. Use minimum projection required to allow door to open as widely as allowed by wall conditions and projection of door hardware. Rated IP 65.

2.08 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.

2.09 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.28; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

2.10 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.11 FINISHES

- A. Provide finishes complying with BHMA A156.18 , 626 Satin Chromium, except for push/pull and protection plates shall be 630 satin stainless steel. Provide similar finishes where 626 is not available.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

3.03 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations. Steel Doors and Frames: ANSI/SDI A250.8.
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period. Replace construction cores with permanent cores as directed by State. Preferred cores are Russwin.
- F. Key Control System:
 - 1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
 - 2. Key Lock Boxes: Install where indicated or approved by Architect to provide controlled access for fire and medical emergency personnel.
 - 3. Key Control System Software: Set up multiple-index system based on final keying schedule.

- G. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07920 "Joint Sealants."
- I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Do not notch perimeter gasketing to install other surface-applied hardware.
- K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.05 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
 - 2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
 - 3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.06 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.07 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for State's continued adjustment, maintenance, and removal and replacement of door hardware.

3.08 DEMONSTRATION

- A. Train State's maintenance personnel to adjust, operate, and maintain door hardware.

3.09 DOOR HARDWARE SCHEDULE

- A. See door schedule in drawings for hardware set assignments.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08710.1	Door Hardware	Lump Sum
08710.2	Door Hardware Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes:
 - 1. Glass for curtainwall and storefront windows, doors, and interior borrowed lites.
 - 2. Glazing sealants and accessories.

1.03 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.04 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.

- C. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
 - 1. Tinted glass.
 - 2. Coated glass.
 - 3. Laminated glass.
 - 4. Insulating glass.
- D. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- F. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- G. Qualification Data: For manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- H. Product Certificates: For glass. Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
- I. Product Test Reports: For coated glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- J. Sample Warranties: For special warranties.
- K. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Install glazing in mockups specified in Section 08442 "Structural Sealant Glazed Curtainwalls" to match glazing systems required for Project, including glazing methods.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.08 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.09 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period.

Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard. Warranty Period: Five years from date of Substantial Completion.

- C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AGC Glass Company North America, Inc.
 - 2. Gardner Glass, Inc.
 - 3. Guardian Glass; SunGuard.
 - 4. Oldcastle BuildingEnvelope.
 - 5. Pilkington North America.
 - 6. Viracon, Inc..
 - 7. Or approved equal.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type. Obtain reflective-coated glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.02 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design Responsibility: Provide structural design of glazing, including all components. Prepare Shop Drawings, design calculations, and other structural data. Engineer licensed in State of Hawaii shall perform engineering analysis, and seal and sign documentation. When required by jurisdiction having authority, submit engineering data and obtain separate permit for Work Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
1. Design Wind Pressures: As indicated on Drawings.
 2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.03 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
 - 1. Minimum Glass Thickness for Exterior Lites: 6 mm.
 - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.04 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Reflective-Coated Vision Glass: ASTM C 1376.

2.05 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.06 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
 - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 - 2. Perimeter Spacer: Manufacturer's standard spacer material and construction Aluminum with black, color anodic finish.
 - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.07 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by State Engineer from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

2.08 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.09 MISCELLANEOUS GLAZING MATERIALS

- ### A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- ### B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- ### C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Presence and functioning of weep systems.
 - 3. Minimum required face and edge clearances.
 - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.03 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.05 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting

dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.06 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.07 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.08 GLASS SCHEDULE

- A. Basis of Design Assemblies: Assembly characteristics are based on products manufactured by Viracon. Subject to compliance with requirements, provide indicated products or comparable products from an approved equal.
- B. Glass Type GL-01 (Vision, Laminated): Glass in doors.
 - 1. Overall Unit Thickness: 1 inch.
 - 2. Laminated Assembly: 2 plies: ¼ inch. Clear, heat-strengthened float glass.
 - 3. Interlayer Thickness: 0.060 inch
- C. Glass Type GL-02 (Vision, Insulated, Laminated): Vision Glass, laminated insulating glass assembly.
 - 1. Overall Unit Thickness: 1 1/8 inch.
 - 2. Outdoor Lite: Thickness: 5/16 inch. Clear, fully tempered.
 - 3. Interspace Width: ½ inch.
 - 4. Interspace Content: Air
 - 5. Indoor Lite: Laminate assembly; 2 plies, Clear, heat-strengthened float glass. Thickness of Each Glass Lite: ¼ inch (6.0mm)
 - 6. Interlayer Thickness: 0.060 inch (1.52 mm).
- D. Glass Type GL-03 (Vision, Insulated, Laminated): Vision Glass, laminated insulating glass assembly. Provide architect's sample Viracon VZE1-42 glazing assembly, or equal, as follows:
 - 1. Overall Unit Thickness: 1-3/8 inch.
 - 2. Outdoor Lite: Thickness: 5/16 inch. Tinted "VE-42 on #2 surface," heat - strengthened float glass.
 - 3. Interspace Width: 1/2 inch.
 - 4. Interspace Content: Argon gas.
 - 5. Indoor Lite: Laminated assembly; 2 plies. Clear, heat-strengthened float glass, tinted VZE-SC on #3 surface. Thickness of Each Glass Lite: ¼ inch (6.0 mm).
 - 6. Interlayer Thickness: 0.060 inch (1.52 mm).
 - 7. Visible Light Transmittance: 32 percent minimum.
 - 8. Winter Nighttime U-Factor: 0.24 maximum.
 - 9. Summer Daytime U-Factor: 0.20 maximum.
 - 10. Solar Heat Gain Coefficient: 0.24 maximum.
 - 11. Shading Coefficient: 0.27.
 - 12. Light to Solar Gain Ratio: 1.33.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08800.1	Glazing	Lump Sum
08800.2	Glazing - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 08911 - FIXED LOUVERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Fixed formed-metal louvers.
 - 2. Blank-off panels for existing louvers at existing security checkpoint
 - 3. Rooftop mechanical equipment screen
- B. Related Requirements:
 - 1. Section 08111 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.
 - 2. Section 09911 "Exterior Painting" for field painting exterior louvers.
 - 3. Section 09912 "Interior Painting" for field painting interior louvers.

1.03 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).
- C. Vertical Louver: Louver with vertical blades (i.e., the axis of the blades are vertical).
- D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing according to AMCA 500-L.

- F. Windborne-Debris-Impact-Resistant Louver: Louver that provides specified windborne-debris-impact resistance, as determined by testing according to AMCA 540.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- C. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 - 1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
 - 2. Show mullion profiles and locations.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.
- E. Sample Warranties: For manufacturer's special warranties.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M.
 - 2. AWS D1.3/D1.3M.
 - 3. AWS D1.6/D1.6M.

1.06 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.02 PERFORMANCE REQUIREMENTS

- A. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.03 FIXED FORMED-METAL LOUVERS

- A. General: Where louvers are located above hollow metal door and frame assemblies, integrate louver frames as extension of door frames. Match frame material, thickness, and dimensions. Refer to Section 08111 "Hollow Metal Doors and Frames" for requirements.
- B. Horizontal Nondrainable-Blade Louver:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Balance; a division of MESTEK, Inc.
 - b. Airolite Company, LLC (The).
 - c. Construction Specialties, Inc.
 - d. Greenheck Fan Corporation.
 - e. Or approved equal.
 - 2. Louver Depth: 6 inches.
 - 3. Blade Profile: Plain blade without center baffle.
 - 4. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.052 inch.
 - 5. Mullion Type: Fully recessed.
 - 6. Louver Performance Ratings:

- a. Free Area: Not less than 6.5 sq. ft. for 48-inch-wide by 48-inch-high louver.
- b. Point of Beginning Water Penetration: Not less than 550 fpm.
- c. Air Performance: Not more than 0.10-inch wg static pressure drop at 550-fpm free-area velocity.

2.04 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Bird screening.
- B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same type and form of metal as indicated for louver to which screens are attached.
 - 2. Finish: Mill finish unless otherwise indicated.
 - 3. Type: Rewirable frames with a driven spline or insert.
- D. Louver Screening for Galvanized-Steel Louvers: Bird Screening: Galvanized steel, 1/2-inch-square mesh, 0.041-inch wire.

2.05 BLANK-OFF PANELS (AT EXISTING LOUVER IN EXISTING SSCP)

- A. Uninsulated Blank-Off Panels: Metal sheet attached to outside of louver.
 - 1. Galvanized-steel sheet for galvanized-steel louvers, not less than 0.052-inch nominal thickness; OR
 - 2. Aluminum sheet for aluminum louvers.
 - 3. Panel Finish: Same finish applied to existing louvers (match dark bronze color).
 - 4. Attach blank-off panels with sheet metal screws.

2.06 ROOFTOP MECHANICAL EQUIPMENT SCREENS

- A. Horizontal Nondrainable-Blade Louver:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Basis of Design: Construction Specialties, Inc. Vert-a-cade model VAC-301
 - b. Air Balance; a division of MESTEK, Inc.
 - c. Airolite Company, LLC (The).
 - d. Greenheck Fan Corporation.
 - e. Or approved equal.
- 2. Louver Depth: 4 inches.
 - 3. Blade Profile: Plain blade.
 - 4. Frame and Blade Material and Nominal Thickness: Galvanized-steel sheet, not less than 0.052 inch.
 - 5. Mullion Type: Fully recessed.

2.07 MATERIALS

- A. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 zinc coating, mill phosphatized.
- B. Fasteners: Use types and sizes to suit unit installation conditions.
 - 1. Use Phillips flat-head tamper-resistant screws for exposed fasteners unless otherwise indicated.
 - 2. For fastening galvanized steel, use hot-dip-galvanized-steel or 300 series stainless-steel fasteners.
- C. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless-steel components, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing according to ASTM E 488/E 488M conducted by a qualified testing agency.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.08 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
 - 1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.

2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.
- C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
 - D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints. Frame Type: Channel unless otherwise indicated.
 - E. Include supports, anchorages, and accessories required for complete assembly.
 - F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.
 1. Fully Recessed Mullions: Where indicated, provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.
 2. Exterior Corners: Prefabricated corner units with mitered and welded blades and with fully recessed mullions at corners.
 - G. Provide subsills made of same material as louvers or extended sills for recessed louvers.
 - H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.09 GALVANIZED-STEEL SHEET FINISHES

- A. Finish louvers after assembly.
- B. Surface Preparation: Clean surfaces with nonpetroleum solvent, so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and repair according to ASTM A 780/A 780M.
- C. Finish: Comply with the following:
 1. Where frame and louver are an extension of door frames, match finish type and color of adjacent door frames.
 2. Where louver assemblies are not extension of door frames, provide finish type indicated below.

- D. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 2 mils. Color and Gloss: Custom color to match adjacent wall color at wall louver. Color to match Dark Bronze at Blank-off panels on existing louver. Custom color to match green roof color at rooftop mechanical screen.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.03 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07920 "Joint Sealants" for sealants applied during louver installation.

3.04 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
08911.1	Fixed Louvers	Lump Sum
08911.2	Fixed Louvers - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09221 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for ceilings and soffits.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Product Certificates: For each type of code-compliance certification for studs and tracks.
- D. Evaluation Reports: For post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Horizontal Deflection: For wall assemblies, limited to 1/360 of the wall height based on horizontal loading of 5 lbf/sq. ft..

2.02 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Steel Studs and Tracks:
 - 1. Minimum Base-Metal Thickness: As indicated on Drawings.
 - 2. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:
 - 1. Single Long-Leg Track System: ASTM C 645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 - 2. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated. Minimum Base-Metal Thickness: 0.0329 inch.
- E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: 1-1/2 inches.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.0179 inch.
 - 2. Depth: As indicated on Drawings 7/8 inch.
- G. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission. Configuration: Asymmetrical.

- H. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
 - 1. Depth: 1-1/2 inch.
 - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

2.03 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, AC193, AC58, or AC308 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 - c. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
 - 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges. Depth: 1-1/2 inches.
- F. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
 - 2. Steel Studs and Tracks: ASTM C 645.

- a. Minimum Base-Metal Thickness:] 0.0296 inch.
- b. Depth: As indicated on Drawings.
- 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep. Minimum Base-Metal Thickness: 0.0296 inch.
- 4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.04 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.03 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.04 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
 - 2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring: Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 07210 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.05 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Hangers: 48 inches o.c.
 2. Carrying Channels (Main Runners): 48 inches o.c.
 3. Furring Channels (Furring Members): 16 inches o.c. (gypsum board ceiling)
 4. Furring Channels (Furring Members): 12 inches o.c. (cement plaster ceiling)
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09221.1	Non-Structural Metal Framing	Lump Sum
09221.2	Non-Structural Metal Framing - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 09240 - CEMENT PLASTERING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Exterior vertical plasterwork (stucco).

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- D. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, 12 by 12 inches, and prepared on rigid backing.
- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories. Size: 100 sq. ft. in surface area.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.06 FIELD CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 2. Apply plaster when ambient temperature is greater than 40 deg F.
 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E 119 by a qualified testing agency.

2.02 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating. Diamond-Mesh Lath: Self-furring,] 3.4 lb/sq. yd..
- B. Paper Backing: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable paper. Provide 2 separate layers, lapped, at exterior locations where portland cement plaster is applied over sheathing Provide paper-backed lath in locations indicated on Drawings.

2.03 ACCESSORIES

- A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Metal Accessories:
1. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
 2. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.
 3. External- (Outside-) Corner Reinforcement: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.
 4. Cornerbeads: Fabricated from zinc-coated (galvanized) steel. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
 5. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
 6. Control Joints: Fabricated from aluminum, Fry-Reglet Channel Screed / Control Joint; clear anodized aluminum, or equal..
 7. Expansion Joints: Fabricated from aluminum, Fry-Reglet two-piece Channel Screed / Expansion Joint; clear anodized aluminum, or equal
 8. Two-Piece Expansion Joints: Fabricated from zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.
 9. Fascia Drip Screed Edge: Fabricated from aluminum; Fry-Reglet DS 875-875, clear anodized aluminum, or equal.
- C. Opening Flashing: Comply with the following:
1. Basis of Design Product: Grace Construction Products (GCP) Perm-A-Barrier Wall Flashing, or approved equal.
 2. Material: Manufacturer's standard self-adhered flashing comprising two waterproofing materials, rubberized asphalt and cross-laminated polyethylene. Minimum system thickness: 40 mils.
 3. Location: Provide at perimeter of window, door, and similar openings in exterior walls.
- D. Penetration Flashing: Comply with the following:
1. Basis of Design Product: Flashing panels manufactured by Quickflash Weatherproofing Products, or approved equal.
 2. Material: Manufacturer's standard one-piece product consisting of combination of high-density polyethylene (HDPE) and low-density polyethylene (LDPE).
 3. Location: Provide at mechanical, electrical, and similar penetrations in exterior walls.

2.04 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster.
- C. Bonding Compound: ASTM C 932.
- D. Fasteners for Attaching Metal Lath to Substrates: ASTM C 1063.
- E. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.
- F. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

2.05 PLASTER MATERIALS – CP-01 & CP-02

- A. Portland Cement: ASTM C 150/C 150M, Type I.
- B. Sand Aggregate: ASTM C 897.
- C. Acrylic-Based Finish Coatings: Factory-mixed acrylic-emulsion coating systems formulated with colorfast mineral pigments and fine aggregates; for use over cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. California Stucco Products Corp.; Texture Flex.
 - 2. Dryvit Systems, Inc.; Dryvit TAFS.
 - 3. LaHabra, a brand of ParexLaHabra, Inc.; Acrylic Finish.
 - 4. Parex, Inc., a brand of ParexLaHabra, Inc.; e-lastic.
 - 5. Sto Corp.; Powerwall Finish.
- D. Color: Match paint color indicated on Drawings.

2.06 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.

- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows: Portland Cement Mixes:
 - 1. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - 2. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Base-Coat Mixes for Use over Unit Masonry: Single base (scratch) coat for two-coat plasterwork on high-absorption plaster bases as follows: Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
- D. Factory-Prepared Finish-Coat Mixes: For acrylic-based finish coatings, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.03 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.

3.04 INSTALLING PAPER BACKING

- A. General: Cover sheathing with paper backing as follows:
 - 1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
 - 2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap, unless otherwise indicated.
- B. Paper Backing: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails. Install paper backing over sheathing substrate separate from metal lath. Apply first layer with joints lapped. Apply second layer with joints lapped and staggered from first layer.

3.05 INSTALLING FLEXIBLE AND PENETRATION FLASHING

- A. Apply flexible and penetration flashing around openings, storefront and window systems, penetrations, control joints, tops of walls, and similar, and where indicated complying with manufacturers written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.
 - 2. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
 - 3. Lap flashing over weather-resistant paper backing at bottom and sides of openings.
 - 4. Lap weather-resistant paper backing over flashing at heads of openings.
 - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.06 INSTALLING METAL LATH

- A. Metal Lath: Install according to ASTM C 1063.
 - 1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.
 - 2. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.07 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Reinforcement for External (Outside) Corners:
 - 1. Install lath-type, external-corner reinforcement at exterior locations.
 - 2. Install cornerbead at interior locations.

- C. Control Joints: Locate as approved by Architect for visual effect and as follows:
1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft..
 - b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft..
 2. At distances between control joints of not greater than 18 feet o.c.
 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
 4. Where control joints occur in surface of construction directly behind plaster.
 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.08 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on unit masonry substrates for direct application of plaster.
- C. Walls; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch total thickness, as follows: Portland cement mixes.
- D. Acrylic-Based Finish Coatings: Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.
- E. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.

3.09 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.10 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09240.1	Cement Plastering	Lump Sum
09240.2	Cement Plastering - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 09290 - GYPSUM BOARD

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Interior gypsum board.
- B. Related Requirements:
 - 1. Section 09221 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
 - 2. Section 09301 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Samples: For the following products: Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.05 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install 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 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.02 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.03 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. PABCO Gypsum.
 - e. USG Corporation.

- f. Or approved equal.
 - 2. Thickness: 5/8 inch.
 - 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
- 1. Thickness: 1/2 inch.
 - 2. Long Edges: Tapered.
- C. Gypsum Shaftliner: ASTM C 1396/C 1396M.
- 1. Thickness: 1" inch.

2.04 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
- 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. Expansion (control) joint.
 - 3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.

2.05 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
- 1. Interior Gypsum Board: Paper.
 - 2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
- C. Joint Compound for Interior Gypsum Board: 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 drying-type, all-purpose compound.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

2.06 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- D. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- E. Thermal Insulation: As specified in Section 07210 "Thermal Insulation."

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 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.

- 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. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:

SOUTH TSA CHECKPOINT
 KAHULUI AIRPORT
 STATE PROJECT NO. AM1095-10
 AIP PROJECT NO. 3-15-0006-##

Gypsum Board
 09290-5

1. Type X: Typical.
 2. Ceiling Type: Ceiling surfaces.
- B. 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. At 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.
- C. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.04 INSTALLING 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 C 840 and in specific locations approved by State 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.

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, rounded or beveled edges, 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 C 840:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated. Primer and its application to surfaces are specified in Section 09912 "Interior Painting."
 3. Level 5: At walls and ceilings scheduled to receive paint finish. Primer and its application to surfaces are specified in Section 09912 "Interior Painting."

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

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09290.1	Gypsum Board	Lump Sum
09290.2	Gypsum Board - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 09291-ACOUSTIC ISOLATION PADS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes installation of acoustic isolation pads over penetrations and junction boxes within all partitions containing sound insulation, including but not limited to, demising partitions, corridor partitions, walls adjacent to stairwells, shafts, and similar conditions.

1.03 SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 PRODUCT

- A. Basis of Design Product: Subject to compliance with requirements, provide Lowry & Associates “Lowry’s Electrical Box Pads,” or approved equal. Comply with the following
 1. Material Composition
 - a. Polybutene - butyl, inert fillers
 - b. Shall not contain asbestos.
 2. Shelf Life - 1 year
 3. Service Temperature – 30 deg. to 200 deg. F.
 4. Adhesion - adheres readily to metal or plastic.
 5. Minimum Thickness - 1/8 inch.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates for compliance with requirements and other conditions affecting performance.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's written recommendations. Secure pads with positive attachment to prevent dislodgment.
- B. Brush or wipe construction dust and dirt from box surface. If surface is contaminated with oil, etc., wipe with xylene or toluene to remove residue.
- C. Center electrical box pad on the back of the junction box. Mold around conduit and cable entering the box. Mold cover around box sides covering all openings.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09291	Acoustic Isolation Pads	Lump Sum

END OF SECTION

SECTION 09301 - CERAMIC TILING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Porcelain tile.
 - 2. Tile backing panels.
- B. Related Requirements: Section 07920 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.03 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

- D. Samples for Verification:
1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 36 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
 3. Full-size units of each type of trim and accessory for each color and finish required.
 4. Stone thresholds in 6-inch lengths.
 5. Metal edge strips in 6-inch lengths.
- E. Qualification Data: For Installer.
- F. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- G. Product Certificates: For each type of product.
- H. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.
- I. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
- J. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockup of each type of wall tile installation.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type from single source or producer.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

2.02 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.03 TILE PRODUCTS – (CT-01, CT-02, and CT-03)

- A. Ceramic Tile Products: Subject to compliance with requirements, provide ceramic tile products indicated in “Finish Legend” on Drawings, or approved equal. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes selected from manufacturer's standard shapes:

2.04 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints. Thickness: 5/8 inch. Use rated Type 'X' panels where shown on rated walls.

2.05 SETTING MATERIALS

- A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - 1. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
 - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

2.06 GROUT MATERIALS

- A. High-Performance Tile Grout: ANSI A118.7.
 - 1. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.07 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for specific applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.08 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.03 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage: Tile floors in wet areas.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with 1/8-inch joint widths:
- H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated, and at intersections with adjoining surfaces/materials. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

3.04 TILE BACKING PANEL INSTALLATION

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.05 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.06 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

- B. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.07 CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Wall Installations, Metal Studs or Furring: Ceramic Tile Installation, Thinset: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units.
 - 1. Thinset Mortar: Improved modified dry-set mortar.
 - 2. Grout: High-performance unsanded grout.
- B. Exterior Wall Installations, Metal Studs or Furring: Ceramic Tile Installation, Thinset: TCNA W244C ; thinset mortar on wall render over gypsum sheathing (sheathing by Division 06)
 - 1. Thinset Mortar: Improved modified dry-set mortar.
 - 2. Grout: High-performance unsanded grout.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09301	Ceramic Tiling	Lump Sum

END OF SECTION

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- D. Delegated-Design Submittal: For seismic restraints for ceiling systems. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer, licensed in the State of Hawaii, 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. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
- 7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
 - 8. Minimum Drawing Scale: 1/4 inch = 1 foot.
- F. Qualification Data: For testing agency.
 - G. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
 - H. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
 - I. Field quality-control reports.
 - J. Maintenance Data: For finishes to include in maintenance manuals.
 - K. 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.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.
 - L. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, 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.

1.05 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 from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, licensed in the State of Hawaii, 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 and 2018 IBC.
- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E 1264.
 - 2. Smoke-Developed Index: 50 or less.
- D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Indicate design designations from UL or from the listings of another qualified testing agency.

2.03 ACOUSTICAL PANELS (ACT-01)

- A. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- B. Acoustical Panels ACT-01: Comply with the following:
 - 1. Composition: Mineral Fiber.
 - 2. ASTM E 1264, Type XIII, Form 2, pattern E.
 - 3. Class: A, flame speed 25 or under.

4. Light reflectance (LR): Not less than 0.85
 5. Noise Reduction Coefficient (NRC): Not less than 0.80
 6. Ceiling Attenuation Class (CAC): Not less than 35
 7. Articulation Class (AC): Not less than 170.
 8. Size: As indicated on the Drawings.
 9. Thickness: As indicated on the Drawings.
 10. Edge/Joint Detail: Tegular
 11. Color: White
 12. Surface Texture: Fine.
 13. Pattern: E (lightly textured) .
- C. Available Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Armstrong World Industries, Inc. "Ultima" (Basis of Design)
 2. American Gypsum.
 3. CertainTeed Corporation.
 4. USG Corporation.
 5. Or approved equal.
- D. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.04 METAL SUSPENSION SYSTEM

- A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 3. Face Design: Flat, flush.
 4. Cap Material: Cold-rolled steel.
 5. Cap Finish: Painted white.

2.05 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, 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 A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- F. Hold-Down Clips: Manufacturer's standard hold-down.
- G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- H. 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. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.

2.07 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 07921 "Acoustical 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 C 636/C 636M, seismic design requirements, and manufacturer's written instructions. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- 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. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. 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.
4. 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.
 5. 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.
 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. 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.
 8. 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. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
3. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
4. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

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 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections: Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7 and 2018 IBC.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
 1. Within each test area, testing agency select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and test them for 200 lbf of tension; it also select one of every two postinstalled anchors used to attach bracing wires to concrete and test them for 440 lbf of tension.
 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.06 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

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09511	Acoustical Panel Ceilings	Lump Sum

END OF SECTION

SECTION 09542 - LINEAR METAL CEILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

Section includes strip, linear metal pans and suspension systems for ceilings.

1.03 COORDINATION

Coordinate layout and installation of linear metal pans and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Product Data: For each type of product.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below:
 - 1. Linear Metal Pan: Set of 12-inch-long Samples of each type and color and a 12-inch-long spliced section.
 - 2. Suspension System Members: 12-inch-long Sample of each type.
 - 3. Exposed Molding and Trim: Set of 12-inch-long Samples of each type, finish, and color.
 - 4. Filler Strips: Set of 12-inch-long Samples of each type, finish, and color.
 - 5. Sound Absorber: 12 inches long.
 - 6. End Cap: Full size.
- D. Delegated-Design Submittal: For design of seismic restraints and attachment devices. 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. Linear pattern.
 2. Joint pattern.
 3. Ceiling suspension members.
 4. Method of attaching hangers to building structure.
 5. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
 6. Ceiling perimeter and penetrations through ceiling; trim and moldings.
 7. Access panels size and locations
 8. Minimum Drawing Scale: 1/8 inch = 1 foot.
- F. Qualification Data: For testing agency.
- G. Product Test Reports: For each linear metal ceiling, for tests performed by a qualified testing agency.
- H. Evaluation Reports: For linear metal ceiling and components and anchor and fastener type.
- I. Maintenance Data: For finishes to include in maintenance manuals.
- J. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals:
- K. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Linear Metal Ceiling Components: Quantity of each pan, carrier, accessory, and exposed molding and trim equal to 2 percent of quantity installed.

1.05 QUALITY ASSURANCE

Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver linear metal pans, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture,

humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Handle linear metal pans, suspension system components, and accessories carefully to avoid damaging units and finishes in any way.

1.07 PROJECT CONDITIONS

Environmental Limitations: Do not install linear metal 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 PERFORMANCE REQUIREMENTS

- A. **Delegated Design Responsibility:** Provide structural design of complete system, including all components. Prepare Shop Drawings, design calculations, and other structural data. Engineer licensed in State of Hawaii shall perform engineering analysis, and seal and sign documentation. When required by jurisdiction having authority, submit engineering data and obtain separate permit for Work
- B. **Structural Performance:** Exterior linear metal ceilings shall withstand exterior exposure and the effects of gravity loads and the following loads and stresses without showing permanent deformation of ceiling system components including pans and suspension system; noise or metal fatigue caused by vibration, deflection, and displacement of ceiling pans; or permanent damage to fasteners and anchors:
 - 1. **Wind Load:** Uniform pressure as indicated on Drawings, acting inward or outward.
 - 2. **Seismic Criteria:** Provide linear metal ceilings designed and installed to withstand the effects of earthquake motions according to the following:
 - a. **Standard for Ceiling Suspension Systems Requiring Seismic Restraint:** Comply with ASTM E 580/E 580M.
 - b. **ASCE/SEI 7, "Minimum Design Loads for Buildings and Other Structures":** Section 9, "Earthquake Loads."
 - c. **2018 IBC.**
- C. **Thermal Movements:** Allow for thermal movements from ambient and surface temperature changes. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

- D. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 50 or less.

2.02 LINEAR METAL CEILING PANS

- A. Acoustical Metal Pan Standard: Provide manufacturer's standard perforated and microperforated linear metal pans of configuration indicated that comply with ASTM E 1264 classifications as designated by types, acoustical ratings, and light reflectances unless otherwise indicated.
- B. Basis of Design Product: Subject to compliance with requirements, provide Certainteed "Multi-Box Continuous Series" linear metal ceiling product indicated as "LMC-01" and "LMC-02" in "Finish Legend" on Drawings, or comparable product from one of the available manufacturers.
- C. Available Manufacturers: Subject to compliance with requirements, product from one of the following manufacturers is acceptable:
 - 1. Certainteed "Multi-Box Continuous Series" (Basis of Design)
 - 2. USG.
 - 3. Rockfon
 - 4. Or approved equal.
- D. Sheet Metal Characteristics: For metal components exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, roughness, stains, or discolorations. Steel Sheet: Commercial-quality, cold-rolled, carbon-steel sheet; stretcher leveled; with protective coating complying with ASTM C 635/C 635M. Painted Finishes: Electrolytic zinc-coated steel complying with ASTM A 879/A 879M, 04Z coating; surface treatment as recommended by finish manufacturer for type of use and finish indicated.
- E. Pan Fabrication: Manufacturer's standard units of size, profile, and edge treatment indicated, formed from metal indicated to snap on and be securely retained on carriers without separate fasteners, and finished to comply with requirements indicated.
- F. Pan Splices: Construction same as pans, in lengths 8 to 12 inches; with manufacturer's standard finish.
- G. End Caps: Metal matching pans; fabricated to fit and conceal exposed ends of pans.

- H. Filler Strips: Metal matching pans; fabricated to uninterruptedly close voids between pans.
- I. Moldings and Trim: Provide manufacturer's standard moldings and trim for exposed members, and as indicated or required, for edges and penetrations of ceiling, around fixtures, at changes in ceiling height, and for other conditions; of same metal and finish as linear metal ceiling pans.
- J. Color: See Finish Legend on Drawings.

2.03 METAL SUSPENSION SYSTEMS

- A. Metal Suspension Systems Standard: Provide ceiling manufacturer's standard metal suspension systems of types and finishes indicated that comply with applicable ASTM C 635/C 635M requirements.
- B. Suspension Systems: Provide systems complete with carriers, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, fixture adapters, and other suspension components required to support ceiling units and other ceiling-supported construction.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, Direct Hung, unless otherwise indicated.
- D. Wire Hangers, Braces, and Ties: Provide wire complying with the following requirements:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at 3 times the hanger design load indicated in ASTM C 635/C 635M, Table 1, Direct Hung is less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.
- E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed from 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- G. Carriers: Factory finished with matte-black baked finish. Main Carriers: Steel, not less than 0.0209-inch nominal thickness, cold-rolled sheet, with factory-applied protective coating, complying with ASTM C 635/C 635M. Electrolytic Zinc-Coated Steel: ASTM A 879/A 879M, not less than 08Z zinc coating.
- H. Carrier Splices: Same metal, profile, and finish as for carriers.
- I. Stabilizer Channels, Tees, and Bars: Manufacturer's standard components for stabilizing main carriers at regular intervals and at light fixtures, air-distribution equipment, access doors, and other equipment; spaced as standard with

manufacturer for use indicated; and factory finished with matte-black baked finish.

- J. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- K. Exterior Bracing: Cold-rolled steel channels and angles, hot-dip galvanized to comply with ASTM A 653/A 653M, G60 coating designation; size and profile as required to withstand wind load.
- L. Hold-Down Clips: Manufacturer's standard hold-down clips spaced as standard with manufacturer.
- M. Edge Moldings and Trim: Provide exposed members as indicated or required to comply with seismic requirements of authorities having jurisdiction, to conceal edges of penetrations through ceiling, to conceal ends of pans and carriers, for fixture trim and adapters, for fasciae at changes in ceiling height, and for other conditions; of metal and finish matching linear metal pans or extruded plastic unless otherwise indicated.

2.04 STEEL PANS AND SUSPENSION SYSTEM FOR LINEAR METAL CEILING

- A. Classification: Units complying with ASTM E 1264 for Type XX, other types described as perforated steel strips with sound-absorbent fabric backing.
- B. Pan Thickness: Not less than 0.024 inch.
- C. Pan Edge Detail: Square.
- D. Linear Module Width and Pan Face Width: As indicated on Drawings.
- E. Pan Depth: 5/8 inch deep.
- F. Pan Face Finish: Painted to match scheduled color.
- G. End Cap, Finish of Exposed Portions: To match pan.
- H. Filler Strip Design: Recessed.
- I. Suspension-System Main-Carrier Material: Electrolytic zinc-coated steel.

2.05 ACCESSORIES

Access Panels: For access at locations required, provide door hinge assembly, retainer clip, and retainer bar, assembled with ceiling panels and carrier sections into access doors of required size, permitting upward or downward opening. Contractor shall coordinate access panels at all equipment and devices needing access.

2.06 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

2.07 STEEL SHEET FINISHES

Electroplated Finish: Electroplating process complying with finish manufacturer's written instructions for surface preparation, pretreatment, process, and minimum thickness to produce a coating uniform in appearance and free of blisters, pits, roughness, nodules, burning, cracks, unplated areas, and other visible defects.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which linear metal 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 linear metal ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

Measure each ceiling area and establish layout of linear metal pans to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width pans at borders, and comply with layout shown on reflected ceiling plans and on Coordination Drawings.

3.03 INSTALLATION

- A. Comply with ASTM C 636/C 636M and seismic requirement indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

- 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. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. 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.
 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate to which hangers are attached and for type of hanger involved.
 5. 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 structure to which hangers are attached and type of hanger involved. Install hangers in a manner that does not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. 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.
 8. Do not attach hangers to steel deck tabs.
 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 10. 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.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- 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 but without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.

- D. Install edge moldings and trim of type indicated at perimeter of linear metal ceiling area and where necessary to conceal edges and ends of linear metal pans.
 - 1. Screw attach moldings to substrate at intervals not more than 16 inches O.C. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system carriers so they are aligned and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Cut linear metal pans for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
- G. Install linear metal pans in coordination with suspension system and exposed moldings and trim.
 - 1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.
 - 2. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.
 - 3. Install pans with butt joints using internal pan splices.
 - 4. Where metal pan ends are visible, install end caps unless trim is indicated.
 - 5. Install filler strips where indicated.
- H. Install hold-down clips where indicated.

3.04 CLEANING

Clean exposed surfaces of linear metal ceilings, including trim and edge moldings after removing strippable, temporary protective covering if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09542	Linear Metal Ceilings	Lump Sum

END OF SECTION

SECTION 09651 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Thermoplastic-rubber base.
 - 2. Rubber molding accessories.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.
- D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.
- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.
- F. 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. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.05 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.01 THERMOPLASTIC-RUBBER BASE (RB-01)

- A. Basis of Design Product: Subject to compliance with requirements, provide products indicated in "Finish Legend" on Drawings, or approved equal.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
 - 1. Group: I (solid, homogeneous).
 - 2. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient floor coverings.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed.

- G. Inside Corners: Job formed.
- H. Colors: As scheduled.

2.02 RUBBER MOLDING ACCESSORY

- A. Description: Rubber joiner for transition strips.
- B. Locations: Provide rubber molding accessories at locations indicated.
- C. Colors and Patterns: As selected from manufacturer's full color range.

2.03 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of resilient products indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.03 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length. Cope corners to minimize open joints.

3.04 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.

- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.05 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 1. Remove adhesive and other blemishes from surfaces.
 2. Sweep and vacuum horizontal surfaces thoroughly.
 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09651	Resilient Base and Accessories	Lump Sum

END OF SECTION

SECTION 09653 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

Section Includes:

1. Rubber flooring
2. Rubber stair treads and risers

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 – SUBMITTALS.
- B. Product Data: For each type of product.
- C. Shop Drawings: For each type of resilient floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
- D. Product Schedule: For floor tile. Use same designations indicated on Drawings.
- E. Qualification Data: For Installer.
- F. Maintenance Data: For each type of floor tile to include in maintenance manuals.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.
- H. 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. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.04 QUALITY ASSURANCE

Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation

and seaming method indicated. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.05 DELIVERY, STORAGE, AND HANDLING

Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.02 RUBBER FLOORING TILE

- A. Basis of Design Product: Subject to compliance with requirements, provide Burke product indicated as RBF-01 in "Finish Legend" on Drawings, or comparable product from an approved equal manufacturers.

- B. Available Manufacturers: Subject to compliance with requirements, comparable product from one of the following is acceptable:
 - 1. Armstrong World Industries.
 - 2. Burke Flooring. (Basis of Design)
 - 3. Flexco Floors.
 - 4. Or approved equal.
- C. Tile Standard: ASTM F 1066, Class 1, solid color.
- D. Wearing Surface: Smooth.
- E. Thickness: 0.125 inch.
- F. Size: 18 by 18 inches.
- G. Colors and Patterns: As indicated in "Finish Legend" on Drawings.
- H. Ground and floor surfaces along accessible routes and in accessible rooms and spaces, including, but not limited to, floors, walks, etc., shall be stable, firm, and slip-resistant in accordance with ADAAG 402.

2.03 RUBBER TREADS AND RISERS

- A. Basis of Design Product: Subject to compliance with requirements, provide Burke product indicated as RBT-01 in "Finish Legend" on Drawings, or comparable product from an approved equal manufacturers.
- B. Available Manufacturers: Subject to compliance with requirements, comparable product from one of the following is acceptable:
 - 1. Armstrong World Industries.
 - 2. Burke Flooring. (Basis of Design)
 - 3. Flexco Floors.
 - 4. Or approved equal.
- C. Location: Provide rubber treads and risers at locations indicated.
- D. Colors and Patterns: As indicated in "Finish Legend" on Drawings.

2.04 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

- B. Adhesives: Two part Epoxy type adhesive recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated. Mannington / Burke BR-721G or approved equal.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.03 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles. Lay tiles with grain running in one direction.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.04 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish. Apply one coat(s).
- E. Cover floor tile until Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09653	Resilient Tile Flooring	Lump Sum

END OF SECTION

SECTION 09681 - TILE CARPETING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes modular carpet tile.
- B. Related Requirements: Section 09651 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- C. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of insets and borders.
 - 9. Type, color, and location of edge, transition, and other accessory strips.
 - 10. Transition details to other flooring materials.
- D. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
- E. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.
- F. Qualification Data: For Installer.
- G. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- H. Sample Warranty: For special warranty.
- I. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
- J. 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. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.
- K. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

1.05 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.06 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 CARPET TILE (CPT-01 & CPT-02)

- A. Basis of Design Product: Subject to compliance with requirements, provide products indicated in "Finish Legend" on Drawings, or approved equal.
- B. Applied Treatments:
 - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows: Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

2.02 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03300 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - 1. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - 2. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - 3. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.03 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns indicated on Drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.04 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 2. Remove yarns that protrude from carpet tile surface.
 3. Vacuum carpet tile using commercial machine with face-beater element.

- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09681	Tile Carpeting	Lump Sum

END OF SECTION

SECTION 09720 - ACOUSTICAL WALL PANELS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes acoustical wall panels and attachment systems for interior walls.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
- C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- D. Maintenance Data: For finishes to include in maintenance manuals.
- E. 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.
 - 1. Acoustical Wall Panels Units: Full-size panels equal to 2 percent of quantity installed.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, 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 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panels 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 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class A according to ASTM E 1264.
 - 2. Smoke-Developed Index: 50 or less.
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Indicate design designations from UL or from the listings of another qualified testing agency.

2.02 ACOUSTICAL PANELS (AP-01)

- A. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- B. Acoustical Panels AP-01: Subject to compliance with requirements, Provide "Invisacoustics, 1212FP" by Armstrong Co., or one of the available manufacturers. Comply with the following:
 - 1. Composition: Mineral Fiber.
 - 2. Class: A, flame spread 25 or under.
 - 3. Noise Reduction Coefficient (NRC): Not less than 0.70
 - 4. Size: 24"X48".
 - 5. Thickness: 3/4".
 - 6. Color: Not Applicable; ready for field painting

- 7. Attachment: Adhesive mounting
- C. Available Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Gypsum.
 - 2. Armstrong World Industries, Inc.
 - 3. CertainTeed Corporation.
 - 4. USG Corporation.
 - 5. Or approved equal.
- D. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.03 ACCESSORIES

- A. Adhesive: Type as recommended by manufacturer.

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 wall 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 manufacturer's written instructions.

3.04 CLEANING

- A. Clean exposed surfaces of acoustical panels. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace 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

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09720	Acoustical Wall Panel	Lump Sum

END OF SECTION

SECTION 09911 - EXTERIOR PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes surface preparation and the application of paint systems the following exterior substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Galvanized metal.
5. Aluminum (not anodized or otherwise coated).
6. Exterior portland cement plaster (stucco).

- B. Related Requirements:

1. Section 09912 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.03 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Include preparation requirements and application instructions.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 3. VOC content.
- E. 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. Paint: 5 percent, but not less than 1 gal. of each material and color applied.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. State Engineer will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: State Engineer will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups. If preliminary color selections are not approved, apply additional mockups of additional colors selected by State Engineer at no added cost to State.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless State Engineer specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.07 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.08 WARRANTY

- A. The Contractor shall warrant that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the Contractor. Such warranty shall continue for a period of two (2) years from the project acceptance date during which period the Contractor shall remedy at his own expense any such failure to conform to any such defect.
- B. The Contractor shall warrant a mildew free surface for a period of one year from the project acceptance date. Should mildew formation occur on surfaces painted under this project within the one year, the Contractor shall clean such surfaces at no additional cost to the State.
- C. Should the Contractor fail to remedy any failure or defect described in Paragraph A. above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure of damage at the Contractor's expense.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Benjamin Moore & Co.
 2. Dunn-Edwards Corporation.
 3. Sherwin-Williams Company .
 4. Vista Paint.
 5. Or Approved Equal.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.02 PAINT, GENERAL (PT-01 – PT-08)

- A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- C. Colors: As indicated in "Finish Legend" on Drawings.

2.03 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: State reserves the right to invoke the following procedure:
1. State will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.

3. State may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Portland Cement Plaster: 12 percent.
 4. Gypsum Board: 12 percent.
- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants. Remove

incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer. but not less than the following: SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.03 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to

be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Paint the following work where exposed to view:
 - 1. Equipment, including panelboards.
 - 2. Uninsulated metal piping.
 - 3. Uninsulated plastic piping.
 - 4. Pipe hangers and supports.
 - 5. Metal conduit.
 - 6. Plastic conduit.
 - 7. Tanks that do not have factory-applied final finishes.

3.04 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: State may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.05 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by State Engineer, and leave in an undamaged condition.

- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 EXTERIOR PAINTING SCHEDULE

- A. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Flat.

- 1. Prime Coat:

- a. Benjamin Moore & Co: 023 Fresh Start Primer
- b. Dunn Edwards: UGPR00 Ultra-Grip Premium
- c. Sherwin-Williams Company (The): A24W300 Loxon Primer
- d. Vista Paint: 4600 Uniprime II

- 2. Intermediate Coat:

- a. Benjamin Moore & Co: N105 MooreLife Acrylic Flat
- b. Dunn Edwards: EVSH10 Evershield Flat Exterior
- c. Sherwin-Williams Company (The): K33 Duration Flat
- d. Vista Paint: 2000 Duratone 100% Acrylic Flat

- 3. Finish Coat:

- a. Benjamin Moore & Co: N105 MooreLife Acrylic Flat
- b. Dunn Edwards: EVSH10 Evershield Flat Exterior
- c. Sherwin-Williams Company (The): K33 Duration Flat
- d. Vista Paint: 2000 Duratone 100% Acrylic Flat

- B. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Eggshell.

- 1. Prime Coat:

- a. Benjamin Moore & Co: 023 Fresh Start Primer
- b. Dunn Edwards: UGPR00 Ultra-Grip Premium
- c. Sherwin-Williams Company (The): A24W300 Loxon Primer
- d. Vista Paint: 4600 Uniprime II

- 2. Intermediate Coat:

- a. Benjamin Moore & Co: 631 Aura Satin Exterior
- b. Dunn Edwards: EVSH30 Evershield Eggshell Exterior
- c. Sherwin-Williams Company (The): K334 Duration Satin
- d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic

- 3. Finish Coat:

- a. Benjamin Moore & Co: 631 Aura Satin Exterior

- b. Dunn Edwards: EVSH30 Evershield Eggshell Exterior
 - c. Sherwin-Williams Company (The): K334 Duration Satin
 - d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic
- C. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Semi Gloss.
- 1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. Sherwin-Williams Company (The): A24W300 Loxon Primer
 - d. Vista Paint: 4600 Uniprime II
 - 2. Intermediate Coat:
 - a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): K34 B42 Metalatex Semi GlossDuration Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
 - 3. Finish Coat:
 - a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): K34 Duration GlossB42 Metalatex Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
- D. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Gloss.
- 1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. Sherwin-Williams Company (The): A24W300 Loxon Primer
 - d. Vista Paint: 4600 Uniprime II
 - 2. Intermediate Coat:
 - a. Benjamin Moore & Co: 543 Ben Gloss Exterior
 - b. Dunn Edwards: EVSH50 Evershield Gloss Exterior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic
 - 3. Finish Coat:
 - a. Benjamin Moore & Co: 543 Ben Gloss Exterior

- b. Dunn Edwards: EVSH50 Evershield Gloss Exterior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic
- E. CMU Substrates: 100% Acrylic Flat.
- 1. Prime Coat:
 - a. Benjamin Moore & Co: 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler
 - c. Sherwin-Williams Company (The): B25W25 Block Filler
 - d. Vista Paint: 040 Block Filler
 - 2. Intermediate Coat:
 - a. Benjamin Moore & Co: N105 MooreLife Acrylic Flat
 - b. Dunn Edwards: EVSH10 Evershield Ext Flat
 - c. Sherwin-Williams Company (The): K33 K32 Duration Flat
 - d. Vista Paint: 2000 Duratone 100% Acrylic Flat
 - 3. Finish Coat:
 - a. Benjamin Moore & Co: N105 MooreLife Acrylic Flat
 - b. Dunn Edwards: EVSH10 Evershield Ext Flat
 - c. Sherwin-Williams Company (The): K33 K32 Duration Flat
 - d. Vista Paint: 2000 Duratone 100% Acrylic Flat
- F. CMU Substrates: 100% Acrylic Eggshell.
- 1. Prime Coat:
 - a. Benjamin Moore & Co: 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler
 - c. Sherwin-Williams Company (The): B25W25 Block Filler
 - d. Vista Paint: 040 Block Filler
 - 2. Intermediate Coat:
 - a. Benjamin Moore & Co: 631 Aura Satin Exterior
 - b. Dunn Edwards: EVSH30 Evershield Eggshell Exterior
 - c. Sherwin-Williams Company (The): K334 Duration Satin
 - d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic
 - 3. Finish Coat:
 - a. Benjamin Moore & Co: 631 Aura Satin Exterior
 - b. Dunn Edwards: EVSH30 Evershield Eggshell Exterior
 - c. Sherwin-Williams Company (The): K334 Duration Satin
 - d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic

G. CMU Substrates: 100% Acrylic Semi Gloss.

1. Prime Coat:

- a. Benjamin Moore & Co: 285 Block Filler
- b. Dunn Edwards: SBPR00 Block Filler
- c. Sherwin-Williams Company (The): B25W25 Block Filler
- d. Vista Paint: 040 Block Filler

2. Intermediate Coat:

- a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
- b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
- c. Sherwin-Williams Company (The): B42 Metalatex Semi GlossK34 Duration Gloss
- d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

3. Finish Coat:

- a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
- b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
- c. Sherwin-Williams Company (The): B42 Metalatex Semi GlossK34 Duration Gloss
- d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

H. CMU Substrates: 100% Acrylic Gloss.

1. Prime Coat:

- a. Benjamin Moore & Co: 285 Block Filler
- b. Dunn Edwards: SBPR00 Block Filler
- c. Sherwin-Williams Company (The): B25W25 Block Filler
- d. Vista Paint: 040 Block Filler

2. Intermediate Coat:

- a. Benjamin Moore & Co: 543 Ben Gloss Exterior
- b. Dunn Edwards: EVSH50 Evershield Gloss Exterior
- c. Sherwin-Williams Company (The): A85 Super Paint Gloss
- d. Vista Paint: 8500 Carefree Gloss 100% Acrylic

3. Finish Coat:

- a. Benjamin Moore & Co: 543 Ben Gloss Exterior
- b. Dunn Edwards: EVSH50 Evershield Gloss Exterior
- c. Sherwin-Williams Company (The): A85 Super Paint Gloss
- d. Vista Paint: 8500 Carefree Gloss 100% Acrylic

I. Ferrous Metal Substrate: 100% Acrylic Semi Gloss.

1. Prime Coat:
 - a. Benjamin Moore & Co: M04 Acrylic Prime
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. Sherwin-Williams Company (The): B66W1 DTM Acrylic Primer
 - d. Vista Paint: 9600 Protec Primer

 2. Intermediate Coat:
 - a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi GlossK34 Duration Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

 3. Finish Coat:
 - a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi GlossK34 Duration Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
- J. Galvanized and Aluminum Metal Substrates: 100% Acrylic Semi Gloss.
1. Prime Coat:
 - a. Benjamin Moore & Co: M04 Acrylic Prime
 - b. Dunn Edwards: GAPR00 Galv-Alum Premium
 - c. Sherwin-Williams Company (The): B66A50 DTM Bonding Primer
 - d. Vista Paint: 4800 Metal Pro Primer

 2. Intermediate Coat:
 - a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi GlossK34 Duration Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

 3. Finish Coat:
 - a. Benjamin Moore & Co: 096 MoorGlo Semi Gloss
 - b. Dunn Edwards: EVSH40 Evershield Semi Gloss Exterior
 - c. Sherwin-Williams Company (The): B42 Metalatex Semi GlossK34 Duration Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09911.1	Exterior Painting	Lump Sum
09911.2	Exterior Painting - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 09912 - INTERIOR PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete.
 - 2. Concrete masonry units (CMU).
 - 3. Steel.
 - 4. Cast iron.
 - 5. Galvanized metal.
 - 6. Aluminum (not anodized or otherwise coated).
 - 7. Gypsum board.
- B. Related Requirements: Section 09911 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

1.03 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Include preparation requirements and application instructions.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. VOC content.
- E. 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. Paint: 5 percent, but not less than 1 gal. of each material and color applied.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. State Engineer will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: State Engineer will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups. If preliminary color selections are not approved, apply additional mockups of additional colors selected by State Engineer at no added cost to State.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless State Engineer specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.07 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.08 WARRANTY

- A. The Contractor shall warrant that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the Contractor. Such warranty shall continue for a period of two (2) years from the project acceptance date during which period the Contractor shall remedy at his own expense any such failure to conform to any such defect.
- B. The Contractor shall warrant a mildew free surface for a period of one year from the project acceptance date. Should mildew formation occur on surfaces painted under this project within the one year, the Contractor shall clean such surfaces at no additional cost to the State.
- C. Should the Contractor fail to remedy any failure or defect described in Paragraph A. above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure of damage at the Contractor's expense.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Dunn-Edwards Paint Co.
 - 3. Sherwin-Williams Company.
 - 4. Vista Paint Corporation.
 - 5. Or Approved Equal.

- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.02 PAINT, GENERAL (PT-01 – PT-08)

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

- C. Colors: As indicated in "Finish Legend" on Drawings.

2.03 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: State reserves the right to invoke the following procedure:
 - 1. State will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.

3. State may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Gypsum Board: 12 percent.
 4. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants. Remove

incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer. but not less than the following: SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.03 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match

color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in equipment rooms:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory-applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - 2. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by State Engineer.
 - 3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.04 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: State may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor

shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.05 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by State Engineer, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.06 INTERIOR PAINTING SCHEDULE

- A. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Flat
 - 1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: ESPR00 Eff-Stop Premium
 - c. Sherwin-Williams Company (The): A24W8300 Loxon Primer
 - d. Vista Paint: 4600 Uniprime II
 - 2. Intermediate Coat:
 - a. Benjamin Moore & Co: W625 Ben Int. Acrylic Flat
 - b. Dunn Edwards: SPMA10 Suprema Int Flat
 - c. Sherwin-Williams Company (The): A96 Duration Flat
 - d. Vista Paint: 8100/6100 Carefree Acrylic Flat
 - 3. Finish Coat:
 - a. Benjamin Moore & Co: W625 Ben Int. Acrylic Flat
 - b. Dunn Edwards: SPMA10 Suprema Int Flat
 - c. Sherwin-Williams Company (The): A96 Duration Flat
 - d. Vista Paint: 8100/6100 Carefree Acrylic Flat

B. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Eggshell

1. Prime Coat:

- a. Benjamin Moore & Co: 023 Fresh Start Primer
- b. Dunn Edwards: UGPR00 Ultra-Grip Premium
- c. Sherwin-Williams Company (The): A24W300 Loxon Primer
- d. Vista Paint: 4600 Uniprime II

2. Intermediate Coat:

- a. Benjamin Moore & Co: W626 Ben Acrylic Eggshell
- b. Dunn Edwards: SPMA30 Suprema Eggshell Interior
- c. Sherwin-Williams Company (The): A97 Duration Satin
- d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic

3. Finish Coat:

- a. Benjamin Moore & Co: W626 Ben Acrylic Eggshell
- b. Dunn Edwards: SPMA30 Suprema Eggshell Interior
- c. Sherwin-Williams Company (The): A97 Duration Satin
- d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic

C. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Semi Gloss

1. Prime Coat:

- a. Benjamin Moore & Co: 023 Fresh Start Primer
- b. Dunn Edwards: UGPR00 Ultra-Grip Premium
- c. Sherwin-Williams Company (The): A24W300 Loxon Primer
- d. Vista Paint: 4600 Uniprime II

2. Intermediate Coat:

- a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
- b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
- c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
- d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

3. Finish Coat:

- a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
- b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
- c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
- d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

D. Concrete and Portland Cement Plaster Substrates, Non-traffic Surfaces: 100% Acrylic Gloss

1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. Sherwin-Williams Company (The): A24W300 Loxon Primer
 - d. Vista Paint: 4600 Uniprime II
2. Intermediate Coat:
 - a. Benjamin Moore & Co: NA
 - b. Dunn Edwards: SPMA50 Suprema Gloss Interior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic
3. Finish Coat:
 - a. Benjamin Moore & Co: NA
 - b. Dunn Edwards: SPMA50 Suprema Gloss Interior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic

E. CMU Substrates: 100% Acrylic Flat

1. Prime Coat:
 - a. Benjamin Moore & Co: 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler
 - c. Sherwin-Williams Company (The): B25W25 Block Filler
 - d. Vista Paint: 040 Block Filler
2. Intermediate Coat:
 - a. Benjamin Moore & Co: W625 Ben Int. Acrylic Flat
 - b. Dunn Edwards: SPMA10 Suprema Int Flat
 - c. Sherwin-Williams Company (The): A96 Duration Flat
 - d. Vista Paint: 8100/6100 Carefree Acrylic Flat
3. Finish Coat:
 - a. Benjamin Moore & Co: W625 Ben Int. Acrylic Flat
 - b. Dunn Edwards: SPMA10 Suprema Int Flat
 - c. Sherwin-Williams Company (The): A96 Duration Flat
 - d. Vista Paint: 8100/6100 Carefree Acrylic Flat

F. CMU Substrates: 100% Acrylic Eggshell

1. Prime Coat:
 - a. Benjamin Moore & Co: 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler

- c. Sherwin-Williams Company (The): B25W25 Block Filler
 - d. Vista Paint: 040 Block Filler
2. Intermediate Coat:
- a. Benjamin Moore & Co: W626 Ben Acrylic Eggshell
 - b. Dunn Edwards: SPMA30 Suprema Eggshell Interior
 - c. Sherwin-Williams Company (The): A97 Duration Satin
 - d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic
3. Finish Coat:
- a. Benjamin Moore & Co: W626 Ben Acrylic Eggshell
 - b. Dunn Edwards: SPMA30 Suprema Eggshell Interior
 - c. Sherwin-Williams Company (The): A97 Duration Satin
 - d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic
- G. CMU Substrates: 100% Acrylic Semi Gloss
1. Prime Coat:
- a. Benjamin Moore & Co: 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler
 - c. Sherwin-Williams Company (The): B25W25 Block Filler
 - d. Vista Paint: 040 Block Filler
2. Intermediate Coat:
- a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
3. Finish Coat:
- a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
- H. CMU Substrates: 100% Acrylic Gloss
1. Prime Coat:
- a. Benjamin Moore & Co: 285 Block Filler
 - b. Dunn Edwards: SBPR00 Block Filler
 - c. Sherwin-Williams Company (The): B25W25 Block Filler
 - d. Vista Paint: 040 Block Filler

2. Intermediate Coat:
 - a. Benjamin Moore & Co: NA
 - b. Dunn Edwards: SPMA50 Suprema Gloss Interior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic
 3. Finish Coat:
 - a. Benjamin Moore & Co: NA
 - b. Dunn Edwards: SPMA50 Suprema Gloss Interior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic
- I. Ferrous Metal Substrate: 100% Acrylic Semi Gloss
1. Prime Coat:
 - a. Benjamin Moore & Co: M04 Acrylic Prime
 - b. Dunn Edwards: UGPR00 Ultra-Grip Premium
 - c. Sherwin-Williams Company (The): B66W1 DTM Acrylic Primer
 - d. Vista Paint: 9600 Protec Primer
 2. Intermediate Coat:
 - a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
 3. Finish Coat:
 - a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic
- J. Galvanized and Aluminum Metal Substrates: 100% Acrylic Semi Gloss
1. Prime Coat:
 - a. Benjamin Moore & Co: M04 Acrylic Prime
 - b. Dunn Edwards: GAPR00 Galv-Alum Premium
 - c. Sherwin-Williams Company (The): B66A50 DTM Bonding Primer
 - d. Vista Paint: 4800 Metal Pro Primer

2. Intermediate Coat:
 - a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

3. Finish Coat:
 - a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

- K. Gypsum Wallboard Substrates: 100% Acrylic Flat
 1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: VNPR00 PVA Sealer
 - c. Sherwin-Williams Company (The): B28W08111 Premium Wall & Wood Primer
 - d. Vista Paint: **1100** Hi Build PVA Sealer

 2. Intermediate Coat:
 - a. Benjamin Moore & Co: W625 Ben Int. Acrylic Flat
 - b. Dunn Edwards: SPMA10 Suprema Int Flat
 - c. Sherwin-Williams Company (The): A96 Duration Flat
 - d. Vista Paint: 8100/6100 Carefree Acrylic Flat

 3. Finish Coat:
 - a. Benjamin Moore & Co: W625 Ben Int. Acrylic Flat
 - b. Dunn Edwards: SPMA10 Suprema Int Flat
 - c. Sherwin-Williams Company (The): A96 Duration Flat
 - d. Vista Paint: 8100/6100 Carefree Acrylic Flat

- L. Gypsum Wallboard Substrates: 100% Acrylic Eggshell
 1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: VNPR00 PVA Sealer
 - c. Sherwin-Williams Company (The): B28W08111 Premium Wall & Wood Primer
 - d. Vista Paint: 1100 Hi Build PVA Sealer

2. Intermediate Coat:
 - a. Benjamin Moore & Co: W626 Ben Acrylic Eggshell
 - b. Dunn Edwards: SPMA30 Suprema Eggshell Interior
 - c. Sherwin-Williams Company (The): A97 Duration Satin
 - d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic

3. Finish Coat:
 - a. Benjamin Moore & Co: W626 Ben Acrylic Eggshell
 - b. Dunn Edwards: SPMA30 Suprema Eggshell Interior
 - c. Sherwin-Williams Company (The): A97 Duration Satin
 - d. Vista Paint: 8300 Carefree Eggshell 100% Acrylic

M. Gypsum Wallboard Substrates: 100% Acrylic Semi Gloss

1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: VNPR00 PVA Sealer
 - c. Sherwin-Williams Company (The): B28W08111 Premium Wall & Wood Primer
 - d. Vista Paint: **1100** Hi Build PVA Sealer

2. Intermediate Coat:
 - a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

3. Finish Coat:
 - a. Benjamin Moore & Co: W627 Ben Acrylic Semi Gloss
 - b. Dunn Edwards: SPMA40 Suprema Semi Gloss Interior
 - c. Sherwin-Williams Company (The): A98 Duration Semi Gloss
 - d. Vista Paint: 8400 Carefree Semi Gloss 100% Acrylic

N. Gypsum Wallboard Substrates: 100% Acrylic Gloss

1. Prime Coat:
 - a. Benjamin Moore & Co: 023 Fresh Start Primer
 - b. Dunn Edwards: VNPR00 PVA Sealer
 - c. Sherwin-Williams Company (The): B28W08111 Premium Wall & Wood Primer
 - d. Vista Paint: **1100** Hi Build PVA Sealer

2. Intermediate Coat:
 - a. Benjamin Moore & Co: NA
 - b. Dunn Edwards: SPMA50 Suprema Gloss Interior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic

3. Finish Coat:
 - a. Benjamin Moore & Co: NA
 - b. Dunn Edwards: SPMA50 Suprema Gloss Interior
 - c. Sherwin-Williams Company (The): A85 Super Paint Gloss
 - d. Vista Paint: 8500 Carefree Gloss 100% Acrylic

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09912.1	Interior Painting	Lump Sum
09912.2	Interior Painting - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 09960 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:
 - 1. Exterior steel metal stairs, handrails and guardrails.
- B. Related Sections include the following:
 - 1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
 - 2. Division 09 painting Sections for general field painting.

1.03 DEFINITIONS

- A. Gloss ranges used in this Section include the following:
 - 1. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
 - 2. High gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product indicated.
- C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

- D. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Master Painters Institute (MPI) Standards, Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for preparation and application requirements as supplemental to coating systems manufacturer's written instructions and recommendations.
- B. Mockups: Apply benchmark samples of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. State Engineer will select one surface to represent surfaces and conditions for application of each type of coating and substrate. Provide samples of at least 100 sq. ft.
 - 2. Final approval of color selections will be based on benchmark samples. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by State Engineer at no added cost to State.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.07 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings in rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.01 HIGH-PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. Provide products of same manufacturer for each coat in a coating system.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with limits for VOC content not exceeding maximum permitted by authorities having jurisdiction.

C. Basis of Design Products: Coating systems indicated are products manufactured by Tnemec Company, Inc. Subject to compliance with requirements, provide coating products indicated or comparable products by one of the following, or equal:

1. PPG Amercoat;
2. Carboline Protective Coatings
3. Or Approved Equal.

D. Colors: As indicated in "Finish Legend" on Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for conditions affecting performance of work.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
3. Coating application indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates indicated.

- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated. Clean all welds and damaged organic urethane zinc shop primer.
- D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by coating manufacturer and according to SSPC-SP 11, "Power Tool Clean to Bare Metal."
- E. Galvanized-Metal Substrates: SSPC-SP1 Solvent Clean to Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, mechanically etch surfaces to provide a uniform anchor profile that promote adhesion of subsequently applied coatings.

3.03 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for coating and substrate indicated.
 - 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.04 FIELD QUALITY CONTROL

- A. State reserves the right to invoke the following procedure at any time and as often as State deems necessary during the period when coatings are being applied:
 - 1. State may engage the services of a qualified testing agency to sample coating material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with specified requirements.
 - 3. State may direct Contractor to stop applying coatings if test results show materials being used do not comply with specified requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

3.05 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by State Engineer, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.06 EXTERIOR / INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Steel Substrates: Zinc/Epoxy/Urethane Coating System: Semi-Gloss Acrylic Polyurethane Finish
 - 1. Prime (Spot) Coat: Tnemec 94-H20 Hydro-Zinc @ 2.5-3.5 mils DFT.
 - 2. Intermediate Coat: Tnemec L69 Epoxoline @ 2.0-4.0 mils DFT.
 - 3. Topcoat: Tnemec 1095 Endura-Shield @ 2.0-4.0 mils DFT.
- B. Galvanized-Metal Substrates: Epoxy/Urethane Coating System: Semi-Gloss Acrylic Polyurethane Finish

1. Prime Coat: Tnemec L69 Epoxoline @ 2.0-4.0 mils DFT.
2. Intermediate Coat: Not required
3. Topcoat: Tnemec 1095 Endura-Shield @ 2.0-4.0 mils DFT.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
09960	High-Performance Coatings	Lump Sum

END OF SECTION

DIVISION 10 – SPECIALTIES

SECTION 10260 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Corner guards.
- B. Related Requirements:
 - 1. Section 05500 "Metal Fabrication" for steel angle corner guards and pipe guards.
 - 2. Section 08710 "Door Hardware" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings: For each type of wall and door protection showing locations and extent.
 - 1. Include plans, elevations, sections, and attachment details.
- D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
 - 1. Corner Guards: 12 inches long.

- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
 - 2. Keep plastic materials out of direct sunlight.
 - 3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
 - a. Store corner-guard covers in a vertical position.
 - b. Store wall-guard covers in a horizontal position.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and 2018 IBC.

2.03 CORNER GUARDS

- A. Surface-Mounted, Metal Corner Guards: Fabricated as one piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
 - 1. Material: Stainless-steel sheet, Type 304.
 - a. Finish: Directional satin, No. 4.
 - 2. Wing Size: Nominal 2 by 2 inches.
 - 3. Corner Radius: 1/8 inch.
 - 4. Mounting: Oval head, countersunk screws through factory-drilled mounting holes.

2.04 MATERIALS

- A. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- B. Adhesive: As recommended by protection product manufacturer.

2.05 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.06 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.03 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
 - 3. Adjust end and top caps as required to ensure tight seams.

3.04 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
10260	Wall and Door Protection	Lump Sum

END OF SECTION

SECTION 10440 - SIGNAGE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- B. This project involves construction of an acrylic plaque system with photopolymer face panels; and overhead, backlit aluminum sign boxes with translucent acrylic face. Dynamic digital signage shall also be provided and installed.
- C. Each required sign type is specified by the sign detail drawings. The Contractor shall develop construction details and internal engineering in the shop drawings. Final responsibility for the development and execution of detail drawings rests with the Contractor, who will field verify existing conditions and submit shop drawings with registered Engineer's seal confirming integrity of attachments.
- D. Design Requirements:
 - 1. Signage frame shall be constructed of extruded or die cast aluminum.
 - 2. All welds shall be internal.
 - 3. No external fasteners are to be used except where explicitly directed.
 - 4. All metal surfaces shall be pretreated and finished as noted in the drawings
 - 5. All signage will be capable of wall mounting.

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS
- B. Product Data: Provide to State Engineer information and order numbers for all materials used in fabrication and installation of signs in standard printed published form including performance criteria. Include manufacturer's instructions for applications, construction details, profiles and finishes for each material and type of sign required. Also provide a list of all materials used in the coating system, and all Material Safety Data Sheets. Include cut sheets for dynamic signage.
- C. Shop Drawings: For each type of sign required, provide electronic PDF drawings including dimensions, sections and call-outs of all materials. Drawings to include plans and elevations at sign locations, and small-scale

layouts of all copy applications with indication of colors. Show and indicate all anchorages and accessory items. Drawings are subject to State Engineer's approval prior to fabrication.

- D. Sign Message Layouts: Provide drawings with scaled images of each sign message incorporating all text, and other graphics for review. Drawings are subject to State Engineer's approval prior to fabrication. The State Engineer reserves the right to alter sign messages without allowing additional cost until the final message layouts are approved providing sign sizes are not increased.
- E. Samples: For each type of material and finish specified, Contractor is to provide State Engineer with 4-inch square samples (4 each of all materials/finishes) clearly labeled with COIOF, material number and product order number. Samples are subject to State Engineer's approval prior to fabrication.
- F. Prototype's: For each type of sign required, Contractor is to provide State Engineer with example/sample of sign in actual size of scale version, sufficient to demonstrate product quality and function. Prototypes are subject to State Engineer's approval prior to fabrication.
- G. Warranty Documentation: The contractor shall provide a compiled list of manufacturers' warranties for all components used in this project. In addition, the contractor shall provide complete documentation for the systems covered in this project.
- H. Record Documentation: Record drawings and specifications shall comply with the requirements of Division 01. The Contractor shall maintain a clean, undamaged set of black line prints of both the Contract Drawings and Shop Drawings. The contractor shall mark the set to show the actual installation where the installed work varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing the actual "field" condition fully and accurately. Where Shop Drawings are used for mark-up, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.
- I. Maintenance Material Submittals: Spare Parts: The contractor shall submit to the State Engineer a complete list of Spare Parts that will be provided as part of the maintenance contract.
- J. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 REFERENCES

A. Definitions:

1. Approval: All instances that reference client "Approval" shall only be transferred by means of written documentation listing the components, construction, or procedures that are acceptable.
2. Provide: "Provide" shall mean the supply, installation, demonstration, testing, documentation, and operation of the system or components thereof.
3. Reference Standards:
 - a. American Society for Testing and Materials (ASTM):
 - (1) ASTM B 221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - (2) ASTM B 429, Standard Specification for Aluminum and Aluminum —Alloy Structural Pipe and Tube
 - (3) ASTM D 522, Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings
 - (4) ASTM D 523, Standard Test Method For Specular Gloss
 - (5) ASTM D 2244, Standard Practice for Calculation of Color Tolerances and Color Differences from instrumentally Measured Color Coordinates
 - (6) ASTM D 2794, Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation
 - (7) ASTM D 3359, Standard Test Methods for Measuring Adhesion by Tape Test
 - (8) ASTM D 3363, Standard Test Method for Film Hardness by Pencil Test
 - (9) American National Standards Institute (ANSI): ANSI Z66-1, Paints and Coatings Accessible to Children
 - (10) U.S. Government: Occupational Safety and Health Administration (OSHA)

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. All sign locations and conditions are to be field verified and confirmed with the State Engineer prior to the shop drawing submittal.
2. Coordinate installation of signs with General Contractor as required.
3. Scheduling: Coordinate scheduling of installation of all signs with General Contractor.

1.06 QUALITY ASSURANCE

- A. For each separate type of sign required, obtain signs from one source, from a single manufacturer.
- B. All products are to be handled in accordance with Manufacturer's instructions. All signs are to be warranted by the Sign Contractor for a minimum one (1) year period, covering manufacturing defects and defects in workmanship. Provide warranty documents to the State at shop drawing submittal, for approval prior to manufacturing.
- C. All sign locations and conditions are to be field verified and confirmed with the State Engineer prior to shop drawing submittal.
- D. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery, Storage, and Handling
 - 1. Provisions for direct delivery of system components shall be made for acceptance by the Contractor at the project site. The Contractor shall take such measures as are necessary to ensure that all products are adequately protected from environmental and physical damage during shipment, storage, and installation.
 - 2. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject any damaged, defective or non-conforming items.
 - 3. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction specs.
- B. Storage and Handling Requirements
 - 1. Store delivered materials and finished components in a clean, dry space. Protect materials from dirt, fumes, water, construction debris, and traffic.
 - 2. Handle finished equipment carefully to prevent damage, breakage, denting, and scoring finishes. Do not install damaged components; replace with new equipment and return damaged units to manufacturer.
 - 3. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 - 4. Store products subject to damage by the elements, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by the manufacturer's instructions.

1.08 WARRANTY

Manufacturer Warranty:

1. Manufacturer shall unconditionally warrant materials and workmanship for a period of 5 years from the date of final acceptance of the project by the State.
2. The warranty shall cover, but not be limited to:
 - a. Color fastness against fading or chalking
 - b. Non-yellowing of translucent components
 - c. ssembly, construction and operation
3. Any part found to be defective due to faulty materials and/or workmanship and shall be replaced within 30 days of failure. Manufacturer shall assume all costs involved with the execution of same. Manufacturer shall assume full responsibility for the removal and replacement of all other finishes required to affect such repair and/or replacement.
4. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes wherever exposed to view in the finished unit. Exposed-to-view surfaces which exhibit pitting, seam marks, roller marks, "oil canning", stains, discolorations, or other imperfections on the finished unit will not be acceptable.
- B. Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes: ASTM-B221, Alloy 6061-T6 or 6351-T5, with minimum thicknesses as shown.
- C. Aluminum Sign Face Blanks: ASTM-B209, Alloy 5052-H36, 5052-H38, 5154- H38, or 6061-T6, minimum thickness 0.08-inch or as shown on drawings.
- D. Anchors and Insets: Use non-ferrous metal anchors and inserts as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

- E. Polycarbonate Sheet: Provide "Tuffak XL" (Altuglas International), or approved equal, as noted in drawings, matte finish. Sheets shall be resistant to ultraviolet exposure. Sheets should be cut from a single roll or sheet, multiple panels with visible joints are not to be used.
- F. Paint and Coatings: Acrylic Polyurethane coatings. "Matthews Acrylic Polyurethane" or equal.
- G. Typography: Arial Narrow is the standard typeface for all sign messages, unless shown otherwise in the contract drawings.
- H. Dynamic Digital Signage: "Adtronics" or equal, full color single face digital LED display. With mounting bracket and all hardware for a complete installation.

Physical Pitch:	5mm
Physical Matrix Size:	192 x 512 pixels
Sign's Visual Size	3'-2" x 8'-4 3/4"
LED Type:	RGB-SMD
Grey level	16,384 steps
Color Pallet	281 trillion colors
Viewing Angle:	160 deg
LED Life:	100,000 hours
Brightness:	7,500 nits
Min char height:	3" (for ADA)
Construction:	Aluminum Cabinet
Cabinet	IP65
Operating System	Windows 10
Communications:	Wired/Wireless Ethernet
Warranty	5 year parts
Certifications:	UL48,CSA C22-2 No 207
Operator Training	Free lifetime training

2.02 ASSEMBLY AND FABRICATION

- A. Factory Assembly:
 1. All work shall be fabricated to the details and specifications shown in the Contract Drawings and shall be first class workmanship in accordance with the best trade practices.
 2. All fabrication and assembly will be done in the factory and shipped to the job site as one complete unit.
 3. All joints, corners, mitres, splices, etc. shall be accurately machined, filled, fitted, filed, and rigidly framed together at joints and contact points and mechanically smoothed to give a monolithic appearance and imperceptible joints.
 4. Mechanical fasteners, where allowable, are to be countersunk flush with the top surface being joined.

5. Allow for thermal movement resulting from a maximum ambient temperature change (range) of 100 deg F (70 deg C). Design and fabricate sign assembly to prevent buckling, opening up of joints, or overstressing of welds and fasteners. Base design on actual surface temperatures of metals due to both external and internal heat gain.

PART 3 - EXECUTION

3.01 SUMMARY

- A. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are or defective manufacture with respect to surfaces, sizes or patterns.
- B. Contractor is responsible for the location and mounting of all signs that are shown in the sign location plans and the sign message layouts. Confirm all exact locations with State Engineer prior to installation.

3.02 ASSEMBLY AND FABRICATION

- A. Prepare all surfaces in strict accordance with the Manufacturers' specifications.
- B. Cleaning: Remove all deleterious materials.
- C. Ensure all permanent signs installed are mounted so that a person may approach within 3 inches of signage without encountering protruding objects or standing within the swing of a door. Install signs as shown. Signs should be mounted truly plumb and level. In the event that the installed sign does not "look right" due to ceiling, wall, floor, etc., not being plumb or level, the Contractor shall adjust the sign in such a manner that the sign is oriented optically and subject to approval by the State Engineer. All signs shall be installed with sufficient amounts of fasteners and /or adhesives to ensure against theft.
- D. Finishes
 1. Color: All panel background and housing surfaces shall be "Sugarcane Graphic" digital artwork provided by State Engineer / Architect, unless noted otherwise. Messages on sign panels to be satin or matte-finish white, unless other color indications are given.
 2. Compatibility: All materials comprising a sign shall be finished with a coating system compatible with that material; appropriate preparatory work/priming shall be done in accordance with finisher's specification. All exposed surfaces, edges and connections shall receive this same finish system. Colors and degree of gloss for all surface paint/finish applications shall be consistent throughout, regardless of substrate: satin sheen, matte finish.

E. Acrylic/Polycarbonate

1. Panels shall receive a finish of two (2) coats satin finish clear acrylic polyurethane utilizing ultraviolet inhibitors.
2. Acrylic signs with subsurface graphics are constructed to be vandal-proof. Graphics and/or lettering are applied as shown in layouts, by silkscreen or in vinyl in reverse on back surface of clear 1/16-inch thick matte finish acrylic. Silkscreen inks are epoxy base for maximum coverage and color retention. Submit samples of all colors and materials to State Engineer for approval and to ensure consistent matching of masonry paints and inks where color coding must be uniform.
3. Silkscreen graphics are then back-sprayed in black and/or white to conceal lamination to back plate substrate. Face panels are permanently adhered to substrate of exact same dimensions, with counter sunk fasteners concealed through back for mounting to walls, doors and/or concrete columns.
4. Unit to mount flush to surfaces, provide with epoxy grout filling holes to prevent unauthorized removal. Edges to fit smooth with corners eased slightly – no sharp surfaces.

3.03 CLEANING

- A. All areas of work shall be left completely clean and any damage to the surrounding finish or other areas of work shall be corrected to the satisfaction of the State Engineer.
- B. At the completion of installation clean soiled surfaces of sign units using the recommended procedures for each finished surface of the sign.

3.04 PROTECTION

- A. The Contractor is responsible for the protection and of the condition of installed signs until the signs are approved.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
10440	Signage	Lump Sum

END OF SECTION

SECTION 10441 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Fire-protection cabinets for the following: Portable fire extinguishers.
- B. Related Requirements: Section 10442 "Fire Extinguishers."

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction. Show location of knockouts for hose valves.
- C. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- D. Samples: For each type of exposed finish required.
- E. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.
- F. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

2.02 FIRE-PROTECTION CABINET

- A. Cabinet Type: Products: Provide Potter Roemer, 1700 Series, #1724-B, full break glass with lock, with stainless steel #4 door and frame, or approved equal Suitable for fire extinguisher.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Guardian Fire Equipment, Inc.
 - 2. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - 3. Larsens Manufacturing Company.
 - 4. Modern Metal Products, Division of Technico Inc.
 - 5. Nystrom, Inc.
 - 6. Potter Roemer LLC.
 - 7. Or approved equal.
- C. Cabinet Construction: Nonrated and rated. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.
- D. Cabinet Material: Cold-rolled steel sheet.
- E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
- F. Cabinet Trim Material: Stainless Steel sheet.

- G. Door Material: Stainless Steel sheet.
- H. Door Style: Vertical duo panel with frame.
- I. Door Glazing: Float glass (clear).
- J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- K. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Door Lock: Cam lock.
 - 3. Break-Glass Strike: Provide manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet
 - 4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - a. Location: Applied to cabinet door.
 - b. Application Process: Decals or Pressure-sensitive vinyl letters.
 - c. Lettering Color: Red.
 - d. Orientation: Vertical.
- L. Materials:
 - 1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel or powder coat.
 - b. Color: White
 - c. Location: Interior of cabinet
 - 2. Clear float glass, ASTM C 1036, Type I, Class 1, Quality q3, 1.5 mm, single strength.
 - 3. Stainless steel: Type 304, #4 finish.

2.03 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.

2. Provide factory-drilled mounting holes.
 3. Prepare doors and frames to receive locks.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
 2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.04 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare recesses for semi recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.
 - 3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C. Identification: Apply decals or vinyl lettering at locations indicated.

3.04 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
10441	Fire Protection Cabinets	Lump Sum

END OF SECTION

SECTION 10442 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements: Section 10441 "Fire Protection Cabinets."

1.03 SUBMITTALS

- A. Submit in accordance with Section 01300 "Submittals."
- B. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- C. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.
- D. Warranty: Sample of special warranty.
- E. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.05 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.02 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International.
 - c. Badger Fire Protection.
 - d. Buckeye Fire Equipment Company.
 - e. Guardian Fire Equipment, Inc.
 - f. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - g. Kidde Residential and Commercial Division.
 - h. Larsens Manufacturing Company.
 - i. MOON American.
 - j. Nystrom, Inc.
 - k. Potter Roemer LLC.
 - l. Or approved equal.

2. Valves: Manufacturer's standard.
 3. Handles and Levers: Manufacturer's standard.
 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:80-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.03 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International.
 - c. Badger Fire Protection.
 - d. Buckeye Fire Equipment Company.
 - e. Fire End & Croker Corporation.
 - f. Guardian Fire Equipment, Inc.
 - g. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - h. Larsens Manufacturing Company.
 - i. Nystrom, Inc.
 - j. Potter Roemer LLC.
 - k. Or approved equal.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface. Orientation: Vertical.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective, or undercharged fire extinguishers.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
10442	Fire Extinguishers	Lump Sum

END OF SECTION

SECTION 10900 - MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Work includes coordination of requirements for the installation of Automated Exterior Defibrillators (AEDs) procured and installed under an Allowance.
- B. Contractor shall coordinate receipt of installation instructions so that backing, blocking, framing, and formwork can be properly installed and work of other trades will not be delayed. Provide necessary framing and blocking for AED cabinet installation.

PART 2 - PRODUCTS

2.01 AUTOMATED EXTERNAL DEFIBRILLATORS (AEDs)

- A. Procured and installed under an Automated External Defibrillators (AEDs) allowance.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Check areas to receive Automated External Defibrillators (AEDs) and related accessories such as signage and cabinet housing for conditions that would affect quality and execution of Work.
- B. Verify spacing of items that affect installation of the Automated External Defibrillators (AEDs) and related accessories.
- C. Coordinate installation of AEDs and accessories to ensure conditions are acceptable.

3.02 ADJUST AND CLEAN

- A. After completion of AED installation, clean all exposed surfaces and adjacent surfaces affected by the installation.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for the procurement and installation of Automated External Defibrillators (AEDs) and related accessories such as signage and cabinet housing, shall be considered incidental to and included in the bid prices for the various items of work in this project.

Procurement and installation of Automated External Defibrillators (AEDs) required by the State shall be paid for under allowance item in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
10900	Procurement and Installation of Automated External Defibrillators (AEDs)	Allowance

The allowance is an estimate and the amount shall not exceed the maximum amount shown in the proposal schedule.

END OF SECTION

DIVISION 12 – FURNISHINGS

SECTION 12241 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes: Manually operated roller shades with single rollers.
- B. Related Requirements:
 - 1. Section 06105 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
 - 2. Section 07920 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.03 SUBMITTALS

- A. Product Data: For each type of product. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples for Verification: For each type of roller shade.
 - 1. Shadeband Material: Not less than 10 inches square. Mark inside face of material if applicable.
 - 2. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.
 - 3. Installation Accessories: Full-size unit, not less than 10 inches long.
- D. Product Certificates: For each type of shadeband material, signed by product manufacturer.

- E. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a testing agency.
- F. Maintenance Data: For roller shades to include in maintenance manuals.
- G. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- B. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
- C. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.06 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain each type of roller shade from single source from single manufacturer.
- B. Basis of Design Product: Subject to compliance with requirements, provide MechoSystems roller window shades, or comparable product from one of the available manufacturers.
- C. Available Manufacturers: Subject to compliance with requirements, products manufactured by the following are acceptable:
 - 1. Draper Inc.
 - 2. Hunter Douglas Contract.
 - 3. Mechoshade
 - 4. Or approved equal.

2.02 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated. Provide manufacturer's heavy-duty clutch system.
 - 1. Bead Chains: Stainless steel.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Chain tensioner, jamb mounted.
 - 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criteria are more stringent.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Drive-End Location: Right side of inside face of shade.
 - 2. Direction of Shadeband Roll: Regular, from back of roller.
 - 3. Shadeband-to-Roller Attachment: Removable spline fitting integral channel in tube.

- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- D. Shadebands:
 - 1. Shadeband Material: Sound absorbing, light blocking, near blackout textile.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum. Type: Enclosed in sealed pocket of shadeband material.
- E. Installation Accessories:
 - 1. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than height indicated on Drawings.
 - 2. Endcap Covers: To cover exposed endcaps.
 - 3. Installation Accessories Color and Finish: As selected by State Engineer from manufacturer's full range.

2.03 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Identify products with appropriate markings of applicable testing agency.
- B. Light Blocking Fabric: Woven fabric, stain and fade resistant.
 - 1. Product: MechoSystems, "Thermoveil, 1320," or approved equal.
 - 2. Orientation on Shadeband: Up the bolt.
 - 3. Fabric Content: 75% PVC & 25% Polyester.
 - 4. 5 % open.
 - 5. Color: #1320, Shadow Grey.

2.04 ROLLER-SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F: Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

- C. Shadeband Fabrication: Fabricate shade cloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shade cloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ROLLER-SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

3.03 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.04 CLEANING AND PROTECTION

- A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of acceptance.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by State Engineer, before time of acceptance.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train State's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
12241	Roller Window Shades	Lump Sum

END OF SECTION

DIVISION 14 – CONVEYING SYSTEMS

SECTION 14210 – ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. Section Includes: Machine-Room Less Elevators.
- B. Related Work Specified Elsewhere:
 - 1. Section 01352- LEED REQUIREMENTS.
 - 2. Section 03300- CAST-IN-PLACE CONCRETE.
 - 3. Section 05500- METAL FABRICATION.
 - 4. DIVISION 15- MECHANICAL.
 - 5. DIVISION 16- ELECTRICAL.

1.03 DESCRIPTION OF ELEVATOR

- A. Elevator Manufacturers: Basis of Design KONE .
 - 1. Otis
 - 2. Schindler
 - 3. Thyssen Krup
 - 4. Or Approved Equal
- B. Type: Machine Room Less
- C. Drive: Regenerative.
- D. Quantity of Elevators: 2 (OGG 22 and 23)
- E. Landings: 2.
- F. Openings: 2 Front Openings, 0 Back Openings.
- G. Travel: Elevators 1 (OGG 22) thru 2 (OGG 23)- 18'-2".
- H. Rated Capacity: Elevators 1 (OGG 22) thru 2 (OGG 23)- 5000 lbs.

- I. Rated Speed: 150 fpm.
- J. Clear Inside Dimensions (W x D):
Elevators 1 (OGG 22) thru 2 (OGG 23): 7'-11 1/2" x 10'-5 1/16".
- K. Cab Height: 8'-5"
- L. Clear Height Under Suspended Ceiling: 7'-7".
- M. Entrance Width and Type:
Elevators 1 (OGG 22) thru 2 (OGG 23) – 4'-6" Right & Left Opening
- N. Entrance Height: 7'-0:.
- O. Main Power Supply: 480 Volts + 5%, three-phase.
- P. Operation: Elevators 1 (OGG 22) thru 2 (OGG 23)- Duplex.
- Q. Machine Location: Inside the hoistway mounted on car guide rail.
- R. Control Space Location: Remote Closet.
- S. Elevator equipment shall conform to the requirements of seismic zone:
Seismic Zone 'D'.
- T. Maintenance Service Period: 24 Months.

1.04 PERFORMANCE REQUIREMENTS

- A. Car Performance:
 - 1. Car Speed +/- 5% of contract speed under any loading condition or direction of travel.
 - 2. Car Capacity: Safely lower, stop and hold (per code) up to 125% of rated load.
- B. System Performance:
 - 1. Vertical Vibration (Maximum): 15 mg.
 - 2. Horizontal Vibration (Maximum): 12 mg.
 - 3. Jerk Rate (Maximum): 3.3 ft/sec³.
 - 4. Acceleration (Maximum): 1.3 ft/sec².
 - 5. In Car Noise: =55 dB(A).
 - 6. Leveling Accuracy: +/- 0.2 inches.
 - 7. Starts Per Hour (Maximum): 240.

1.05 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Product Data: Submit manufacturer's product literature for each proposed system.
 - 1. Cab design, dimensions and layout.
 - 2. Layout, finishes, and accessories and available options.
 - 3. Controls, signals and operating system.
 - 4. Color selection charts for cab and entrances.
- C. Shop Drawings:
 - 1. Clearances and travel of car.
 - 2. Clear inside hoistway and pit dimensions.
 - 3. Location and layout of equipment and signals.
 - 4. Car, guide rails, buffers and other components in hoistway.
 - 5. Maximum rail bracket spacing.
 - 6. Maximum loads imposed on building structure.
 - 7. Hoist beam requirements.
 - 8. Location and sizes of access doors.
 - 9. Location and details of hoistway door and frames.
 - 10. Electrical characteristics and connection requirements.
- D. Operation and Maintenance Data: Provide manufacturer's standard maintenance and operation manual.
- E. Diagnostic Tools: Prior to seeking final acceptance for the completed project as specified by the Contract Documents, the Elevator Contractor shall furnish all specialty, diagnostic, programming, calibration and adjustment tools, passwords, fault codes solutions, laptop computers with all of the most current software packages and manuals with drawings and diagrams that are required for complete maintenance, repair, trouble shooting, adjustments and performing safety tests of the installed elevators for the State's use at no additional cost and shall be turned over to the State Engineer.

This shall include any specialized tool(s) required for monitoring, inspection and/or maintenance where the means of suspension other than conventional wire ropes are furnished and installed by the Elevator Contractor. Any and all such tool(s) shall become property of the State. Any diagnostic tool provided to the State Engineer by the Elevator Contractor shall be configured to perform all levels of diagnostics, systems adjustment and parametric software changes which are available to the Elevator Contractor.

In those cases where diagnostic tools provided to the State Engineer require periodic recalibration/or re-initiation, the Elevator Contractor shall perform such tasks at no additional cost to the State for a period equal to the term of the maintenance agreement from the date of final acceptance of the competed project During those intervals in which the State Engineer might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation, or repair,

the Elevator Contractor shall provide a temporary replacement for the tool at no additional cost to the State.

The Elevator Contractor shall deliver to the State Engineer, printed instructions for the proper use of any tool that may be necessary to perform diagnostic evaluations, system adjustment, and/or parametric software changes on any unit of microprocessor- based elevator control equipment and means of suspension other than standard elevator steel cables furnished and install by the Elevator Contractor.

Accompanying the printed instructions shall be any and all access codes, password, or other proprietary information that is necessary to interface with the microprocessor-control equipment.

- F. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.06 QUALITY ASSURANCE

- A. Manufacturer: Minimum of fifteen years experience in the fabrication, installation, and service of elevators of the type and performance of the specified. The manufacturer shall have a documented quality assurance program.
- B. Installer: The equipment manufacturer shall install the elevator.
- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections, and tests.
- D. The elevators provided as part of this Contract shall be serviceable by any maintenance and repair contractor licensed to perform such maintenance in the State of Hawaii. Systems shall not possess proprietary parts which cannot be obtained by maintenance contractors outside of the original equipment manufacturer's own forces.
- D. Elevator Contractor must certify that he has installed and maintained similar elevators to those specified and which have given satisfactory service; has been in successful operation for at least five (5) years; maintains an adequate stock of parts for replacement or emergency purposes locally and has available qualified persons to do the work.
- E. The controls shall not have any software embedded that shuts the elevator down if the equipment is not malfunctioning and forces the State to call the Manufacturer for service.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. If the construction site is not prepared to receive the elevator equipment at the

agreed ship date, the General Contractor shall be responsible for providing a safe, dry, and easily accessible storage area on or off the premises. Additional labor costs for double handling will be the responsibility of the general contractor.

- B. Delivered elevator materials shall be stored in a protected environment in accordance with manufacturer recommendations. A minimum storage area of 10 feet by 20 feet is required adjacent to the hoistway.

1.08 WARRANTY

- A. Provide manufacturer warranty for a period of one year. The warranty period is to begin upon Substantial Completion of the Contract. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.

1.09 MAINTENANCE SERVICE

- A. The elevator manufacturer shall provide maintenance service consisting of regular examinations and adjustments of the elevator equipment for a period of 24 Months after date of substantial completion. Replacement parts shall be produced by the original equipment manufacturer.
- B. Maintenance service be performed during regular working hours of regular working days and shall include regular time call back service.
- C. Maintenance service shall not include adjustments, repairs, or replacement of parts due to negligence, misuse, abuse or accidents.
- D. The manufacturer must have locally stocked parts, representation and an authorized service organization within 500 miles of the site of installation and has serviced manufacturer's units of comparable type, size and capacity installed in the State of Hawaii for a minimum of 5 years immediately prior to bid opening.

1.10 PARTS AND PRINTED CIRCUIT BOARDS

- A. Contractor guarantees they will sell all parts, including but not limited to items such as printed circuit boards, programmed microprocessors/computers and all software updated/upgrades to the State and the State's maintenance contractor. The same shall not be dependent on an exchange component.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Provide AC gearless machine room-less elevator systems subject to compliance with the design and performance requirements of this specification. Elevator manufacturers may include but are not limited to one of the following:
1. Basis of Design: traction elevators by KONE, Inc. (www.kone.com).
 2. Otis Elevator Company
 3. Schindler Elevator Corp.
 4. Thyssen Krupp Elevator

2.02 EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE

- A. Controller: Provide microcomputer based control system to perform all of the functions.
1. All high voltage (110 V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.
 2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed and physically segregated from the rest of the controller.
 3. Provide a serial cardrack and main CPU board containing a non erasable EPROM and operating system firmware.
 4. Variable field parameters and adjustments shall be contained in a non-volatile memory module.
- B. Drive: Provide Variable Voltage Variable Frequency AC drive system to develop high starting torque with low starting current. The drive will be set up for regeneration of AC power back into the building grid.
- C. Controller Location: Within 100'-0" Controller(s) shall be located in a remote cabinet or room within 140"-0" wire feet of the elevator machine.

2.03 EQUIPMENT: HOISTWAY COMPONENTS

- A. Machine: AC gearless machine, with permanent magnet synchronous motor, direct current electro-mechanical disc brakes and integral traction drive sheave, mounted to the car guide rail at the top of the hoistway.
- B. Governor: Friction type over-speed governor rated for the duty of the elevator specified.
- C. Buffers, Car and Counterweight: Polyurethane buffer.

- D. Hoistway Operating Devices:
 - 1. Emergency stop switch in the pit.
 - 2. Terminal stopping switches.
 - 3. Emergency stop switch on the machine.
- E. Positioning System: System consisting of magnets and proximity switches.
- F. Guide Rails and Attachments: Steel rails with brackets and fasteners.

2.04 EQUIPMENT: HOISTWAY ENTRANCES

- A. Hoistway Entrances:
 - 1. Sills: Extruded.
 - 2. Doors: Hollow metal construction with vertical internal channel reinforcements.
 - 3. Fire Rating: Entrance and doors shall be UL fire-rated for 1-1/2 hour.
 - 4. Entrance Finish: Elevators 1 (OGG 22) thru 2 (OGG 23) - Satin Stainless Steel.
 - 5. Entrance Markings Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings. *Comply with ADAAG 407.2.3 Hoistway Signs: Signs at elevator hoistway shall comply with 407.2.3.*

2.05 EQUIPMENT: CAR COMPONENTS

- A. Car Frame: Provide car frame with adequate bracing to support the platform and car enclosure.
- B. Platform: Platform shall be all steel construction.
- C. Car Guides: Provide guide-shoes mounted to top and bottom of both car and counterweight frame. Each guide-shoe assembly shall be arranged to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.
- D. Steel Cab:
 - 1. Car Wall Finish: Elevators 1 (OGG 22) thru 2 (OGG 23) -
Side Walls – See interior elevations
Rear Walls – See interior elevations
 - 2. Car Front Finish: Brushed stainless steel.
 - 3. Skirting: Brushed stainless steel.
 - 4. Car Door Finish: Brushed stainless steel.
 - 5. Ceiling:
 - a. Elevators 1 (OGG 22) thru 2 (OGG 23)- : Polygal Translucent three

panel suspended ceiling with T-5 Fluorescent lighting and Brushed Stainless Steel frame..

6. Handrail: Round, straight ends – Brushed stainless steel - 2 in. Rails to be located on side and rear walls of car enclosure.
7. Bumper Rail: Brushed stainless steel 4 in. flat rail located on side and rear walls of car enclosure.
8. Flooring: Rubber Flooring (RBF-01)
9. Threshold: Aluminum.

E. Emergency Car Signals:

1. Emergency Siren: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure level of 80 dB(A) at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.
2. Emergency Car Lighting: Provide emergency power unit employing a 12-volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
3. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.

F. Ventilation: Fan.

2.06 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

A. Car Operating Panel: Provide car operating panel with all push buttons, key switches, and message indicators for elevator operation.

1. Car Operating Panel Elevators 1 (OGG 22) thru 2 (OGG 23): Comply with ADAAG 407.2.3 Call Controls: Where elevator call buttons or keypads are provided, they shall comply with 407.2.1 and 309.4. The car operating panel shall contain a bank of round, mechanical, illuminated buttons marked to correspond to landings served, emergency call button, door open button, door close button, and key switches for lights, inspection, and exhaust fan. Buttons have amber illumination (halo). All buttons to have raised text and Braille marking on left hand side. The car operating display panel shall be amber DOT-matrix. All texts, when illuminated, shall be amber. The car operating panel shall have a brushed stainless steel finish.
2. Additional features of car operating panel shall include:
 - a. Car Position Indicator within operating panel (amber).
 - b. Elevator Data Plate marked with elevator capacity and car number on car top.
 - c. Help buttons with raised markings.

- d. In car stop switch per local code.
 - e. Firefighter's hat
 - f. Firefighter's Phase II Keyswitch.
 - g. Call Cancel Button.
 - h. Pre-programmed integrated ADA phone (complete description of krms features included as standard).
 - i. Help Button/Communicator. Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
 - j. Firefighter's Phase II emergency in-car operating instructions.
 - k. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
- B. Hall Fixtures: Comply with ADAAG 407.2.2 Hall Signals: Hall signals, including in-car signals, shall comply with 407.2.2. Wall mounted hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Wall mounted hall fixtures for Elevators 1 (OGG 22) thru 2 (OGG 23) shall have a brushed stainless steel finish. Hall fixtures shall feature round, mechanical, buttons in applied mount face frame. Hall fixtures shall correspond to options available from that landing. Buttons shall be in a vertically mounted fixture. Hall fixtures shall not be jamb-mounted.
- C. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound. The chime will sound once for up and twice for down. Elevator doors shall comply with ADAAG 407.3.5 Door Delay: Elevator doors shall remain fully open in response to a car call for 3 seconds minimum.

2.07 EQUIPMENT: ELEVATOR OPERATION AND CONTROLLER

- A. Elevator Operation:
- 1. Elevators 1 (OGG 22) thru 2 (OGG 23): Duplex Collective Operation (two cars): Using a microprocessor-based controller, the operation shall be automatic by means of the car and hall buttons. In the absence of system activity, one car can be made to park at the pre-selected main landing. The other car shall remain at the last landing served. Only one car shall respond to a hall call. If either car is removed from service, the other car shall immediately answer all hall calls, as well as its own car calls.
 - 2. Zoned Car Parking
 - 3. Relative System Response Dispatching.

B. Standard Operating Features to include:

1. Full Collective Operation.
2. Fan and Light Control.
3. Load Weighing Bypass.
4. Ascending Car Uncontrolled Movement Protection.
5. Top of Car Inspection Station.

C. Additional Operating Features to include:

1. Hoistway Access Bottom Landing
2. Emergency Battery Power Supply: When the main line power is lost for longer than 5 seconds the emergency battery power supply provides power automatically to the elevator controller. The elevator will rise or lower to the first available landing, open the doors, and shut down. The elevator will return to service upon the return of normal main line power. An auxiliary contact on the main line disconnect and shunt trip breaker (if used) will be provided by others.

D. Elevator Control System for Inspections and Emergency:

1. Provide devices within controller to run the elevator in inspection operation.
2. Provide devices on car top to run the elevator in inspection operation.
3. Provide within controller an emergency stop switch to disconnect power from the brake and prevents motor from running.
4. Provide the means from the controller to electrically lift and control the elevator brake to safely bring car to nearest available landing when power is interrupted.
5. Provide the means from the controller to reset the governor over speed switch and also trip the governor.
6. Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.
7. Provide the means for the control to reset elevator earthquake operation.

2.08 EQUIPMENT: DOOR OPERATOR AND CONTROL

- A Door Operator: A closed loop permanent magnet VWF high-performance door operator shall be provided to open and close the car and hoistway doors simultaneously. Door movement shall be cushioned at both limits of travel. Electro-mechanical interlock shall be provided at each hoistway entrance to prevent operation of the elevator unless all doors are closed and locked. An electric contact shall be provided on the car at each car entrance to prevent the operation of the elevator unless the car door is closed.
- B. The door operator shall be arranged so that, in case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in

accordance with applicable code. Emergency devices and keys for opening doors from the landing shall be provided as required by local code.

- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. A door open button shall be provided in the car. Momentary pressing of this button shall reopen the doors and reset the time interval.
- D. Door hangers and tracks shall be provided for each car and hoistway door. Tracks shall be contoured to match the hanger sheaves. The hangers shall be designed for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed-for-life bearings.
- E. Electronic Door Safety Device. The elevator car shall be equipped with an electronic protective device extending the full height of the car. The doors shall remain open as long as the flow of traffic continues. Electronic door safety device shall comply with ADAAG 407.3.3.3 Duration: Door reopening devices shall remain effective for 20 seconds minimum.

2.09 ADAAG REQUIREMENTS

ADAAG 206.6 Elevators provided for passengers shall comply with 407.

2.10 PROPRIETARY EQUIPMENT

Proprietary equipment shall not be allowed. All equipment installed shall be maintainable by any licensed elevator mechanic.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.
- B. Do not proceed with work until unsatisfactory conditions are corrected.
- C: Prior to start of Work, verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.
- D. Prior to start of Work, verify projections greater than 2 inches (4 inches if ASME A17.1/CSA 844 2000 applies) must be beveled not less than 75 degrees from horizontal.

- E. Prior to start of Work, verify landings have been prepared for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.
- F. Prior to start of Work, verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in approved submittal. Verify that sumps or sump pumps located within pit will not interfere with installed elevator equipment.
- G. Prior to start of Work, verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including Sleeves and penetrations.
- H. Verify installation of GFCI protected 20-amp in pit and adjacent to each signal control cabinet in control space.

3.02 PREPARATION

- A. Coordinate installation of anchors, bearing plates, brackets and other related accessories.

3.03 INSTALLATION

- A. Install equipment, guides, controls, car and accessories in accordance with manufacturer installation methods and recommended practices.
- B. Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure using isolation system to minimize transmission of vibration to structure.
- C. All hoistway frames shall be securely fastened to fixing angles mounted in the hoistway. Coordinate installation of sills and frames with other trades.
- D. Lubricate operating system components in accordance with manufacturer recommendations.
- E. Perform final adjustments, and necessary service prior to substantial completion.

3.04 CONSTRUCTION

- A. Interface with Other Work:
 - 1. Guide rail brackets attached to steel shall be installed prior to application of fireproofing.
 - 2. Coordinate construction of entrance walls with installation of door frames and sills. Maintain front wall opening until elevator equipment has been

installed.

- a. Ensure adequate support for entrance attachment points at all landings.
- b. Coordinate wall openings for hall push buttons, signal fixtures and sleeves. Each elevator requires sleeves within the hoistway wall.
- c. Coordinate emergency power transfer switch and power change pending signals as required for termination at the primary elevator signal control cabinet in each group.
- d. Coordinate interface of elevators and fire alarm system.
- e. Coordinate interface of dedicated telephone line.

3.05 TESTING AND INSPECTIONS

- A. Perform recommended and required testing in accordance with authority having jurisdiction.
- B. Obtain required permits and provide originals to State Engineer.

3.06 DEMONSTRATION

- A. Prior to substantial completion, instruct State Engineer on the proper function and required daily maintenance of elevators. Instruct personnel on emergency procedures.

3.07 LOCAL TECHNICAL SUPPORT

- A. The conveying equipment supplier shall have a Hawaii office, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.
- B. The control system supplier shall have a Hawaii office, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
14210.1	Electric Traction Elevators	Lump Sum
14210.2	Electric Traction Elevators Operations & Maintenance Service	Month

END OF SECTION

SECTION 14310 - ESCALATORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. Section Includes: Escalators.
- B. Related Work Specified Elsewhere:
 - 1. Section 01352- LEED REQUIREMENTS.
 - 2. Section 03300 - CAST-IN-PLACE CONCRETE.
 - 4. Section 05500- METAL FABRICATION.
 - 6. DIVISION 15- MECHANICAL.
 - 7. DIVISION 16- ELECTRICAL.

1.03 DESCRIPTION OF ESCALATOR

- A. Quantity: 2, Escalator 1 (OGG 24) and Escalator 2 (OGG 25)
- B. Arrangement: Parallel without common center deck.
- C. Vertical Rise: 18'-2".
- D. Speed: Nominal speed of 100 feet/minute (0.5 M/sec.) ascending and descending.
- E. Nominal Step Width: 40".
- F. Horizontal Steps: 2.
- G. Transition Radius: 1.5m/1.0m.
- H. Power Supply: 3 Phase, 60Hz, 460V, 120V.
- I. Step Load / Dynamic Brake Load / Motor Duty Load / Step Chain Load: 264 lbs. / step
- J. Balustrade Type: Inclined Solid Balustrade
- K. Operation Mode: Continuous operation.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300- SUBMITTALS.
- B. Product Data: Submit manufacturer's product literature for each proposed system.
 - 1. Layout, finishes, and accessories and available options.
 - 2. System capacity and performance.
 - 3. Controls, signals and operating system.
- C. Shop Drawings:
 - 1. Maximum loads imposed on the building structure at all support points.
 - 2. Rise of escalator and required clearances.
 - 3. Dimensions of escalator and related systems.
 - 4. Electrical characteristics and connection requirements.
- D. Samples:
 - 1. Balustrade
 - 2. Skirts
 - 3. Decking
 - 4. Handrails
- E. Manufacturer's operation and maintenance manuals.
- F. Inspection Certificates and Permits.
- G. Specialty Tools: Provide to the State all specialty tools, computers, software, diagnostic equipment, user manuals, specialty materials, and any other items required for any licensed elevator mechanic to perform full diagnostics, troubleshooting, maintenance, and repairs to any escalators installed as part of this Contract. This includes, but is not limited to computer terminals, software, specialty tools, manuals, cables, proprietary adapters, etc.
- H. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Manufacturer: Shall have a minimum of 10 years experience in the fabrication, installation and service of escalators. Manufacturer shall be ISO 9001 and 14001 certified, and have a documented quality assurance program.
- B. Installer: Manufacturer shall install Escalators or a manufacturer recommended installer with a minimum 5 years experience in the installation and service of escalators.

- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.
- D. The escalators provided as part of this Contract shall be serviceable by any maintenance and repair contractor licensed to perform such maintenance in the State of Hawaii. Systems shall not possess proprietary parts which cannot be obtained by maintenance contractors outside of the original equipment manufacturer's own forces.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of escalator material.
- B. Store escalator materials in protected environment in accordance with manufacturer recommendations.

1.07 WARRANTY

Provide Manufacturer warranty for a period of one year. Warranty period to begin upon escalator final acceptance. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.

1.08 MAINTENANCE SERVICE

- A. Provide maintenance service consisting of examinations for a period of 24 Months after date of escalator final acceptance.
- B. Escalator manufacturer recommended service personnel shall provide maintenance service. Manufacturer recommended parts and supplies shall be used in maintenance service as in the original manufacture and installation. The manufacturer must have locally stocked parts, representation, and an authorized service organization within 500 miles of the site of installation and has serviced manufacturer's units of comparable type, size and capacity installed in the State of Hawaii for a minimum of 5 years immediately prior to bid opening.
- C. Maintenance service shall be conducted during regular working hours of regular working days and shall include regular time call back service. Maintenance service shall not include adjustments, repairs, or replacement of parts due to negligence, misuse, abuse, or accidents.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Provide Escalators 1 thru 2 (OGG 24 and OGG 25) subject to compliance with the design and performance requirements of this specification.
 - 1. Basis of Design Manufacturer: KONE, Inc. (www.kone.com).
 - 2. Other acceptable escalator manufacturers:
 - a. OTIS Elevator Co.
 - b. Schindler Elevator Corp.
 - c. Thyssen Krupp Elevator
 - d. Approved equal.

2.02 COMPONENTS

- A. Truss:
 - 1. The escalator trusses shall be designed to accommodate the loadings and factors referred to in the latest edition of ASME A17.1. The trusses shall not deflect greater than 1:750 of the distance between supports under a live uniformly distributed passenger loading of 5 kN/my (load area = width of escalator step x distance between supports). The truss shall be designed to accommodate the load without intermediate (center) supports.
 - 2. The trusses shall be constructed of rolled steel sections, continuously welded where appropriate, and treated with an approved rust inhibitor.
 - 3. The trusses shall include all the frames, supports and reinforcements necessary for the support and fastening of the mechanical parts of the escalators.
 - 4. There shall be no cross members on the soffit of the truss, either inside or outside. The soffit plate shall be 3/16" minimum thickness and welded and sealed to ensure it is oil tight.
 - 5. All the necessary steelwork, trimming angles and bearing plates to support the escalators from the building structure are to be provided and fitted by the building contractor.
 - 6. Side cladding - by Division: Truss side cladding shall be provided and installed per Section 05750.
 - 7. Soffit cladding - by Division: Truss soffit cladding shall be provided and installed per Section 05750.
- B. Isolation Mounting: Upper and lower end supports shall be isolated from building structure using a fabricated assembly of rubber and steel.

Standard Support Type: The truss supports at each end shall be provided with isolation (anti-vibration) pads, which dampen vibration and prevent structure-borne noise being transmitted to the building structure.

C. Escalator Drive:

1. Worm Gear: The drive unit is located outside the step band, at the upper end of the escalator. The chain sprockets of the step band and the handrail driving wheels are driven via a duplex chain by a compact worm gear with an electric motor, flange-mounted at the gearbox. The main driving shaft supports the chain sprockets for the step band. The main driving shaft supports the handrail driving shaft via handrail chain and handrail wheels. The drive system assures that the handrails are moved synchronously with the step band.
2. Upper Reversing Station: Precision-machined step chain sprocket mounted on the machine output shaft and rotating on bearings.
3. Lower Reversing Station: Machined floating track system designed to maintain proper tension on the step chain by use of springs.

D. Drive Motor:

1. The drive motor shall be continuously rated and of adequate size for the duty concerned in both directions of travel. The drive shall be positive and quiet. The tenderer shall include details of the motor within the tender.
2. The tenderer shall include within the tender a list of protection provided, which shall preferably be by means of temperature sensitive devices in the motor windings with a magnetically operated overload device to cater for stall conditions. The motor shall be provided with class F insulation and a minimum ingress protection class of NEMA 12.

E. Brake:

1. The escalator shall have a "fail-safe" operational braking system which shall be capable of bringing an unloaded and loaded escalator to rest within the stopping distances given in the latest edition of ASME A17.1 and maintaining it in a stationary position. The action of the brake shall be smooth so that the step band is brought to a standstill without subjecting the passengers to sudden deceleration forces.
2. The brake shall be released by application of electric power and mechanically applied via compression spring(s) upon removal of electric power. Provision shall be available for temporary release of the brake by means requiring a continuously applied manual release force.
3. The escalator shall stop automatically in the event of the operation of any safety device or electrical power failure.
4. Each escalator shall have the facility to lock the step band in position to enable work to be carried out safely within the step band.

- F. Handrail Drive- C Handrail: To ensure the handrail runs synchronously with the step band, within a speed tolerance of 0% to 2%, a chain from the main drive shaft to the handrail shaft shall be used. A positive drive and proper tensioning of the handrail shall be achieved at all times. At the newel ends there shall be adequate sized rollers to guide the handrail around the newels. Each roller shall be fitted with sealed ball bearings and be grease lubricated.

- G. Handrails - C Handrail: The endless rubber handrails shall be pre-stretched and provided with a nylon lining on the running faces and suitably reinforced with steel or cord tension members to enhance service life. The minimum breaking strength of the handrails shall be 27 kN. The color of the handrail shall be Black, and suitable for use outdoors.
- H. Step Chains - Lubrication-Free Chain: The step chains shall be specifically designed for escalator applications and be of the roller type with heat-treated links to satisfy the requirements of ASME A17.1. In the interests of the environment and fire prevention, the step chains shall be of the sealed-for-life, lubrication-free type which require no external oil lubrication. The links, pins and bushes shall be suitable treated to prevent corrosion (e.g. zinc plated).
- I. Step Chain Tension Carriage: A step chain tension device shall be provided in an easily accessible position in the lower machine pit. The tension carriage assembly shall be mounted on rollers with adequate lateral guidance to prevent skewing and shall be fitted with adjustable pressure springs to ensure uniform tensioning of the step chains.
- J. Steps:
 - 1. Black Aluminum: The black painted steps shall be of an interchangeable design of rigid high tensile die cast aluminum, incorporating grooved tread plates and risers, and shall be capable of being removed and replaced without removing the skirtings or inside balustrade. Multi-piece step assemblies are not acceptable.
The step rollers shall have sealed ball bearings which are permanently grease lubricated. The steps are of distortion-resistant design, made of high tensile, die-cast aluminum. The tread plates have narrow grooves. The inner width between the cleats is 1/4" (average). Similar to the tread plate, the step riser is grooved vertically. Each step is provided with two step rollers of 3" diameter with encased, sealed-for-life ball bearings.
 - 2. Step Demarcation- Yellow Plastic Inserts: Provide step demarcation inserts at sides and rear of each step. Inserts to be fabricated from reinforced structural plastic, and easily replaced. Attach inserts to step with concealed fasteners. Demarcation inserts shall be yellow.
- K. Step Combs - Comb Segment Material - Powder Coated Aluminum: Step combs shall be easily replaceable. The escalator must incorporate step guides of wear-resistant material to ensure precise lateral entrance of the step into the comb. Safety switches shall be fitted to the comb plate, acting both vertically and horizontally, to stop the escalator in the event of an object becoming entrapped between the steps and the combs.
- L. Skirts- Brushed satin stainless steel skirt with clear anti-friction coating: Rigid brushed stainless steel skirting panels, minimum 11 gauge, shall be provided adjacent to the steps. They shall be coated with a clear long-wearing friction reduction compound and adequately supported to prevent bending or deflection. Flexible skirting panels with micro-switches shall not be accepted.

- M. Brush Guards - Black Anodized Aluminum with Single Brush: Single brush guards shall be provided to protect the step/skirting gap. They shall follow the nose line of the steps, running continuously throughout the length of the moving step band and terminating 2" before the comb plates at both ends. At each end of the brush guard there shall be a smooth tapered aluminum leading piece to ensure that there are no sharp edges, which may be a hazard to passengers. The holder/basis shall be made of black anodized aluminum.
- N. Floor Cover Plates - Natural Ribbed Aluminum: Single panel covers of aluminum shall be provided at the escalator entrances, covered with ribbed aluminum flooring. The covers shall be removable for maintenance purposes.
- O. Balustrades:
1. Solid panel - vertical balustrade: The balustrades shall be of solid panel construction, stainless steel resistant type. Their minimum thickness shall be 1/2-inch and the panels shall be self-supporting without the need for mullions. The vertical height of the balustrade, both on the incline and the ends, shall be minimum 40 inches.
 2. Balustrade configuration (option 2): Provide equal length incline balustrade panels with joints perpendicular to the floor.
 3. Satin polished stainless steel front plates: Satin polished stainless steel front plates shall be provided at upper and lower ends, designed to include the handrail inlet device.
- P. Deck- Brushed Stainless Steel: The inner/outer decking and the handrail profile shall be of brushed stainless steel. The joints of all sections shall be of the flush butted type.
- Q. Control Cabinet- Position of the Controller Cabinet- Inside Truss: The controller for the escalators shall be in a sheet metal cabinet located within the top machine compartment and shall be removable for maintenance purposes. The controller shall incorporate all devices for controlling the direction of travel of the escalator and all overload and safety devices. The controller cabinet shall be protected with the following class NEMA1.
- R. Operational Mode - Continuous: The escalator shall be started by a key switch and shall run continuously in the selected direction until stopped by a key switch or by an emergency stop.
- S. Safety Devices: The escalators shall be equipped with the following safety devices/features:
1. Reversal Stop Device: Provide controller sensitive device to automatically stop the escalator should its direction reverse while operating in the ascending direction.
 2. Broken Step Chain Device: Provide device on each chain as a component of the lower reversing station assembly a device to bring escalator to controlled stop when activated.
 3. Step Up Thrust Device: Provide device each side of the lower curve track

- on the lower end of each escalator, that should a step be displaced against the upthrust track, will cause the escalator to come to a controlled stop.
4. Comb-step Impact Device: Provide device at the upper and lower comb plates, impact between comb segments and step will cause the escalator to come to a controlled stop.
 5. Skirt Obstruction Device: Provide devices on each side of the balustrade at upper and lower ends within the skirt panels. Device shall activate should an obstruction occur between the step and skirt panel. Switches shall be of the plunger, self-resetting type, adjustable to maintain the required position and clearance from the skirts.
 6. Missing Step Device: Provide device to detect missing step or steps at the upper or lower ends of the escalator. Upon activation, the escalator will come to a controlled stop.
 7. Step Demarcation Lights: Provide demarcation lights at top and bottom of each escalator. Light shall be mounted below the track system where the step leaves or enters the combplate, light shall be visible between the steps and the step/comb segment. Provide two independent green fluorescent lamps, capable of lighting the entire width of the step.
 8. Handrail Entry Device: Provide device at the handrail inlet in the newel. The escalator will come to a controlled stop should an object enter the handrail inlet area.
 9. Handrail Speed Monitoring Device: Provide magnetic sensor to sound an alarm, when the speed of the handrail deviates from that of the step band by a minimum fifteen percent. If the deviation lasts for more than two seconds, device will cause the escalator to come to a controlled stop.
 10. Emergency Stop Buttons: Provide buttons to cut electrical power supply to the motor upon activation.
 - a. Locate emergency stop button at each landing in the newel upper radius quadrant, 45 degrees above horizontal. The stop button shall be red in color.
 - b. The button shall be housed under a clear, high impact resistant plastic, self-closing cover. Instructions for operating shall be imprinted on the cover in accordance with ASME/ANSI A17.1. When the cover is lifted, an audible alarm shall sound until returned to its closed position.
 11. Safety Signs: In accordance with ASME/ANSI A17.1 provide pictorial sign at upper and lower landings.
 12. Stop Switch in the Machinery Spaces: Provide stop switch in the upper and lower pits, upon activation of either switch escalator will come to a controlled stop.
 13. Step Level Devices: Provide level devices at upper and lower ends of escalator. Devices shall detect downward displacement of the step prior to reaching the combplates. Upon activation the escalator will come to a controlled stop.
 14. Step Guards: Provide guards in the upper and lower pit to protect maintenance personnel from step band.
 15. Step Band Lock: A locking device, with mechanical and electrical

protection, to lock the step band in position for when it is necessary to work within the step band.

16. Voice Announcement System: Provide an automated system with enunciator and speakers to continually narrate safety messages along the escalator to hold on to handrail. Confirm safety message with State Engineer.

- T. Wiring: This includes the laying of all cables and conductors from the main circuit breaker in the control cubicle to the individual controls, lighting, and safety devices inside the escalator. All the electrical installation material must be suitable for humid conditions. The cables, switching elements and electrical devices must be in accordance with NEII requirements.

- U. Control Switches: The control switch shall be mounted at the lower end of the escalator and shall be key operated.

- V. Bearings: All bearings of rotating shafts are to be of a high quality, high precision and self aligning, and ball or roller type as appropriate. All bearings are to be selected to give, under an appropriate load profile for applications, a minimum calculated design life of 100,000 hours (L10h) based on the ISO definition of life rating.

- W. Lubrication: The tenderer shall define the method of lubrication and state by what means oil and other debris are removed from the escalators at periodic intervals. Where a drive chain is used to couple the drive unit to the main drive shaft, an electronic automatic lubrication system shall be provided with sufficient oil capacity for at least one month's operation.

- X. Notices/Signs: A caution sign shall be located at the top and bottom landing of each escalator, readily visible to the boarding passengers. The sign shall include the following wording:
 1. Caution
 2. Passengers only.
 3. Hold handrail.
 4. Attend children.
 5. Avoid sides.

- Y. Electrical Supplies - Electrical Service: A 460 V, 3-phase, 4-wire, 60 Hz supply shall be provided by other parties. This supply shall be terminated in a junction box, adjacent to the control cabinet, and be used for the main motor power required. The tenderer shall detail the load requirements of each supply and the preferred locations of the incoming cables at the time of tender.

- Z. Proprietary equipment shall not be allowed. All equipment shall be maintainable by any licensed escalator mechanic.

2.03 FACILITY SERVICES REQUIREMENTS REQUIRED BY ELECTRICAL

- A. Provide for connection to 460VAC/3 phase/60Hertz electrical power, including a fused disconnect switch and equipment-grounding conductor. Switch and grounding conductor shall terminate at the escalator controller terminal block.
- B. Provide for connection to single (1) phase, 120 volt, 60 hertz, 15 amps electrical power supply including a grounding conductor terminating receptacle. Receptacle to be located within the machine space. Single-phase receptacles within wellways shall have ground-fault circuit-interrupter protection.
- C. Provide for connection to dedicated phone line, located at upper end pit area at the escalator controller.

2.04 FABRICATION

Escalators shall be partially pre-assembled prior to delivery to the job site.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Field measure and examine substrates, supports, and other conditions under which escalator work is to be performed. Conditions may include, but are not limited to:
 - 1. Installation of required permanent enclosures including railings and smoke baffles for the well ways.
 - 2. Well ways are clear of conduit, piping, ducts, sprinkler systems and any other utilities.
- B. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Protect floor openings adjacent to and in the general area of escalator installation.
- B. Install barricades a minimum of 48" high (1219 mm), for the duration of the escalator erection period.

3.03 INSTALLATION

- A. Properly locate truss and required intermediate supports at locations in accordance with manufacturer's recommendations and approved shop drawings. Anchor to building structure.

- B. Install escalator components in strict accordance with manufacturer installation methods.

3.04 ADJUSTING

Adjust components to provide a smooth start, which shall prevent undue strain on drive components. As directed by manufacturer literature, adjust and lubricate operating parts in compliance with manufacturer recommended equipment-operating standards.

3.05 DEMONSTRATION

Prior to final escalator acceptance, make a final check of each escalator operation with the State Engineer present. Manufacturer representative shall be present to determine that control systems and operating device are functioning properly.

3.06 PROTECTION

Escalator shall be protected from damage throughout the remainder of the construction period. Contractor shall not put escalator into service until final escalator acceptance.

3.07 LOCAL TECHNICAL SUPPORT

- A. The conveying equipment supplier shall have a Hawaii office, staffed within factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.
- B. The control system supplier shall have a Hawaii office, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.

PART 4- MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
14310.1	Escalators	Lump Sum
14310.2	Escalators - Operations & Maintenance Service	Month

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15011 - GENERAL MECHANICAL REQUIREMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. These general mechanical requirements govern work specified under all sections of DIVISION 15 - MECHANICAL.
- B. The Contractor shall furnish all labor, materials, tools and equipment and perform all work and services necessary for a complete and properly operating mechanical equipment system, as shown on the drawings and as specified, in accordance with provisions of the Contract Documents and completely coordinated with work of other trades.
- C. The Contractor shall completely examine the drawings and specifications and report to the State Engineer any error, inconsistency, omission, or error in the work of others affecting the mechanical work. If the Contractor proceeds with the work affected without written instructions from the State, he shall correct or pay for any resultant damage or defect.
- D. Furnish and install all supplementary or miscellaneous items, details, appurtenances and devices incidental to, or necessary for a complete operating system where work required is not specifically indicated or specified.
- E. Drawings and specifications shall be taken together. Provide work specified and not indicated or work indicated and not specified as though mentioned in both.
- F. The Contractor shall warrant that all materials and equipment furnished under this Contract will be new and that all work will be good quality, free from faults and defects and in conformance with Contract Documents for a guaranteed period of one year. It shall be the Contractor's responsibility to obtain extended warranties for use of all new equipment provided by the Contractor prior to project acceptance at no additional cost to the State.
- G. The Contractor shall maintain at the job site one copy of all drawings, specifications, addenda, approved shop drawings, change orders, and other modification, in good order and marked to record all changes made during construction. These documents shall be made available to the State Engineer.

- H. The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the work, he shall remove all his waste materials and rubbish from and about the project as well as all his tools, construction equipment, machinery and surplus materials and shall clean all new equipment and accessories.
- I. The Contractor shall schedule a date and time with the State Engineer, a minimum of 7 days in advance, for all testing. The Contractor shall bear all cost of the tests.
- J. The State Engineer shall have the right to accept or reject material, equipment, and/or workmanship and determine when the Contractor has complied with the Contract Documents.

1.03 INSPECTION OF SITE

- A. The Contractor shall visit the site and examine the conditions affecting his work before submitting his proposal. The submission of the proposal shall be considered evidence that the Contractor has visited the site and no extra payments will be allowed to the Contractor on account of extra work made necessary by his failure to visit the site.

1.04 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Submit 8 copies of each required submittal to the State Engineer. Submittals shall include the manufacturer's name, trade name, place of manufacture, catalog model or number, nameplate data, size, layout dimensions, 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 be provided. Photographs of existing installations and date submitted in lieu of catalog data are not acceptable and will be returned without review. Partial submittals are not acceptable and will be returned without review.
- C. At the time the submittals are submitted, the Contractor shall inform the State Engineer, in writing, of any deviation in the shop drawings and other submittals from the requirements of the contract documents.
- D. Product 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.
- E. Shop Drawings:
 - 1. Submit drawings at 22 by 34 inches in size, using a minimum scale of

- 1/8-inch per foot. Include floor plans, section 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. Indicate locations of items requiring maintenance or inspection. 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 equipment devices.
2. Provide a written certification with the shop drawing submittal stating that the Contractor has determined and verified all field measurements, sizes and obstructions, and that he has coordinated the shop drawings with the field conditions and the work of other trades.
 3. No direct reproductions of contract drawings shall be used as shop drawings.
- F. **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 prior to installation. Installation of the item shall not proceed until the manufacturer's instructions are received. Failure to submit can be cause for rejection of the equipment or material.
- G. **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 certificate 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.
- H. **Reference Standards Compliance:** Where equipment or 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.
- I. **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 State Engineer. The certificate shall state that the item has been tested in accordance with the specified organization's

test methods and that the item complies with the specified organization's reference standard.

- J. Site Maintained Drawings:
1. Maintain an accurate record of all changes made in installation from layout and materials shown on Contract Drawings and/or approved shop drawings.
 2. Indicate location of items requiring maintenance or inspection.
 3. Submit reproducible copies of these drawings to State Engineer prior to final inspection.
- K. Record Drawings: Record changes from the contract drawings of all ductwork, piping and equipment. Indicate location of valves and items requiring maintenance or inspection. Submit as-built drawings for review prior to final inspection.
- L. Operation and Maintenance Manuals: Submit 3 hard bound copies and 2 CDs of the operating and maintenance manuals on all equipment and the system as a whole. The manual shall identify project name and number, Contractor, Consultant, date and all equipment provided. It shall include the equipment manufacturer's name, model and serial number, tag number, capacity, quantity of units, their location and area (room) served and shall include the manufacturer's operation and maintenance manuals including control and wiring diagrams and source of service and replacement parts. Provide tabs separating each piece of equipment. When standard manufacturer's brochures are used, adequately indicate (highlight, arrow, etc.) the project related information and delete (X or cross-out) the non-applicable information. Include all applicable submittal items and information. Submit complete manuals for review prior to final inspection. Operating Instructions in manual shall include:
1. Detailed description of the system and sequence of operations for all equipment.
 2. Step by step procedure to follow in putting each piece of equipment in operation and trouble shooting.
 3. Provide schematic control diagrams for each separate system. Each diagram shall show locations of start-stop switches and correct operating settings for each control instrument shall be marked on this diagram.
 4. Provide diagram for the electrical control system showing the as-built wiring of all related electrical control items and interlocks.
- M. Contractor's License: Submit installer's current applicator license.
- N. Warranty: Submit warranty as noted under item entitled "WARRANTY" hereinbelow.
- O. Maintenance Service Contract: Submit maintenance service contract as noted under item entitled "TWO YEAR WARRANTY AND MAINTENANCE SERVICE

CONTRACT" hereinbelow.

1.05 WARRANTY

Contractor's Warranty:

- A. The Contractor shall warrant that all materials and equipment furnished under this Contract will be new and that all work will be good quality, free from faults and defects and in conformance with Contract Documents for a guaranteed period of one year from the project acceptance date.
- B. It shall be the Contractor's responsibility to obtain extended warranties for use of all new equipment provided by the Contractor prior to the project acceptance date at no additional cost to State.
- C. In addition to the general warranty requirements specified in SECTION 01300 – SUBMITTALS, the following shall also apply. The warranty period and one-year maintenance service commence concurrently from the project acceptance date or as authorized by the State Engineer, if earlier than the project acceptance date. Start-up and operation of a system component prior to acceptance of the whole system shall not constitute the start of the one year guarantee of that component. Correction of undue noise or vibration if included in the guarantee. Should any equipment, fixture or material fail within this period, the Contractor shall be responsible for all damage to any part of the premises caused by the failure and shall repair or replace the defects at no cost to the State. All work shall produce capacity and performance specified or shown.
- D. Refer to item entitled "TWO YEAR WARRANTY AND MAINTENANCE SERVICE CONTRACT" hereinbelow for more details.

1.06 LAWS, REGULATIONS AND CODES

- A. All work shall be in accordance with government laws, ordinances, rules and regulations, and orders.
- B. Comply with the County of Maui building, fire and plumbing codes; State of Hawaii Department of Health and Department of Labor and Industrial Relations Regulations; U.S. Occupational Safety and Health Act; U.S. Environmental Protections Agency Regulations; National Fire Protection Association Codes; and other laws, codes and regulations, and ordinances and manufacturer's recommendations and requirements, when applicable and as referenced in these specifications. The Contractor shall schedule and pay for all inspections required by any government agency.
- C. Comply with the recommendations and requirement of the Codes and Standards listed hereinafter in addition to the detailed requirements of this specification. In the event of conflicting requirements, this specification shall

prevail.

1. Americans with Disabilities Act Accessibility Guidelines (ADAAG):
36 CFR Americans with Disabilities Act (ADA) Accessibility
1991 Guidelines for Buildings and Facilities, Architectural
Barriers Act (ABA) Accessibility Guidelines
2. Air Moving and Conditioning Association (AMCA) Standards:
AMCA 210 Test Code for Air Moving Devices
AMCA 300 Test Code for Sound Rating Air Moving Devices
3. American National Standards Institute Publications (ANSI):
ANSI/ASME Scheme for the Identification of Piping Systems
A13.1
ANSI B16.18 Cast Copper Alloy Solder-Joint Pressure Fittings
ANSI B16.22 Wrought Copper and Copper Alloy Solder-Joint Pressure
Fittings
ANSI B16.23 Cast Copper Alloy Solder Joint Drainage Fittings - DMV
ANSI B16.26 Cast Copper Alloy Fittings for Flared Copper Tubes
ANSI B16.29 Wrought Copper and Wrought Copper Alloy Solder-Joint
Drainage Fittings
ANSI B31.1 Power Piping
ANSI B31.5 Refrigeration Piping and Heat Transfer Components
4. American Society of Heating, Refrigerating and Air-Conditioning
Engineers (ASHRAE):
Handbook, Applications - latest edition
Handbook, Equipment - latest edition
ASHRAE Energy Standards for Buildings except for Low Rise
90.1 Residential
5. ASTM International (ASTM):
ASTM A36 Standard Specification for Carbon Structural Steel
ASTM A53 Pipe, Steel, Black and Hot Dipped Zinc Coated Welded
and Seamless
ASTM A74 Cast Iron Soil Pipe and Fittings
ASTM A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A446 Standard Specification for Steel Sheet, Zinc-Coated
(Galvanized) by the Hot Dipped Process, Structural
(Physical) Quality
ASTM A500 Standard Specification for Cold-Formed Welded and
Seamless Carbon Steel Structural Tubing in Rounds and
Shapes
ASTM A501 Standard Specification for Hot-Formed Welded and
Seamless Carbon Steel Structural Tubing
ASTM A603 Standard Specification for Metallic-Coated Steel Structural
Wire Rope
ASTM B88 Seamless Copper Water Tube
ASTM B117 Standard Practice for Operating Salt Spray (Fog)
Apparatus
ASTM B306 Copper Drainage Tube (DWV)
ASTM B368 Standard Test Method for Copper-Accelerated Acetic Acid-

- Salt Spray (Fog) Testing (CASS Test)
- ASTM C564 Rubber Gaskets for Cast Iron Soil (R82) Pipe and Fittings
- ASTM C1071 Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)
- ASTM D1056 Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
- ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- ASTM F594 Standard Specification for Stainless Steel Nuts
- ASTM G21 Standard Practice for Determining Resistance of Polymeric Materials to Fungi
- 6. American Welding Society (AWS):
 - B3.0 Welding Procedure and Performance Qualification
- 7. Cast-Iron Soil Pipe Institute Publication (CISPI):
 - CISPI Hubless Cast-Iron Sanitary System Standard with Cast-Iron No Hub Pipe and Fittings No. 301
 - CISPI Installation Suggestions for "No-Hub" Pipe Fittings Pamphlet 100
- 8. National Fire Protection Association (NFPA) Standards:
 - NFPA 1 Fire Code
 - NFPA 70 National Electrical Code
 - NFPA 90A Standard for the Installation of Air-Conditioning and Ventilating Systems
- 9. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 - Manual for the Balancing and Adjusting of Air Distribution Systems
 - Low Velocity Duct Construction Standards, latest edition

1.07 PERMITS AND INSPECTIONS

- A. Applications for permits will be done by the Consultant. The Contractor shall pay for all necessary permits and fees required for the mechanical work.
- B. The Mechanical Contractor shall apply and pay for all necessary inspections required by any public authority having jurisdiction.

1.08 DISCREPANCIES

- A. The Drawings and Specifications are intended to be cooperative. Any material, equipment, or system related to this section and exhibited on the Architectural, Structural, Electrical or Mechanical Drawings, but not mentioned in the specifications, are to be executed to the intent and meaning thereof, as if it were both mentioned in the Specifications and set forth on the Drawings.

- B. In case of differences between the Drawings and Specifications, the more stringent of the requirements shall govern.
- C. Drawings and Specifications are intended to be in full agreement, but should any discrepancy or apparent difference occur between the Drawings and Specifications or should any error occur in the work of others affecting the work, the Contractors shall notify the State Engineer at once. If the Contractor proceeds with the work affected without written instructions from the State Engineer, the Contractor shall make good any resultant damage or defect. All interpretations of Drawings and Specifications shall be clarified by the State Engineer.

1.09 TRADE NAME

Mentioning of a trade name in the plans or specifications indicates that the manufacturer is acceptable to the State. However, certain specified construction and details may not be regularly included in the manufacturer's cataloged product. The Mechanical Contractor shall provide the material or equipment complete as specified.

1.10 WORKMANSHIP AND MATERIALS

- A. Workmanship shall be of the best quality and none but competent mechanical workers skilled in their trades and thoroughly familiar with the work involved shall be employed. The Contractor shall furnish the services of an experienced superintendent, who will be constantly in charge of the erection of the work, until completed and accepted.
- B. Unless otherwise hereinafter specified, each article of its kind shall be the standard product of a single manufacturer.
- C. Whenever the words "or approved equal", or other words of similar intent or meaning are used, implying judgement is to be exercised, it is understood that it is the judgement of the State Engineer that is referred to.
- D. The State Engineer shall have the right to accept or reject material, equipment and/or workmanship and determine when the Contractor has complied with the requirements herein specified.
- E. All manufactured materials shall be delivered and stored in their original containers. Equipment shall be clearly marked or stamped with the manufacturer's name and rating. Equipment and materials shall be carefully handled, properly stored and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the State Engineer. Damaged or defective items, in the opinion of the State Engineer, shall be replaced.
- F. Reference to standards is intended to be the latest version of the standard

referenced.

1.11 MANUFACTURER'S RECOMMENDATIONS

Equipment and/or systems installed under this division of the specifications shall be installed according to the manufacturer's written recommendations unless otherwise shown on the drawings or herein specified. Where installation procedures, or any part thereof, are required to be in accordance with the Manufacturer's written recommendations, printed copies of these recommendations shall be furnished to the State Engineer prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received and approved by the State Engineer. The State Engineer shall have final authority in approving manufacturer's recommendations. Failure to furnish these recommendations can be cause for rejection of the material.

1.12 CONTINUITY OF SERVICES

- A. The facility will be in use during construction of this project. It is intended that interruption of utilities be kept to a minimum. Notice of service interruptions shall be submitted to the State Engineer for approval at least 3 weeks before the intended date of service interruption. Exact date and time of interruption shall be determined by the State Engineer. Provide temporary valves, connections, piping, etc., as necessary to assure the continuity of service and shall be removed when no longer necessary. This shall be provided at no additional cost to the State.
- B. The Contractor shall submit to the State Engineer a copy of his work schedule indicating the date and area to be affected by his work.
- C. Execute work using such methods, techniques, connections and tie-ins which will cause least interference and interruptions of existing utilities and services. Keep roads clear of materials, debris, etc., to maximum extent possible. Schedule and make necessary arrangements for all work which will cause interferences or interruptions in advance with the State Engineer, all other affected trades and authorities having jurisdiction.
- D. Examine site and become familiar with existing local conditions affecting work.
- E. Examine all Drawings and Specifications, including electrical, and become familiar with the types and systems of construction to be used. Determine how such types and systems will affect the installation of mechanical work.
- F. Investigate, determine and verify locations of any overhead utilities on or near site. Determine such locations in conjunction with all public and private utility companies and with all authorities having jurisdiction.

1.13 OPENINGS, CUTTING AND REPAIRING

- A. The Mechanical Contractor shall coordinate with the work to be done under other sections in providing information as to openings required in walls and slabs for all ductwork and piping, including sleeves, where required.
- B. Any drilling or cutting required for the performance of work under this section shall be the responsibility of the Contractor and the cost shall be borne by him.
- C. The Mechanical Contractor shall pay all costs for cutting holes. All holes through existing concrete shall be toned to locate existing rebar, pre-stressed cables, or other utilities and shall either be core drilled or saw cut. All holes required shall have the approval of the State Engineer prior to cutting or drilling.
- D. It shall be the responsibility of the Contractor to ascertain that all openings are properly located and that no rebars, pre-stressed cables or other utilities are severed. Any damage due to the cutting or sawing shall be repaired by the Contractor.

1.14 ELECTRICAL WORK

- A. Provide electrical components of mechanical equipment and systems such as motors, controllers, contactors, starters, and disconnects under DIVISION 15 - MECHANICAL, as specified herein, and as necessary for complete and operable systems. 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 rated less than 100 volts or less and conduit shall be provided under DIVISION 15 - MECHANICAL and as specified in DIVISION 16 - ELECTRICAL. Extended voltage range motors will not be permitted. Motor control equipment forming part of motor control centers, assemblies, or other power sources to mechanical equipment shall conform to DIVISION 16 - ELECTRICAL.
- B. Electrical work under DIVISION 16 - ELECTRICAL is based on the electrical rating of equipment indicated on the Mechanical Drawings. Additional electrical work caused by any deviation under DIVISION 15 - MECHANICAL shall be paid for by the Mechanical Contractor.

1.15 SAFETY REQUIREMENTS

- A. Equipment Safety: Fully enclose or properly guard, in accordance with DOSH regulations, belts, pulleys, chains, gears, couplings, projecting setscrews, keys, rotating parts, and other power transmission apparatus, located where persons can come in close proximity thereto. Points of operation, in going nip points, and machinery producing flying chips and sparks shall be guarded in accordance with the applicable portions of DOSH regulations. Provide positive means of locking out equipment so that the 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.

- B. Warning Sign: Provide a permanent placard or sign at the entrance to confined spaces contained in the equipment. The sign shall warn personnel not to enter the space until the atmosphere inside has been tested and systems have been de-energized.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be new and free from defects. Unless otherwise specified, each equipment or material of its kind shall be the standard product of a single manufacturer. All pump motors shall be sized to not overload anywhere on the operating curve. Safety factor shall be a minimum of 1.15.
- B. 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 2-years prior to award of this contract. The 2-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 2-year period. The Contractor shall provide a list of locations in Hawaii with addresses and telephone number when requested by the State Engineer. All equipment with local manufacturer's representation shall be purchased through the local factory authorized distributor. Preference should be given to products made or manufactured in the United States of America.
- C. Alternative Qualifications: Products having less than a 2-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.
- D. Service Support: The equipment items shall be supported by more than one local service organization. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

- E. 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 distributing agent will not be acceptable.

PART 3 - EXECUTION

3.01 FACTORY PAINTING OF EQUIPMENT

Factory applied painting of equipment shall be as specified herein, and provided under each section. Manufacturer's standard factory painted systems may be provided subject to certification that the factory painting system applied will withstand 125 hours in a salt spray fog test, except that equipment located outdoors shall withstand 500 hours in a salt spray fog test. Salt spray fog test shall be in accordance with ASTM B117. Immediately after completion of the test, the paint shall show no signs of blistering, wrinkling or cracking; no loss of adhesion; and the specimen shall show no signs of rust creepage beyond 0.125-inch on either side of the scratch mark. The film thickness of the factory painted system applied to the equipment shall be not less than the film thickness used on the test specimen. If manufacturer's standard factory painting system is being proposed for use in lieu of the shop painting systems, submit certifications that the manufacturer's standard factory painting system conforms to the heat resistance requirement in addition to other certifications.

3.02 FIELD PAINTING

- A. Conform to SECTION 09911 – EXTERIOR PAINTING and SECTION 09912 – INTERIOR PAINTING. Provide labels/signs for all piping.
- B. The following items furnished under this section are to be painted and identified under DIVISION 15 - MECHANICAL as specified in SECTION 09911 – EXTERIOR PAINTING and SECTION 09912 – INTERIOR PAINTING. Do not paint over name plates or other identifying labels.
 - 1. Paint exposed black iron work including pipe hangers, etc., with 2 coats of zinc rich paint. Included in this work shall be bare metal access panel for mechanical equipment, control covers, sheetmetal ductwork, jackets, hangers, etc. Prepare surface as required in paint schedule. Provide 2 final coats to match adjoining surfaces except as noted.
 - 2. Stencil all exposed piping with painted black letters indicating the service and with an arrow indicating the direction of flow. Piping shall be stenciled where it enters and leaves each area and not in intervals over 30-feet within an area. Width of color band, size of legend letters, and position of legend shall conform to the requirements of ANSI A13.1, Scheme for the Identification of Piping System

3.03 EQUIPMENT AND PIPING IDENTIFICATION

- A. Identification of new pipelines shall be by means of colored, waterproof, all temperature, self-adhering labels and directional arrows.
- B. At Contractor's option, each and every system may be identified by painting with contrasting colors, using 3/4-inch high minimum stencil letters.
- C. Exposed pipes, whether insulated or not, shall be identified. Labels may be omitted from piping where the use is obvious, due to its connection to equipment and where the appearance would be objectionable in finished rooms or as approved by the State Engineer.
- D. Identification labels shall be placed as follows:
 - 1. Place near each valve and branch connection.
 - 2. Wherever piping merges or disappears from view from the floor of the room in which it is installed.
 - 3. Labels shall not be more than 50 feet apart.
 - 4. Direction of flow labels for all piping.
- E. Valve Index: Provide brass or plastic tags on valves with letters stamped or engraved thereon designating service of each valve. Tags shall be secured to the valves with a brass chain.
 - 1. Identify electrical and related power accessories. Identification shall be correlated with sequence of operation documents.
 - 2. Identification of valves, controllers and related power accessories shall be correlated with the sequence of operation documents.

3.04 PIPING INSTALLATION

- A. Conform to the requirements of the Uniform Plumbing Code and all manufacturer's recommendations. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Pull-tees are not permitted. Install valves with stems above horizontal. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions or separation at all dissimilar metals. Wrap pipe or tubing with 1/4-inch thick felt, secured with tape, where they contact other materials. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight galvanized steel pipe sleeves for all pipes passing through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry.

- B. Grout with fire proof material around all pipe penetrations through slabs and walls full length of penetrations. Provide chrome plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide clamping collar or membrane flange where pipe or drains penetrate waterproof membrane. Perform all welding using qualified welders in accordance with American National Standards Institutes Code B31.1 and American Welding Society Standard B3.0. Soil for bedding and backfill shall be tested for soil resistivity.

3.05 FIELD TESTS

The Contractor shall provide all labor, material, equipment, and instruments needed for the tests. During pressure test, all items in the system to be tested, which are not designed for the test pressure shall be removed or isolated from the system, and shall be reconnected or unblocked after the tests are completed. If operating tests require the supervision of the manufacturer's representative, the Contractor shall assist the representative by providing any labor, material, or equipment needed by the representative.

3.06 SEISMIC RESTRAINTS

- A. The requirements for seismic protection measures described in this section shall be applied to mechanical equipment and systems specified herein. Seismic protection requirements shall be in accordance with current adopted ICC IBC as amended using an importance factor of one and shall be provided in addition to any other requirements called for in other sections of these specifications. Refer to Structural Design Data for seismic requirements. Lateral support against earthquake induced forces shall be accomplished by positive attachments without consideration of friction resulting from gravity loads.
 - 1. The following mechanical equipment and electrical systems shall be installed as required on the drawings and other sections of these specifications and shall be seismically protected in accordance with this specification.
 - a. All piping inside the building in accordance with this specification.
 - b. All water supply systems.
 - c. Sanitary sewer systems.
 - 2. The bracing for mechanical equipment and systems shall be developed by the Contractor in accordance with the requirements of this specifications.
- B. Exclusions:
 - 1. Seismic protection of piping for fire protection systems shall be installed in accordance with NFPA.

2. Pipes and ducts do not require special seismic restraints on the following.
 - a. Piping in mechanical rooms less than 1-1/4-inch inside diameter.
 - b. All other piping less than 1-1/2-inch inside diameter.
 - c. Electrical conduit less than 2-1/2-inch inside diameter.
 - d. Piping suspended by individual hangers 12-inches or less in length from the top of pipe to the bottom of the supporting structural member where the hanger is attached, except as noted below.
 - e. Ducts suspended by hangers 12-inches or less in length from the top of the duct to the bottom of the supporting member, except as noted below.
 - f. All hangers shall meet the length requirements. If the length requirements are exceeded by one hanger in the run, the entire run shall be braced.
- C. Products: All materials and equipment shall be hot dipped galvanized.
1. Bolts and nuts shall be ASME F 593, Group 2 and ASTM F594, Group 2.
 2. Sway bracing shall be structural steel conforming with the following.
 - a. Plates, rods and rolled shapes, ASTM A36.
 - b. Wire rope, ASTM A603.
 - c. Tubes, ASTM A501.
 - d. Pipes, ASTM A500.
 - e. Light gauge angles less than 1/4-inch thick, ASTM A446.
 3. Flexible couplings shall have the same pressure and temperature ratings as adjoining pipe.
- D. Execution:
1. Bracing and Coupling: Bracing and coupling shall conform to the arrangements shown. Provisions of this paragraph apply to all piping within a 5-foot line around outside of the building unless buried in the ground. Piping grouped for support on trapeze type hangers shall be braced at the same intervals as determined by the smallest diameter pipe in the group. No trapeze type hangers shall be secured with less than two 2-inch bolts. Bracing rigidly attached to pipe flanges or similar shall not be used where it would interfere with thermal expansion of piping.
 2. Pipe Sleeves: Pipe sleeves in interior non-fire rated walls shall be sized as indicated on the drawings to provide clearances that will permit differential movement of piping without the piping striking the pipe sleeve.
 3. Spreaders: Spreaders shall be provided between adjacent piping runs to prevent contact during seismic activity whenever pipe or insulated pipe surfaces are less than 4-inches apart. Spreaders shall be applied at the same interval as sway braces at an equal distance between the sway braces. If rack type hangers are used where the pipes are restrained from contact by mounting to the rack, spreaders are not required for pipes mounted in the rack. Spreaders shall be applied to surface of bare pipe and over insulation on insulated pipes utilizing high density inserts and

pipe protection shields in accordance with manufacturer's recommendations.

4. Sway Bracing for Piping: Sway braces shall be provided to prevent movement of the pipes under seismic loading. Braces shall be provided in both the longitudinal and transverse directions, relative to the axis of the pipe. The bracing shall not interfere with thermal expansion requirements for the pipes as described in other sections of these specifications.
5. Transverse Sway Bracing: Transverse sway bracing for copper pipe shall be provided at intervals not to exceed those given in the tabulation below. All runs shall have minimum of 2 transverse braces. Transverse sway bracing for all pipes shall not exceed the hanger spacing specified in SECTION 15400 - PLUMBING.

<u>Pipe Diameter</u>	<u>L (Span)</u>	<u>F (Force on Brace)</u>
One	11	17
1-1/2	12	35
2	14	70
2-1/2	15	110
3	17	150
4	19	300

Note: Bracing shall consist of at least one vertical angle 2x2x16 gauge and one diagonal angle of the same size.

6. Longitudinal Sway Bracing: Longitudinal sway bracing shall be provided at 40-foot intervals except when the location of the sway braces is shown on the drawings for the particular piping system. All runs shall have one longitudinal brace minimum. Sway braces shall be constructed in accordance with the drawings. Branch lines, walls or floors shall not be used as sway braces.
7. Vertical Runs: Vertical runs of pipe shall be braced at not more than 10-foot vertical intervals. For tubing, bracing shall be provided at more than 4-foot spacing. Vertical bracing shall be above the center of gravity of the span being braced. All sway braces shall be constructed in accordance with the drawings. Branch lines, walls, floors shall not be used as sway braces.

8. Anchor Rods, Angles and Bars: These items shall be bolted to either pipe clamps or pipe flanges at one end and cast-in-place concrete or masonry insert or clip angles bolted to the steel structure on the other end. Rods shall be sold metal or pipe as specified. Anchor rods, angles and bars shall not exceed lengths given in the tabulation below.

<u>Type</u>	<u>Size (in.)</u>	<u>Max. Length (ft/in)</u>	<u>Max.Load (kips)</u>
Angle	1-1/2x1-1/2x1/4	4-10	5.7
	2x2x1/4	6-6	7.8
	2-1/2x1-1/2x1/4	8-0	9.8
	3x2-1/2x1/4	8-10	10.8
	3x2-1/2x1/4	9-10	11.9
Rods	3/4	3-1	5.7
	7/8	3-8	5.0
<u>Type</u>	<u>Size (in.)</u>	<u>Max. Length (ft/in)</u>	<u>Max.Load (kips)</u>
Flat Bars	1-1/2x1/4	1-2	3.1
	2x1/4	1-2	4.1
	2x3/8	1-9	6.2
Pipes 40S	1	7-0	4.1
	1-1/4	9-0	5.5
	1-1/2	10-4	6.6
	2	13-1	8.9

9. Clamps and Hangers: Clamps and hangers on uninsulated pipes shall be applied directly to pipe. Insulated piping shall have clamps or hangers applied over insulation in accordance with Insulation section.
10. Bolts: Bolts used for attachment of anchors to pipe and structure shall be not less than 2-inches in diameter.

3.07 CLEANUP AND CLEANING

The Contractor shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the work, he shall remove all his waste materials, and rubbish from the project site as well as his tools, construction equipment, and surplus materials. Clean all new equipment and materials prior to final inspection.

3.08 POSTED OPERATING INSTRUCTIONS

Furnish approved operating instructions for each principal item of equipment for the use of the operating and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams and control sequence for each principal item of equipment. Operating instructions shall be framed under glass or in approved laminated plastic and posted where directed by the State Engineer. Operating instructions shall be attached to or posted

adjacent to each principal item of equipment including start up procedure in the event of equipment failure and other items of instruction as recommended by the manufacturer of each item of equipment. Operating instructions exposed to the weather shall be made of weather-resistant materials or shall be suitably enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

3.09 INSTRUCTION TO STATE PERSONNEL

The Contractor shall furnish the services of competent, factory certified instructors who will give full instruction to the designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements of the equipment, components and system specified. Each instructor 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. Service Contractor during warranty period must also attend. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the State for regular operation. At a minimum, the number of man-days (8-hours) of instruction shall be provided. When the number of hours exceeds 3-hours, training shall be provided in 4-hour blocks per day and shall be scheduled with the State 2-weeks prior to start of training. When significant changes or modifications in the equipment or system are made under the terms of the contract, additional instruction shall be provided to acquaint the operating personnel with the changes or modifications.

3.10 OPERATION AND MAINTENANCE MANUAL

Refer to paragraph entitled "Operation and Maintenance Manuals", hereinabove.

3.11 TWO YEAR WARRANTY AND MAINTENANCE SERVICE CONTRACT

- A. Contractor shall attend a pre-maintenance meeting with the representative of the State to review the requirements and expectations of the State. The Contractor and Subcontractor(s) who are primarily in charge of maintenance shall attend this meeting.
- B. The installer shall submit 8 copies of the Maintenance Service Contract, countersigned by the General Contractor, that will validate the warranty.
- C. The warranty and maintenance service 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 warranty period shall run concurrently (same start and end dates). However, should the Contractor default on or delay the maintenance service contract and must restart or complete the service at a later time, then

the warranty period shall also extend to match the revised maintenance service period.

- D. Certification of Maintenance Work: All work done under this maintenance contract shall be performed by a technician with a minimum of 4 years of servicing experience of the equipment being serviced and work 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 shall include findings by the service personnel and description of work performed to maintain the systems in proper operating condition. All service reports shall be reviewed with an authorized representative of the State who will acknowledge and sign reports.
- E. 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. Monthly service shall be defined as 12 service periods a year. Each service period shall be approximately 30 days apart. Quarterly service shall be defined as 4 service periods a year. Each period shall be approximately 3 months apart. The first service shall occur 3 months after the start of the maintenance period. Semi-annual service shall be defined as 2 services per year. Each period shall be approximately 6 months apart. The first service shall occur 6 months after the start of the maintenance period. Annual service shall be defined as one service period a year. This service shall be performed 12 months after the start of the maintenance period. Monthly, quarterly, semi-annual and annual services shall all be performed independent of each other but, may be completed simultaneously. For example, quarterly service visits shall not count as monthly service visits.
 3. Contractor shall submit a written maintenance work schedule to the State for approval prior to performing the maintenance service work. The schedule shall identify all service tasks (i.e. monthly, quarterly, semi-annual, etc.) accurate to a specific week of each month. Any changes in the schedule that will affect subsequent scheduled services shall be submitted in writing to the State prior to the next service and approved by the State.
 4. Contractor shall give the State a minimum of 7 days prior to the notice to any maintenance and repair work. For any work that will require equipment outages, Contractor shall inform the State on the estimated duration of the outage.
- F. Trouble Calls: Emergency services and repairs required between regular

service call shall be rendered with 4 hours after the Contractor is notified, non-working days included, at no additional costs to the State. The Contractor shall call the representative of the State the next working day after being notified of the problem and report the status of repairs.

- G. Maintenance Report/Checklist: The Contractor shall prepare and maintain a maintenance service report/checklist for all regular and emergency services which shall include the following:
1. Name of person making the service call.
 2. Date of call.
 3. Time in and out from project site.
 4. Nature of call; if emergency, who contacted the service company.
 5. Listing of equipment serviced including model and serial numbers.
 6. 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.
 7. All items indicated in the Schedule of Maintenance Service.
- H. The Service Contractor shall keep a separate log recording all regular and emergency maintenance calls to the project at his office. In addition, the Contractor shall submit a signed copy of the written reports of maintenance and repair services performed within 2 working days after completion of the service. Reports shall be signed by an authorized representative of the State.
- I. Maintenance Log: The Contractor shall provide a composition book to log all job site service visits. The log shall include the date, name of mechanic, reason for the service visit, and notes on any discrepancies found and work performed. This composition book log shall remain at the job site. In addition, the Contractor shall provide a copy of the service reports, checklists, and any other pertinent documentation to be left at the job site in a Contractor provided binder.
- J. Cleanup and Work Practices: The Contractor shall keep the job site free of debris, litter, discarded parts and materials, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts, and equipment from 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.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured or paid for separately, but shall be considered incidental to and included in the price bid for the various items of work in this project.

ATTACHMENT NO.1

SCHEDULE OF MAINTENANCE SERVICE

All services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks:

A. Air Handling Unit/Fan Coil Unit:

1. Monthly Service:

- a. Clean and clear all drip pans and flush all related condensate drain lines with nitrogen. (Note: Contractor may be liable for water damage due to clogged drains). Install pan tablets as necessary to control algae growth.
- b. Replace all disposable air filters. Use Farr 30/30 or equal.
- c. Lubricate and oil all fan and motor bearings and connections of dampers and vanes.
- d. Check all drives for wear; adjust belt tension. Replace belt as required.
- e. Operate equipment to check for proper operation, unusual noise and vibration. Adjust or repair all equipment and controls as required. Clean up all equipment.
- f. Check DDC scheduling for proper operation and settings.
- g. Certify performance of monthly services and that all discrepancies are reported and corrected.

2. Annual Service:

- a. Adjust alignment of bearings and sheaves. Lubricate fan and motor bearings. Replace worn or noisy bearings or sheaves.
- b. Clean cooling coils of dirt accumulation using nitrogen, high pressure air/water, steam, or chemical coil cleaner solution.
- c. Check pressure and temperature differential across cooling coils and log readings.
- d. Clean supply and return air grilles, registers and diffusers and fresh air intake grilles and dampers and repair or replace deteriorated bird screens.

- e. Clean and adjust all fan wheels and interior and exterior of equipment housings.
- f. Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.
- g. Check and calibrate all electric temperature controls.
- h. Certify performance of annual service and correct and report all discrepancies.

B. Ventilating Fans (Exhaust):

1. Quarterly Service

- a. Check motor controlled and backdraft dampers for proper operation; lubricate linkage for free movement.
- b. Lubricate fan motors and bearings.
- c. Check belt wear and tension; adjust or replace as needed.
- d. Check sheaves for wear, replace as needed.
- e. Check fan collar, bearings and shaft for wear, repair or replace as needed.
- f. Replace air filters where installed; remove and wash intake grilles.
- g. Certify performance of quarterly fan maintenance service and correct and report all discrepancies.

2. Semi-Annual Service

- a. Check and clean all fan wheels and housings of dust, dirt, and grease.
- b. Remove and wash all intake grilles and dampers and repair or replace deteriorated bird screens.
- c. Certify performance of semi-annual fan maintenance service and correct and report all discrepancies.

C. Valves, Equipment and Supports:

- 1. The Contractor shall exercise all equipment shut off valves annually for proper operation and tightness.

2. Wire brush, prime and paint rust from equipment and support surface to further rusting.
3. Certify that all discrepancies are reported and corrected.

D. Controls:

1. Quarterly Service:
 - a. Verify all temperature setpoints.
 - b. Check and record findings for control devices for proper operation, sticking stems and calibrations; repair/replace weak or broken springs and all other parts.
 - c. Certify performance and completion of quarterly maintenance service. Submit written service report indicating all abnormalities/discrepancies, if any, and actions taken.

E. Pumps:

1. Quarterly Service
 - a. Check and record findings for pump and motor bearings for abnormal temperature and unusual noise or vibration.
 - b. Check and record findings for packing glands and seals for excessive leakage and tighten or replace.
 - c. Check and record findings for thermometers and pressure gauges. Calibrate or replace as necessary.
 - d. Certify performance and completion of quarterly maintenance service. Submit written service report indicating all abnormalities/discrepancies, if any, and actions taken.
2. Semi-Annual Service
 - a. Check and record findings for condition of insulation; re-insulate as necessary.
 - b. Log suction and discharge pressure. Remove and clean pump strainers. Coordinate strainer cleaning with cooling tower cleaning.
 - c. Clean and remove all dust and foreign matter. Clean all rust spots and scratches and touch-up paint with matching color.
 - d. Lubricate motor pump bearings as required.

- e. Check and record findings for motor coupling for alignment and coupling inserts for wear; check and make sure mounting bolts secure.
- f. Certify performance and completion of semi-annual maintenance service. Submit written service report indicating all abnormalities/discrepancies, if any, and actions taken.

F. Air Devices:

1. Quarterly Service

- a. Provide complete cleaning of supply and return air grilles, registers and diffusers and fresh air intake grilles and dampers.

END OF SECTION

SECTION 15400 - PLUMBING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

Work involves a complete plumbing design including sanitary waste, water and storm drain piping.

1.03 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS. Refer to SECTION 15011 - GENERAL MECHANICAL REQUIREMENTS for additional submittal requirements.
- B. Certificates: As specified in SECTION 15011 - GENERAL MECHANICAL REQUIREMENTS.
- C. Warranty: Submit warranty as noted under item entitled "WARRANTY" in SECTION 15011 - GENERAL MECHANICAL REQUIREMENTS.
- D. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification. Coordinate deliveries to avoid interferences or construction delays. Protect products during delivery, storage, installation, and the remainder of the construction period after installation.

1.05 COORDINATION WITH OTHER SECTIONS

Excavating, trenching and backfilling shall follow standard industry practices and the Uniform Plumbing Code.

1.06 QUALITY ASSURANCE

- A. Comply with all the requirements of the State of Hawaii, County of Maui and applicable utility companies, and all recommendations of manufacturers.

- B. Obtain and pay for all fees, permits, licenses, assessments, connection charges and inspections required for this work.
- C. Refer to the General Provisions, Section 6.13 Substitution of Materials and Equipment After Bid Opening.
 - 1. Plumbing Fixtures: American Standard, Eljer, Elkay, Kohler or approved equal.
 - 2. Valves: Dezurick, Hammond, Lukenheimer Nibco, Stockham, Walworth or approved equal.
 - 3. Drainage System Specialties: Josam, Smith, Wade, Zurn or approved equal.
 - 4. Pipe Supports: Elcen, Fee and Mason, Grinnell, Unistrut or approved equal.
- D. Comply with the recommendations and requirement of the latest edition Codes and Standards listed hereinafter in addition to the detailed requirements of this specification. In the event of conflicting requirements, this specification shall prevail.
 - 1. Americans with Disabilities Act Accessibility Guidelines (ADAAG):
 - 36 CFR 1991 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities, Architectural Barriers Act (ABA) Accessibility Guidelines
 - 2. American National Standards Institute Publications (ANSI):
 - ANSI/ASME A13.1 Scheme for the Identification of Piping Systems
 - ANSI B16.18 Cast Copper Alloy Solder-Joint Pressure Fittings
 - ANSI B16.22 Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
 - ANSI B16.23 Cast Copper Alloy Solder Joint Drainage Fittings - DMV
 - ANSI B16.26 Cast Copper Alloy Fittings for Flared Copper Tubes
 - ANSI B16.29 Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings
 - 3. American Society for Testing and Materials Publications (ASTM):
 - ASTM A53 Pipe, Steel, Black and Hot-Dipped Zinc Coated Welded and Seamless
 - ASTM A74 Cast Iron Soil Pipe and Fittings
 - ASTM B88 Seamless Copper Water Tube
 - ASTM B306 Copper Drainage Tube (DWV)
 - ASTM C564 Rubber Gaskets for Cast Iron Soil (R 82) Pipe and Fittings

4. Cast-Iron Soil Pipe Institute Publication (CISPI):
 - CISPI Hubless Cast-Iron Sanitary System
Standard with Cast-Iron No Hub Pipe and Fittings
No. 301
 - CISPI Installation Suggestions for "No-Hub" Pipe Fittings
Pamphlet
100
5. National Fire Protection Association (NFPA):
 - NFPA 1 Fire Code

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Requirements of the manufacturer's equipment that is a component of a system provided under this work is included with the system's specification hereinafter. Capacities and characteristics of the equipment are indicated on the drawings. See electrical drawings for voltage and phase requirements of all equipment furnished under this work.
 1. Sump Pump (Elevator and Escalator Pit): Submersible non-clog sump pump. Solids discharge size to 2-1/2-inches diameter. Ratings and capacity as indicated on drawings. Grundfos, Liberty, PACO, TACO or approved equal.
 2. Elevator Sump Water Level Alarm: Provide control panel with 100 dBA minimum alarm, metal cabinet with lock, warning light and by-pass with control voltage transformer. Honeywell, Johnson Control or approved equal.

2.02 FIXTURES

- A. Furnish masonry and concrete contractor with standard galvanized wall sleeves and inserts required for fixture installation. All valves bronze and brass with chrome plating.
 1. Mop Sink (M/S): Kohler K-6710, acid resisting enameled cast iron, floor corner type mop sink, 3-inch outlet, removable vinyl coated rim guard, Kohler K-8940. Provide service sink faucet with 8-inch centers, vacuum breaker spout, 3/4-inch threaded outlet, ADA compliant, No. 369 handles, pail hook and wall support, hot and cold water faucet, Chicago 540-LD-897S-WXF or accepted equivalent. Provide 2.0 gpm cold water flow restrictor.

2.03 PIPE FITTINGS

- A. Only "domestic" piping shall be allowed on this project (made in USA, no foreign products).
1. Water Piping: Type "L" hard drawn copper tube, ASTM B88 with non-lead soldered (95-5) joint wrought copper pressure fittings for aboveground. Use Type "K" copper tube with brazing alloy on joints and pipe below grade. All solder shall be non-lead; flux shall be non-corrosive complying with Copper Development Association Standard 1.0.
 2. Waste and Vent Pipes Smaller than 3-Inches Above Grade: Service weight cast-iron soil pipe, ASTM A74, no-hub cast-iron soil pipe conforming to CISPI 301 with stainless steel bands.
 3. Waste and Vent Pipes 3-Inches or Larger Above Grade: Service weight cast-iron soil pipe, ASTM A74, no-hub cast-iron soil pipe conforming to CISPI 301 with stainless steel bands.
 4. Waste and Vent Piping Below Grade: Schedule 40 polyvinyl chloride (PVC) pipe or ABS pipe. Provide transition union connections or threaded gate valve between copper tubing and PVC piping. Provide male threaded joints with PTFE (polytetrafluoroethylene) pipe threaded paste for threaded connections.
 5. Storm Drain Piping: Underground and concealed pipes shall be service weight cast iron pipe, hub and spigot fittings, double asphalt coated, ANSI A112.5.1 double coated fittings. Joints for cast iron hub and spigot fitting shall be made by use of positive double seal elastomeric compression gaskets conforming to ASTM C564, such as TY-seal or equal. Above ground exposed pipes and pipes cast in concrete shall be Schedule 40 Acrylonitrile Butadiene Styrene (ABS) with solvent-joined fittings, ASTM D2661. Above ground concealed pipes in furred wall, enclosed under floor spaces, or ceiling spaces shall be Schedule 40 Acrylonitrile Butadiene Styrene (ABS) with solvent-joined fittings, ASTM D2661.

2.04 VALVES

- A. All valves shall be bronze and rated for 250 psi operating pressure.
1. Ball Valve 2-inches and Smaller (Shut-Off Valve): Nibco T-585-70.
 2. Check Valve 2-inches and Smaller: Nibco T-413.
 3. Globe Valve 2-inches and Smaller (Balancing Valve): Nibco T-235.

2.05 PLUMBING SYSTEM SPECIALTIES

- A. Floor Cleanout: Watts CO-200-R floor cleanout. Provide clamp device when installed in floor with waterproofing membrane.
- B. Floor Sink: Josam 49040 Series, 12-inch square top, 8-inch deep with sediment bucket.

- C. Roof Drain: J.R. Smith Fig. No. 1015 series with deck clamp, flashing flange, adjustable top, drain receiver, extension collar as required.
- D. Overflow Drain: J.R. Smith Fig. No. 1070 flooding dam type C1, flashing clamp.
- E. Area Drain: Zurn Z-540 cast iron medium duty, "Sur-Set" bucket area drain with sediment bucket. 12- inch diameter grate.
- F. Exterior Hose Bibb: Chicago No. 998, chrome plated, vacuum breaker, ¾ - inch inlet, loose key handle with bronze square head stop.

PART 3 - EXECUTION

3.01 PREPARATION

Visit the work site and become fully aware of all existing conditions. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route of each pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate the structure and the work of other trades. Furnish other trades with information to properly locate and size openings in the structure required for this work. Furnish anchor bolts, sleeves, inserts and support required for this work.

3.02 INSTALLATION AND REQUIREMENTS

Perform work using personnel skilled in the trade involved. Provide competent supervision. Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification and conforming to recognized commercial standards. Provide all extra materials and labor for a complete operable system at no extra cost to the State. Installation shall be in accordance with manufacturer's recommendations. Provide access panels for all items requiring servicing, inspection, maintenance and adjustment.

3.03 UTILITY CONNECTIONS

Existing utility locations were determined from information available at the time of design. Verify the exact location and elevation of all existing utilities. Notify the State Engineer immediately in writing of all discrepancies. Be fully responsible for any and all damage resulting from failure to exactly locate and preserve existing ground utilities.

3.04 FIXTURE INSTALLATION

Set fixtures in approved workmanlike manner. Point up all edges against walls and partitions with white grout. Provide adequate supports for wall-mounted fixtures. Provide supplies for all water lines to fixtures; 1/4 turn angle stops,

stainless steel braided supply line. Provide chrome plated brass p-trap, waste fittings and escutcheon as required for fixture. Exposed metal including pipe shall be polished chrome plated.

3.05 EQUIPMENT INSTALLATION

Install equipment in the space allotted with sufficient clearance and support for proper operation and maintenance. Where equipment differs in arrangement or connections from those shown, provide all required changes in piping, supports, floor drain locations and appurtenances and cost of work of any other trades affected. Provide equipment accessories necessary for proper operation and support. Final connections shall include shutoff valves, regulators, traps, unions, strainers, and direct/indirect waste connections. Plumbing Contractor shall obtain all information necessary for a complete and operable system. Provide structural steel framing for equipment as required.

3.06 PIPING INSTALLATION

Conform to the requirements of the Uniform Plumbing Code and all manufacturer's recommendations. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Provide proper support and adequate provisions for expansion, contraction, slope and anchorage. Provide dielectric unions at all dissimilar metals. Wrap pipe or tubing with 1/4-inch thick felt, secured with tape, where they contact other materials. Have piping treated, inspected and approved before it is furred in, buried or otherwise hidden. Provide standard weight galvanized steel pipe sleeves for all pipes passing through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete or masonry. Grout with fire proof material around all pipe penetrations through slabs and walls full length of penetrations. Provide chrome plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide clamping collar or membrane flange where pipe or drains penetrate waterproof membrane. Perform all welding using qualified welders in accordance with American National Standards Institutes Code B31.1 and American Welding Society Standard B3.0. Soil for bedding and backfill shall be tested for soil resistivity. If soil resistivity is less than 20,000 ohms-cm, provide cathodic protection of underground steel and copper lines.

3.07 PIPING SYSTEM SUPPORTS

- A. Pipe Supports: Factory-fabricated by Elcen, Fee and Mason, Grinnel, Unistrut or approved equal. No chains or perforated straps permitted. Provide concrete inserts, beam clamps, channel framing, hanger rods and accessories required

for proper support. Ramset or explosive type anchors may not be used without written permission by the State Engineer. Trenching/backfilling in accordance with the Uniform Plumbing Code. Support underground piping on firm soil along its entire length. Where rocks are encountered, have trench excavated to a minimum overdepth of 4-inches and backfilled with granular moist earth, thoroughly tamped. Materials used for backfilling over piping shall be granular earth, free from debris and stones. The State Engineer may reject any materials which he considers unsuitable for fill. Clay and adobe type soil is not allowed. Provide a minimum of 2-feet of cover for all pipes. Where sewer and water lines are laid in the same trench, place water line on solid shelf with bottom of water line 12-inches above top of sewer. Where sewer and water lines cross, encase sewer in 4-inch thick concrete envelope. Support steel and copper pipe at maximum spacing of 6-feet for pipes 1-1/2-inches and smaller, 10-feet for pipes 2-inches through 4-inches and 15-feet for pipes larger than 4-inches. Support vertical piping with hanger at base of riser and with pipe clamp at each floor. Provide expansion loops in water piping where pipe crosses structural expansion joints. Loop shall consist of four 90-degree elbows with 10 pipe diameters in between.

- B. Pipe Hangers: Steel clevis hanger with adjustable hanger rod; 3/8-inch for pipe 2-inches and smaller, 1/2-inch for pipe 2-1/2-inches through 3-1/2-inches and 5/8-inch for pipe 4-inches and larger. Groups of lines may be supported from steel channel pipe clamp.

3.08 DRAINAGE, WASTE AND VENT PIPING SYSTEMS

Slope drain lines at 1/4-inch per foot unless otherwise indicated. On roof drains and where other drains occur above the ground floor, provide clamping device with drain. Provide a prefabricated flashing sheet (non-lead) extending 8-inches out around drain body and secure with clamping device. On vents through roof, extend vent flashing 8-inches out all around base of vent, extending collar up vent and turn in at top. Install hubless cast-iron pipe in accordance with CISPI pamphlet 100-1972. Provide cast-iron and neoprene gasketed no-hub coupling below grade. MG stainless steel clamps and

cast-iron no-hub couplings shall be installed in accordance with manufacturer's written instructions.

3.09 WATER PIPING SYSTEM

- A. Secure each water line where it penetrates partitions to serve fixtures, hose bibbs and similar items. Wrap all lines passing through concrete with polyethylene tape. Install unions or flanges at all valves, equipment and system specialties. Set hose bibbs 18-inches above finished grade, unless otherwise indicated. Install dielectric unions at connections of copper and ferrous pipes. Provide access panels as required. No flux shall enter inside of piping.

- B. Provide 12-inch long air chambers line sized at all plumbing fixtures.

3.10 ELECTRICAL

Provide control wiring and conduit. Conform to the requirements of ANSI C1, National Electric Code, and to the requirements of DIVISION 16 – ELECTRICAL of these specifications. Obtain equipment manufacturer's control wiring diagram for the equipment furnished. Prepare a control and interlock wiring diagram for the complete system. Indicate terminal points to factory wired equipment. Submit control diagrams for review. Furnish motor starters for all electrically driven plumbing equipment, complete with circuit breaker, one overload relay per phase, 120 volt control circuit and horsepower rating.

3.11 FIELD QUALITY CONTROL

- A. Test plumbing systems in accordance with the Uniform Plumbing Code. Perform tests in the presence of, and to the satisfaction of inspectors having jurisdiction over the work. Ask for final inspection by the State Engineer after tests and adjustments have been performed. Test equipment to demonstrate its operation and compliance with the specification.
- B. Test drainage systems in accordance with the Uniform Plumbing Code.
- C. Hydrostatically test the domestic water piping system at 100 psi for 2 hours. Inspect the entire system while under pressure and correct all deficiencies.
- D. Test equipment to demonstrate its operation and compliance with the specification.

3.12 TESTING AND INSPECTION

- A. Contractor shall furnish all equipment for tests and any required retests and pay for all cost of repairing any damage resulting from such tests. Contractor shall adjust systems until they are approved. Tests shall be performed in the presence of, and to the satisfaction of the State Engineer.
- B. Sanitary and water piping shall be tested in accordance with the Uniform Plumbing Code. Sanitary drains shall be tested with a minimum of 10-feet of water for 15 minutes. Valves shall be rated for at least 200 psi working pressure.
- C. Defective Work: If inspection of tests shows defects, such defective work or material shall be replaced and inspection and tests repeated. Repairs to piping shall be made with new material. No caulking of screwed joints or holes will be accepted. Installation shall be repaired by skilled mechanics of the trade involved at no extra expense to the State.
- D. Protection to Fixtures, Materials and Equipment: Pipe openings shall be closed

with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury. Upon completion of all work, the fixtures, materials and equipment shall be thoroughly cleaned, repainted, adjusted and operated.

- E. Chlorination: Domestic water lines shall be sterilized with chlorine before acceptance of work. Sterilize water system for 24 hours with 100 ppm chlorine introduced into the lines in an approved manner. Dosage of chlorine shall not be less than 50 ppm. After a contact period of not less than 8 hours, the system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 ppm. All valves in the lines being sterilized shall be opened and closed several times during the contact period. A certificate shall be furnished to the State evidencing proper performance of sterilizations.

3.13 CLEANING AND ADJUSTING

At the completion of the work, all parts of the installation shall be thoroughly cleaned. Equipment, pipe valves, and fittings shall be cleaned of grease and metal cuttings, and sludge that may have accumulated by operation of the system for testing. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishing, due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor without cost to the State. Touch-up with matching paint all damaged factory finishes.

3.14 FINAL CONNECTIONS TO EQUIPMENT

Plumbing Contractor shall obtain all information necessary to make final connections to equipment. Provide control wiring and conduit for all items as required. Installation of State furnished equipment to facilitate final connections shall be included.

3.15 INSTRUCTIONS

Instruct the State in the proper operation and maintenance of the systems. Review the maintenance manuals with the State. Submit a list of manufacturer's warranties for the equipment furnished.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
15400.1	Plumbing	Lump Sum
15400.2	Plumbing - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 15500 – FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

Provide an automatic fire sprinkler system, complete and operating and as indicated on the drawings. Provide shall mean "furnish and install" when used herein. All sprinkler systems to be installed shall be tied-in to building fire alarm system. All preaction systems shall be FM and UL listed.

1.03 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS and the following requirements.
- B. Drawings: The plans of the system are to be used as the basis for working plans. Coordinate shop drawings with lighting fixtures, ducts and air inlets of finished areas, to minimize interference before installation. Contractor shall in their shop drawings provide all information required for a complete sprinkler system working drawing in accordance with NFPA Standard 13. Contractor shall coordinate with the Hawaii Fire Insurance Rating Bureau to insure proper compliance with their requirements. Shop drawings of details required for installation shall be prepared by the Contractor and submitted to the Hawaii Fire Insurance Rating Bureau, Fire Department and Building Department. When stamped with the Hawaii Fire Rating Bureau approval, the plans shall be submitted to the State for review, prior to fabrication.
- C. Pipe sizing shall be by pipe schedule for Ordinary Group 1 as designated in NFPA 13 for all areas. At Contractor's option, the sprinkler system may be hydraulically designed in accordance with NFPA 13. Calculations shall be submitted by the Contractor with the shop drawings for review by the State.
- D. Guarantee: Submit guarantee as noted under item entitled "GUARANTEE" hereinbelow.

1.04 QUALITY ASSURANCE

- A. Comply with all the requirements of the State of Hawaii, County of Maui, and Hawaii Insurance Rating Bureau and NFPA 13.
- B. Obtain and pay for all fees, permits, licenses, assessments, connection charges and inspections required for this work.

C. Comply with the recommendations and requirement of the Codes and Standards listed hereinafter in addition to the detailed requirements of this specification. In the event of conflicting requirements, this specification shall prevail.

1. National Fire Protection Association (NFPA) Standards:

NFPA 1	Fire Code
NFPA 13	Installation of Automatic Sprinklers
NFPA 70	National Electrical Code

2. American Society of Testing and Material Publications (ASTM):

ASTM A53	Pipe, Steel, Black and Hot Dipped Zinc Coated Welded and Seamless
ASTM A153	Zinc Coating (Hot Dip) on Iron and Steel Hardware

D. The Contractor shall submit data for the State's review which will show that he has successfully installed systems of the same type and design as specified herein. The data shall include the names and locations of at least 2 installations where the Contractor has installed such systems. The Contractor shall indicate the type of design of these systems and certify that these systems have performed satisfactorily in the manner intended for a period of less than 18 months.

E. Contractor shall submit and obtain a fire protection permit from Maui County Fire Prevention Bureau.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

Furnish all new fixtures, materials and accessories bearing the manufacturer's identification. Coordinate deliveries to avoid interference or construction delays. Protect products during delivery, storage, installation and the remainder of the construction period after installation.

1.06 GUARANTEE

All work in this section shall be guaranteed for a period of one year from date of acceptance of the work as a whole by the State. Should any fixture or material fail within this period, the Contractor shall be responsible for all damage to any part of the premises caused by the failure and shall repair or replace the defects at no cost to the State.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND COMPONENTS

- A. Requirements of manufacturer's equipment that is a component of a system provided under this work are included with the systems specification hereinafter.
- B. Automatic Fire Sprinkler System:
 - 1. All system components shall conform to Chapter 3 of NFPA Standard 13 and shall be UL listed or FM approved.
 - 2. Sprinkler Heads: Provide sidewall heads at the bottom of the elevator hoistway not more than 2 feet from the bottom of the floor pit. Heads shall be upright, pendant or sidewall type bronze or brass at top of elevator hoistway. Heads at elevator machine room and exposed ceiling areas shall be upright or pendant. Heads at finished ceilings shall be recessed pendant type. Heads shall be of the standard type and temperature ratings conforming to NFPA Standard 13.
 - 3. Sprinkler Cabinet: A sprinkler cabinet containing extra sprinkler heads of each style, stoppers and sprinkler wrenches as required by NFPA Standard 13 shall be clearly labeled to indicate the type and quantity of sprinkler equipment which it contains.
 - 4. Piping: Pipe above ground shall be seamless Schedule 40, black steel pipe ASTM A 53A, ASTM A153 and standard black malleable (300 lb. w.o.g.) or cast iron (175 lb. w.o.g.) fittings. Joints in ferrous piping shall be screwed or Victaulic type joints or approved equal. Allied XL threadable lightwall pipe or approved equal acceptable. Copper piping in lieu of steel and Schedule 10 with roll-groove coupling are acceptable.
 - 5. Alarm Check Valve: Provide variable pressure type alarm valve complete with retarding chamber, water gong motor alarm, alarm test valve, alarm shutoff valve, drain valve, pressure gauges, accessories, and appurtenances for the proper operation of the system. Coordinate all monitored items with the fire alarm contractor for compatibility.
 - 6. Sprinkler Supervisory Devices: Provide as indicated. Connection of the sprinkler supervisory devices to the building fire alarm system shall be provided under SECTION 16722 – INTERIOR ADDRESSABLE FIRE ALARM SYSTEM.
 - a. Alarm Pressure and Water Flow Switches: UL listed or FM approved.
 - b. Valve Tamper Switch: Provide each control valve with a listed or approved tamper switch for the automatic transmittal of a trouble signal. Valve tamper switches which are integral to the control valve will be acceptable.
 - 7. Flow Control Valves: Provide flow control valves which are electrically operated via a 24 vdc supervised circuit for control of sprinkler water supplies to the elevator machine room and hoistway. Flow control valves

shall be similar in design to a listed pre-action or deluge valve.

- C. Elevator Releasing Control System Fire Alarm Control Panel: Simplex 4010 Fire Alarm Control Panel or approved equal. Multi-zone capability fire alarm panel shall be capable of controlling actuators for use in automatic extinguishing or pre-action sprinkler systems. FM approved pre-action sprinkler operation requires that initiating device circuits be Class A and wired to listed/approved devices, standby power capacity must be a minimum of 90 hours with 10 minutes of alarm and approved automatic water control valves to be used. Interface with smoke detectors and fire alarm system. System shall be compatible with the building fire alarm system. Coordinate with other trades to provide a complete operable system at no additional charge to the State.

PART 3 - EXECUTION

3.01 PREPARATION

Fire sprinkler design shall be as shown on drawings. Study entire contract drawings and become fully aware of all conditions. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route to each pipe. Make off-sets and changes in direction required to maintain clearance between structure, ducts, lights or other interferences. Provide all hangers, inserts and supports in accordance with NFPA Standard 13 required for this work. Provide additional materials and labor for a complete and operable system at no extra cost to the State. Coordinate connection to site piping by civil.

3.02 INSTALLATION OF THREADED PIPE

- A. All pipe shall be cut accurately to measurements established by the Contractor, then threaded, reamed, and cleaned of all extraneous matter before being worked into place without springing or forcing. Compound shall be applied to the male thread only. Hanger type and spacing, and pitch of pipe, shall conform to NFPA Standard 13 for each respective system, and to the drawings.
- B. Spacing of sprinklers and location shall be for occupancy in accordance with NFPA 13.

3.03 TESTS

- A. Contractor to conduct hydrant flow tests of the Maui Department of Water Supply (DWS) hydrants number 56 and number 88 and provide flow test data to the State.
- B. On completion of the work, the Contractor shall make all standard tests required under NFPA 13, thereby proving the system is in satisfactory working order. Hydrostatic tests shall be conducted on all inside piping. Such tests

shall be at 200 psi pressure for a period of not less than 2 hours. Tests on the underground piping shall be as described in NFPA 13 and 24. Notify State in writing 15 days prior to testing. Upon completing tests, and when satisfactory results have been obtained, a signed and dated statement setting forth the tests which were made and certifying that all required tests have been satisfactorily completed shall be presented by the Contractor to the State.

3.04 ELEVATOR RELEASING CONTROL SYSTEMS FIRE ALARM CONTROL PANEL

Contractor shall coordinate manufacturer of elevator releasing control system fire alarm control panel with manufacturer of existing/new main fire alarm control panel prior to ordering to ensure both panels are compatible. Coordinate with other trades to provide a complete operable system at no additional charge to the State.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
15500.1	Fire Protection Systems	Lump Sum
15500.2	Fire Protection Systems - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 15600 - AIR CONDITIONING AND VENTILATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

Provide a complete air conditioning and ventilation system for the building. Air conditioning equipment shall consist of outdoor rated chilled water air handling units, cabinet type chilled water fan coil unit, variable air volume boxes. Janitor Room shall be mechanically ventilated with cabinet type exhaust fan. All electrical and communications rooms shall be air conditioned.

1.03 GENERAL REQUIREMENTS

- A. Provide all labor and materials necessary for a complete and operating air conditioning and ventilation system. "Provide" shall mean "furnish and install" when used herein. Project drawings show general requirements as to size, arrangement of ducts and location of equipment. All products shall be made in the United States of America. Manufacturer of equipment shall have Hawaii stocked spare parts, representation and support of a service organization which has services manufacturer's units of comparable type, size and capacity as specified herein. Provide all temperature, pressure and flow indicating controls for this work. Mount control devices and provide control wiring and conduit. Furnish motor starters for equipment under this section.
- B. Contractor shall, in the installation process, test and inventory all malfunctioning devices.
- C. Related Work Specified Elsewhere:
 - 1. SECTION 09911 – EXTERIOR PAINTING and SECTION 09912 – INTERIOR PAINTING: Coordinate with painting work.
 - 2. DIVISION 16 - ELECTRICAL: Mounting of starters and providing of fused or non-fused disconnect switches, circuit protection and power wiring conduit are under electrical section. Coordinate all controls work required under the electrical work section.

1.04 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS. Refer to SECTION 15011 - GENERAL MECHANICAL REQUIREMENTS for additional submittal requirements.

- B. Equipment Submittal: Before beginning work, submit for review certified literature showing ratings and dimensions of equipment, and of a list indicating all materials and items that are of a different manufacturer or model than those specified. Submittals shall include the following items.
1. Air handling unit/fan coil unit with sound data.
 2. Exhaust fan with sound data.
 3. Variable air volume boxes with sound data.
 4. Air devices with sound data.
 5. Control wiring, devices and diagrams.
 6. Control equipment and devices.
 7. Starters.
- C. Submittals shall include the following as a minimum.
1. System design information sheet, dimensions, performance information with sound data.
 2. Description of system operation.
 3. Electrical power and control wiring diagram.
 4. Catalog information on control components.
 5. All information and catalog sheets shall designate all options provided.
- D. Warranty: Submit warranty as noted under item entitled "WARRANTY" hereinbelow.
- E. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: For actual fabrication, installation and testing of work under this section, use only thoroughly trained and experienced workmen completely familiar with items required and manufacturer's current recommended methods of installation. In acceptance or rejection of finished installation, no allowance will be made for lack of skill on part of the installer.
- B. The Mechanical Contractor shall provide an independent third party Testing and Balancing Contractor at his expense to verify testing and balancing data under this section of the specifications. The Mechanical Contractor shall coordinate with the State Engineer the scheduling of the performance of the testing and balancing of the system such that its performance can be witnessed by the State Engineer. The Mechanical Contractor shall note that the intent and therefore the basis of the design of this system is to fulfill a specific function of the facility at a very high level of energy efficiency and the specified equipment reflects its selection and evaluation.

- C. All air conditioning and ventilation equipment to be considered for bid purposes must be of a manufacturer that have locally stocked spare parts, local representation, and support of a service organization convenient to the site of installation which has serviced manufacturer's unit located on the island of Maui. The start-up, service and instructional personnel shall be authorized by the manufacture. If required by the manufacturer, the Contractor shall provide the State Engineer a list of all personnel certified to perform work on that equipment. The State Engineer shall have the ability to limit any work on certification required equipment to the provided list. All equipment shall be purchased through the local distributor or the local manufacturer's representative, when locally represented.
- D. Laws, Regulations and Permits:
1. Comply with all the requirements of the State of Hawaii, the County of Maui and the latest editions of SMACNA, ASHRAE and NFPA.
 2. Obtain and pay for all fees, permits, licenses, assessments, connection charges and inspections required for this work.
 3. At completion, submit certification from approving agencies that work meets above requirements.
- E. Refer to the GENERAL PROVISIONS FOR CONSTRUCTION PROJECTS, paragraph pertaining to Section 6.13 Substitution of Materials and Equipment After Bid Opening.
- F. Contractor shall note that the intent and therefore the basis of the design of this system is to fulfill a specific function and fit of the facility at a very high level of energy efficiency and the specified equipment reflects its selection and evaluation.
1. Chilled Water Air Handling Unit/Fan Coil Unit: Carrier, Trane, York or approved equal.
 2. Exhaust Fans: Greenheck, Loren Cook, Penn or approved equal.
 3. Motor Starters: Allen Bradley, Cutler-Hammer, Furnas, General Electric, Westinghouse or approved equal.
 4. Air Distribution Devices: Anemostat, Metalaire, Titus or approved equal.
 5. Variable Air Volume Boxes: Carrier, Johnson Controls, Trane or approved equal.
 6. Variable Frequency Drive: ABB, Danfoss, Trane/Danfoss or approved equal.
- G. Comply with the recommendations and requirement of the Codes and Standards listed hereinafter in addition to the detailed requirements of this specification.
1. American National Standards Institute Publications (ANSI):
ANSI/ASME Scheme for the Identification of Piping Systems
A13.1

- ANSI B31.1 Power Piping
2. National Fire Protection Association (NFPA) Standards:
 - NFPA 70 National Electrical Code
 - NFPA 90A Air Conditioning and Ventilation System
 3. Air Moving and Conditioning Association (AMCA) Standards:
 - AMCA 210 Test Code for Air Moving Devices
 - AMCA 300 Test Code for Sound Rating Air Moving Devices
 4. American Society of Heating, Refrigeration and Air Conditioning Architects (ASHRAE):
 - Handbook, Applications - latest edition
 - Handbook, Equipment - latest edition
 - ASHRAE 90.1 Energy Standards for Buildings except for Low Rise Residential
 5. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
 - Manual for the Balancing and Adjusting of Air Distribution Systems
 - Low Velocity Duct Construction Standards, latest edition
 6. ASTM International (ASTM):
 - ASTM A36 Standard Specification for Carbon Structural Steel
 - ASTM A53 Pipe, Steel, Black and Hot Dipped Zinc Coated Welded and Seamless
 - ASTM A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware
 - ASTM A446 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dipped Process, Structural (Physical) Quality
 - ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - ASTM A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
 - ASTM A603 Standard Specification for Metallic-Coated Steel Structural Wire Rope
 - ASTM B88 Seamless Copper Water Tube
 - ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus
 - ASTM B306 Copper Drainage Tube (DWV)
 - ASTM B368 Standard Test Method for Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test)
 - ASTM C564 Rubber Gaskets for Cast Iron Soil (R82) Pipe and Fittings
 - ASTM C1071 Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)

ASTM D1056	Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM E84	Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F594	Standard Specification for Stainless Steel Nuts
ASTM G21	Standard Practice for Determining Resistance of Polymeric Materials to Fungi

1.06 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect materials and equipment before, during, and after installation and to protect installed work and materials of all other trades. Under no circumstances shall any mechanical equipment be stored outside, unprotected.
- B. Replacements: In event of damage, immediately make all repairs and replacements necessary at no cost to the State.
- C. Delivery: All security and safety procedures and performances shall be borne by the Contractor at no cost to the State.

1.07 CERTIFICATES

The State Engineer shall have the right to require a written certificate, dated and signed by a responsible managing employee of the Contractor, evidencing the performance of any portion of the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Whenever a regulatory agency performs inspections or tests of any portion of the work, a certificate shall be furnished by the Contractor that the inspection or test was satisfactorily passed.

1.08 WARRANTY

- A. Manufacturer's Warranty: Submit conditional warranty for the equipment coating for a period of 3 years from the project acceptance date.
 - 1. Warranty Provisions: The warranty provisions and number of years for the warranties required in this Section shall take precedence over the standard provisions in the Interim General Conditions (IGC).
- B. Submit warranty as noted under item entitled "WARRANTY" in SECTION 15011 - GENERAL MECHANICAL REQUIREMENTS.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Capacities and characteristics of equipment are indicated on the drawings. See electrical drawing for all voltage and phase requirements of all equipment furnished under this work. Provide across-the-line starter (below 25 HP or as per the current edition of the Electric Utility, MECO Rules, relating to the limitation of starting currents), control voltage transformer and circuit breaker for each motor of mechanical equipment unless the equipment is factory-wired to a single power connection or unless otherwise indicated hereinafter. Provide disconnect switch for all mechanical equipment. Exposed to weather starters, disconnects, control boxes, VFD cabinets etc. shall be stainless steel, NEMA 4X type. All steel exposed to weather shall be hot-dipped galvanized and shall have an additional 2-coats of rust-proof paint, except for starter/disconnects enclosures, which shall be stainless steel. Provide vibration isolators as indicated hereinafter.

<u>Isolation Equipment</u>	<u>Minimum Static Description*</u>	<u>Deflection</u>
Exhaust Fan/ Fan Coil Unit	Rubber-in-shear with steel spring isolator	One-inch

1. Air Handling Unit (AHU): Single-zone, central station, draw-thru unit with medium capacity, 2-inch pleated angled MERV 13 filter section, fan section and coil section. Capacity and characteristics of unit shall be as indicated on drawings. Unit shall have double wall rigid casing of either aluminum or zinc coated steel, top of casing shall be sloped. Stainless steel drain pan shall have closed cell insulation and shall be piped to the nearest drain receptacle as indicated on the drawings. Slope drain pan toward condensate drain pan opening. Air handling unit shall have fan and motor drive enclosed within the unit enclosure. Fan shall be forward curved, centrifugal. Fan motor shall be mounted on an adjustable base and shall have V-belt drive and adjustable pitch motor pulley. Unit shall have a bearing lubrication system accessible from unit exterior. Entire fan and motor assembly mounted on spring vibration isolators. Fans shall have discharge configuration as shown on drawings. Fan casing shall have an R-13 double wall sealed panel insulated with 1-inch to 1-1/2 inches thick liner, 3 lb. density and have easily removable access for any concealed items requiring periodic access including motor, drive, drain pan, fan and cooling coil. Unit sound not to exceed 75 dBA (5 feet from unit). Unit access doors to have hinges and handle locking catch mechanism. Provide vibration isolating media as recommended by the manufacturer and approved by the Engineer. Provide magnetic starter with disconnect and control voltage transformer. Size motors to prevent overloading at any point on the operating curve. Chilled water cooling coils shall be copper tubes with aluminum fins, 6 row, 11 fins per inch.

- Provide modulating 3-way valve. Coils shall have drain plug and manual air vent. Refer to drawings for valving. Variable speed drive controller, manual by-pass switch, isolation transformer. Fan wheel shall be coated with corrosion protection.
2. Fan Coil Unit (FCU): Horizontal, 2-pipe above cabinet type for exposed ceiling installation, single-zone unit with fan, coil and filter section. Capacity and characteristics of unit shall be as indicated on the drawings. Unit shall be constructed of galvanized steel with have half-inch thick fiberglass insulation. Drain pan shall be constructed of galvanized steel. Fans shall be direct drive, double width fan wheels with forward curved blades. Motor and drive shall be enclosed, 3 speed fan. Filters shall be one-inch fiberglass disposable filter type. Furnish combination magnetic across-the-line starter and circuit breaker. Provide extended lubrication lines for fan bearings. Fan coil unit shall be AHRI Standard 440. Motors shall be equipped with integral, automatic reset thermal overload protection.
 3. Cabinet Exhaust Fan (EF): Ceiling mounted or in-line centrifugal fan, cabinet type. Capacities and characteristics shall be as indicated on the drawings. Fan set shall consist of centrifugal fan, housing, insulation, lifetime lubricated motor, backdraft damper and white enameled or chrome plated grille. Interlock with light switches as indicated on drawings/control diagrams. Maximum sound levels as indicated on equipment schedule.
 4. Ionization Unit: Modular needlepoint bipolar ionization system that is field assembled providing cover across coil in 6-inch width increments. Provide with multi-voltage selector switch, integral BAS alarm contacts, illuminated on-off switch, UL 2998 and UL 2043 compliant, CARB compliant and FCC Compliant (Part 18).
 5. Ultra Violet (UV) Light: Fixtureless UV-C lamp system factory assembled. Consists of power supply and housing, wiring, ultraviolet lamps. UL 2998 compliant.

2.02 AIR DISTRIBUTION DEVICES

- A. Construction: Aluminum construction, off-white color for face plates, frames and grilles; except as noted.
 1. Supply Diffuser: Square, louvered face diffuser with opposed blade volume damper, 4-way throw unless otherwise indicated, with off-white finish. Titus model TDC-AA (aluminum) or approved equal.
 2. Linear Bar Diffuser: Linear bar diffusers shall be Titus model CT-480 or approved equal with 1/8-inch thick fixed bars at 0-degrees deflection, spaced 1/4-inch on center. Linear bar diffusers shall be available in standard one-piece lengths up to 6-feet and shall have the sizes and mounting types shown on the plans. Diffuser lengths greater than 6-feet shall be furnished in multiple sections and will be joined together end-to-end with alignment strips or pins to form a continuous appearance. All alignment components to be provided by the manufacturer. Opposed

- blade damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the diffuser.
3. High Velocity Diffuser: Turbofuser panel mounted nozzle diffusers shall be Titus model TBF-AA or approved equal for the sizes and mounting types as shown on the plans. Diffuser shall be of heavy duty construction with one, two, three or four nozzles. The TBF-AA model will be constructed of 0.04-inch aluminum nozzles and panel. Each nozzle shall have concentric deep deflection individually adjustable rings. heavy duty pivot bars will maintain numerous deflection settings for rated airflows up to 30-degrees in any direction.
 4. Supply Register: Adjustable, double blade type, front blades horizontal, rear blades vertical, 45-degree angle, 3/4-inch blade spacing with opposed blade volume control damper. Titus model 300FL or approved equal.
 5. Exhaust Register/Transfer Grille: Fixed blade type, 35-degree angle, 3/4-inch blade spacing with opposed blade volume control damper. Titus model 350FL or approved equal.

2.03 VARIABLE AIR VOLUME CONTROL BOX

- A. Single Duct VAV Terminal Unit: Externally powered variable air volume control terminal. Unit shall be complete with a damper assembly, flow sensor, externally mounted volume controller and collars for duct connection. Control box shall operate satisfactorily between 0.4-inch to 3-inch static pressure. Temperature controls shall be wall mounted (with locking cover) consisting of adjustable, modulating thermostat with connecting control wiring. Each box shall be labeled for nominal minimum and maximum CFM. Unit shall be constructed of 22-gauge galvanized steel. Units shall have one-inch thick, 0.5-lb. dual-density fiberglass insulation.
- B. Fan Powered VAV Terminal Unit: Factory assembled, externally powered, horizontal fan powered terminal unit with blower, blower motor, mixing plenum and primary air damper contained in a single unit housing. Unit shall be complete with a damper assembly, flow sensor, externally mounted volume controller, collars for duct connection and all required features. Control box shall be clearly marked with an identification label that lists such information as nominal cfm, maximum and minimum airflow limits, coil type and coil hand, where applicable. Unit shall be constructed of 22-gage galvanized steel with round or rectangular inlet collar and rectangular discharge with slip and drive connection. All primary air inlet collars shall accommodate standard flex duct sizes. Unit casing shall be lined with dual density, one-inch thick, 1-1/2-lb. density fiberglass insulation meeting UL 181 and NFPA 90A. Fan shall be forward curved, centrifugal type. Units shall have pressure-independent communicating controls capable of maintaining required airflow set points $\pm 5\%$ of the unit's capacity at any inlet pressure up to 6-inch w.g. The controllers shall be capable of resetting between factory or field-set maximum and minimum (>350 fpm inlet duct velocity) set points to satisfy the room thermostat demand. The unit shall be equipped with an amplified flow probe in the unit

inlet. Air flow for the pressure independent controller (supplied by others) shall be determined with a factory supplied 12 point total pressure, center averaging cross flow sensor, having a magnification resulting in no greater than 2625 fpm at one-inch developed signal.

2.04 VARIABLE FREQUENCY DRIVE

- A. Drive manufacturer shall be Danfoss Graham, or OEM labeled Danfoss Graham drive (as long as drive meets this specification), ABB or pre-approved equal. Drive shall be listed by and bare the label of Underwriters Laboratories, Inc., Electrical Testing Laboratories, Inc and shall meet Part 15 of Federal Communications Commissioning guidelines. All drives shall also meet or exceed IEEE 519-2014 in order to reduce the drives impact on the building's voltage and current distortions. All electronics and its printed circuit boards shall be provided with conformal coatings. All enclosures shall also conform to National Electrical Manufacturers Association Standards. Start-up shall be performed by factory certified personnel and shall be certified for the equipment being started. Start-up shall include adjustments for minimal drive noise.

- B. Provide a VFD for each VFD prescribed motor rated for the HP at 460/3/60 (or 230/3/60) which exceeds the current rating of the name plate, Full Load Amperes (FLA) of the motor. Each VFD shall be minimally provided with a 3-contactor* by-pass (reduced voltage or soft starter by-pass required for motor HP greater than 20HP or as restricted by the utility, Hawaiian Electric Company, and their rules), high speed 3% impedance (minimum) input line reactor (5% impedance line reactor if site power quality issues are known or as specified; internal link reactor or devices NOT a substitution), through the door lockable and fusible or breaker type disconnect, VFD line protection circuit breakers or fast acting fuses designed by the manufacture to protect the VFD, motor protectors, full function programmable keypad and display (display shall be capable of displaying as minimum the speed of the drive, the status of the drive), fuse kit (complete set of fuses), startup / maintenance / operation / programming (to include startup, maintenance, programming and troubleshooting information) manual. The VFD and By-Pass unit shall be enclosed in a NEMA 1 self-ventilated (equipped with re-usable and washable air filter) enclosure, suitable for indoor use, or if outdoors, NEMA 3R, 14 gauge stainless steel, suitable for outdoor application, self-ventilated (at the bottom) enclosures. All VFD applied motors shall be TEFC/TEAO Inverter Duty High Efficiency type. Motors attached to VFD's shall be provided with a shaft grounding brush or ring to protect motor bearings from common mode voltages. VFD's shall also be provided with common mode filters and VFD output line reactor with input impedance of 3% (unless otherwise specified) to protect the motor leads and motors from excessive over voltages.

- C. Variable frequency drive controllers shall be interfaced (through its integration) with the Energy Management and Control System (EMCS) where their modules will receive sensor inputs in order to stage or control the equipment, adjust speed of variable frequency drives and monitor its performance. The

provided VFD controllers shall be hardwired, as a minimum to the building's EMCS, for start/stop, drive speed dictation, feedback signal and alarm, as well as its integrated with the EMCS information described here within. The EMCS controlled algorithms shall be capable of controlling fans/pumps based on an efficiency optimization program of the HVAC system and shall be compatible with all components of the related systems. Refer to the section of this specification that relates to the Energy Management and Control System for point list requirements (communicate fully through its interface, using the BACnet ®/MSTP protocol or as prescribed by the EMCS contractor).

- D. All units shall be microprocessor-based and designed for variable speed applications to stage/de-stage pumps or fans by means of discrete analog inputs from pressure sensors. Controllers shall scan inputs no less than twice per second at a resolution of not less than 12 bits.
- E. The drive shall be a voltage source, IGBT power transistor based inverted-PWM type. The inverter shall use a high carrier frequency for low drive noise and motor sing. The drive shall also be provided with an input line reactor with minimum input impedance of 3% (5% for applications where power quality issues are known or as specified; manufacture's internal link reactor NOT acceptable substitute for input line reactor). Line Reactors greater than 5% shall not be used. In cases where applicable (e.g. long motor leads (>50 feet), etc.) EMI/RFI mitigation filters may be required at the VFD's outputs. Active filters at the Motor Control Center (MCC) may also be required where multiple VFD operated motors of high ampacity is applied. If specified and for performance critical applications, output sine wave active filters will be required. For 480/3/60 rated VFD's, VFD output line reactors shall also be specified or in some cases, VFD cables rated for 2,000 Volts shall be provided from the VFD to the Motor. This requirement recognizes that the IGBT output transistors of the VFD produces PWM Voltages pulses have ability to deliver >1,200 Volts to the Motor, much higher than THHN insulated conductors are rated for (600 Volts or less).
- F. A self-illuminated LED or LCD readout shall be provided to indicate the following:
 - 1. Drive Enabled
 - 2. Output Frequency
 - 3. All Fault Conditions
- G. The drive shall be capable of automatically restarting after any of the following:
 - 1. Overload
 - 2. Over-Voltage
 - 3. Converter over-current
 - 4. Inverter Over-current
 - 5. Power Failure

- H. The drive shall be provided with a bypass starter (reduced voltage-starter, or soft starter, if >25HP) feature. The VFD shall automatically be electrically isolated (3 contactor bypass) when in bypass. The input line reactor shall provide protection to the VFD, only, unless the bypass is that of a soft starter type, where the input line reactor shall be arranged electrically to protect both the VFD and the soft starter bypass.
- I. The following drive parameters shall be user adjustable, as minimum:
1. Acceleration speed (1-300 seconds); default shall be 120 seconds.
 2. Deceleration speed (1-300 seconds); default shall be 120 seconds.
 3. Minimum Speed Limit; default shall be 20% VFD speed.
 4. Maximum Speed Limit; default shall be 100% VFD speed.
- J. Enclosure: The VFD and bypass assembly shall have a metal NEMA 1 enclosure for reduction of radio and electromagnetic frequency interference. Plastic (or FRP) enclosures are NOT acceptable. The enclosure shall be wall mounted unless otherwise shown and noted on the plans. If the VFD is to be mounted outdoor, both the VFD and the bypass assembly shall be housed within an outdoor ventilated enclosure (NEMA 3R ventilated stainless steel enclosure or an adequate self-ventilated outdoor enclosure built to withstand wind and rain).
- K. In the case where the VFD is not in the line of sight of the controlled motor, a NEMA 4X (stainless steel outdoor enclosure for outdoor applications) enclosed disconnect shall be mounted in the line of sight of each cooling tower, fan or pump motor. The disconnect shall be capable of removing the three phase electrical power from the input to the VFD/by-pass system.

The cover of the disconnect shall clearly designate the equipment identification (e.g. CT-1, CT-2, CHWP-1, etc.) and also have in BOLD print (2") the following permanent signage:

**CAUTION: VFD IN USE
TURNING THIS SWITCH OFF
WHILE IN OPERATION
WILL DAMAGE THE VFD.**

- L. The variable frequency drive shall have, as a minimum, the following design features as standard:
1. 8 kHz sine-coded, pulse width modulation.
 2. Overload capability of 120% for 60 seconds, 110% continuous.
 3. Process follower 4-20mAdc, 0-5Vdc, or 0-10Vdc input.
 4. An LED digital readout displaying output frequency, status, percent current, percent voltage, and response signal.
 5. Output signals proportional to current and frequency 0-1mAdc / 0-7.5Vdc.
 6. Current limiting circuit.

7. Adjustable acceleration and deceleration.
 8. In addition to the inverter's self-diagnostic features, the drive shall have a Form C Contact (1NO, 1NC) for remote indication of fault.
 9. Customer interlock for remote starting and stopping.
 10. On loss of speed reference signal, the drive shall operate at a preset minimum speed so that the inverter will not drive the motor at a speed capable of causing system problems.
 11. The drive shall provide a 24Vdc open collector output signal which will indicate when the drive is running, and when the drive is at speed.
 12. The drive shall have a digital keypad for performing all parameter adjustments and programming which shall include the following features:
 - a. Quick setup key to allow for simple setup and expeditious startup.
 - b. Manual/off/auto keys for selection of control mode.
 - c. Fault clear/reset key.
 - d. Run and stop keys for starting and stopping in manual mode.
 - e. Up and down arrow keys for adjustment of motor speed and adjustment of programming parameters.
 - f. Program key for entering program mode for adjustment of parameters.
 - g. Read/Write key for changing parameters in program mode.
 13. The drive shall have PID (set point) control.
 14. Provide (minimum 3% or 5% input impedance, as specified) High Speed AC input line reactors for all VFD's.
 15. The drive shall be equipped with critical frequency avoidance where it shall be capable of avoiding up to three resonant points in the mechanical system.
 16. An off-cycle voltage feed to keep motor windings warm during off-cycle.
 17. A user programmable personal lockout code shall prevent unauthorized programming of the inverter.
- M. The variable frequency drive shall have as a minimum the following protective features:
1. Through the door fusible disconnect and fast acting VFD fuse protection.
 2. Ground fault protection.
 3. Thermal or Electronic motor overload protection.
 4. Current limit adjustable 10-120%.
 5. Current limited stall prevention during acceleration, deceleration and run conditions.
 6. Automatic restart after momentary power loss or momentary overvoltage, under voltage, or overcurrent due to acceleration rate set too fast, because other faults, such as an overcurrent due to a blown transistor or a short circuit on the output, could cause damage to the inverter.
 7. Fault indicators shall indicate the following fault conditions (faults should be displayed by flashing on the LED display on the front panel of the inverter. When a fault occurs, the drive shall have built-in diagnostic

functions that assist in determining the cause and source of the fault. The drive shall also indicate the level of current and voltage and the frequency at the time of the fault):

- a. Overcurrent during acceleration (OC1)
- b. Overcurrent during deceleration (OC2)
- c. Overcurrent while running (OC3)
- d. Overcurrent on output (OCL)
- e. Overcurrent detected at startup (OCA)
- f. Overload (OL)
- g. Overvoltage while deceleration (OP2)
- h. Overvoltage due to power surge (OP)
- i. Over temperature (OT)
- j. Ground Fault (EF)
- k. Emergency Stop (E)
- l. Frequency setting fault (EFF)
- m. EEPROM abnormality (EEP)
- n. EEPROM abnormality (EEP2)
- o. EEPROM abnormality (EEP3)
- p. Computer link abnormality (Errt)
- q. Power supply under voltage (POFF)
- r. Current limiting DC bus fuse.
- s. Phase-to-phase short circuit protection

8. Motor protectors or overload.
9. Three contactor by-pass (if bypass is provided) to completely isolate the inverter from electrical power and the by-pass circuit.

N. The variable frequency drive shall have the following adjustments available under the quick setup key:

1. Acceleration – 0.1 to 1200 seconds; default set at 120 seconds.
2. Deceleration – 0.1 to 1200 seconds; default set at 120 seconds.
3. Maximum frequency range.
4. Maximum frequency (0 to 100% speed).
5. Bias and gain adjustment for 4-20 mA, 0-5Vdc, 0-10Vdc follower (can be direct or indirect acting).
6. Electronic thermal overload adjustment (10-100%).

O. The variable frequency drive shall be designed to operate within the following environmental and service conditions:

1. Ambient service temperature: -10 °C to 40 °C
2. Ambient storage temperature: -20 °C to 60 °C
3. Humidity: Non-condensing to 95%
4. Altitude to 3300 feet
5. Service factor 1.1
6. Input voltage: Three phase, 460VAC \pm 10% for 460 VAC series drives

7. Input frequency: 50/60 hertz \pm 2 Hz
 8. VFD (and by-pass contactor, if provided) shall be rated for both the FLA of the motor to which it is applied as well as its HP. Single phase provisions under this specification is not provided and therefore its application is NOT allowed.
 9. Multiple Motor application for a single VFD is NOT allowed.
- P. Accessories to be furnished and mounted by the drive manufacturer:
1. Customer interlock terminal strip – Provide a separate terminal strip for connection of freeze. Fire, smoke contacts, fault contact output, input reference signal, and external start command. All external interlocks shall remain fully functional whether the drive is in hand or auto modes. External start command shall be active when in the auto mode only.
 2. A through-the-door motor circuit protector (fuse or circuit breaker type) disconnect which will disconnect all input power from the drive and all internally mounted options. The disconnect handle shall be through-the – door type, and be pad-lockable in the off position for lock-out/tag-out capability. A disconnect switch alone is not acceptable as it provides NO Current Protection for the system, the inverter or the motor. Multiple motor applications are NOT allowed.
 3. Manual Bypass Contactor: Provide a manual 3-contactor bypass consisting of a door interlocked main fused disconnect pad-lockable in the off position, a built-in motor starter and a four position DRIVE / OFF / LINE / TEST switch controlling three contactors. In the DRIVE position, the motor is operated at an adjustable speed from the drive. In the OFF position, the motor and the drive are disconnected. In the LINE position, the motor is operated at full speed from the AC power line and power is disconnected from the drive so that service can be performed. In the TEST position, the motor is operated at full speed from the AC line power. This allows the drive to be given an operational test while continuing to run the motor at full speed in the bypass. The contractor shall provide a normally closed dry contact that shall be interlocked with the drives safety trip circuitry to stop the motor whether in DRIVE or BYPASS mode in case of an external safety fault. Service personnel shall be able to defeat the main power disconnect and open the bypass enclosure with 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.
- Q. Provide for a minimum of 3% impedance (maximum of 5%, as specified or for applications of know power quality issues) High Speed Input Line Reactor to the inputs of the VFDs sized for its bHP and full load amperes (FLA).
- R. Ammeter
- S. Speed meter (RPM)

- T. Automatic restart after power failure ("fly on start")
- U. Power On Light
- V. Manual speed potentiometer (selectable)
- W. Start pushbutton
- X. Stop/VFD fault reset pushbutton
- Y. Manual/Off/Automatic switch
- Z. VFD Fault Light
- AA. DC internal link reactor
- BB. Built-in diagnostic and fault diagnostic test card with LED readout.
- CC. Interface or terminal board for connection and monitoring of all internal control system and all status points and be interfaced and communicate with the building automation system (EMCS) through a BACnet® communication protocol (BACnet/IP or BACnet/MSTP). The control panel shall bear the label of Underwriters' Laboratories signifying that all work performed by the manufacturer is in compliance with the requirements of Underwriter's Laboratories. Approval of just the enclosure or electrical devices is unacceptable. All wiring and electrical construction within the panel must conform to Underwriter's Laboratories' requirements. The manufacturer of the packaged pumping system must be listed by Underwriters Laboratories as an approved manufacturer of control panels. The control panel shall have the capability of communicating analog and digital output signals to the EMCS. The analog output signals shall be 4-20 mA DC. The digital output signals shall be a Form C contact for each condition being monitored. Power for these contacts shall be supplied from a source outside of the packaged system

2.05 DUCTWORK AND ASSOCIATED SHEETMETAL WORK

- A. All low pressure ventilation ducts shall be galvanized steel with gages and construction in accordance with SMACNA Standards "HVAC Duct Construction Standards".
- B. All medium pressure ducts (variable air volume supply ducts) shall be galvanized steel with gauges and construction in accordance with Air Duct Design, Equipment ASHRAE Guide Data Book and with SMACNA Standards "HVAC Duct Construction Standards."
- C. Flexible Duct Connections: Neoprene coated glass fabric prefabricated connections, UL pre-approved. Flexible duct connectors shall be provided at

each inlet and discharge of all units.

- D. Splitter Dampers: Provide on all taps, including low pressure branches to diffusers. Dampers shall be adjustable with locking quadrant.
- E. Deflectors: Provide fixed deflecting vanes at all branch take-offs and elbows. Shop fabricated blades shall fit into side strips and screw or rivet to duct.
- F. Damper: Opposed blade type, all aluminum with exterior lever.
- G. Duct Liner: Liner shall comply with ASTM C-1071, C-1338, NRC (Noise Reduction Coefficient) of 0.7 for one-inch thick, 1.5 lb. density on all interior ducts and 2-inch thick, 1.5 lb. density on all exterior roof mounted ducts. Duct liner shall be treated with an EPA registered anti-microbial agent in accordance with ASTM G-21. Provide airtight access panels in lined ducts at a minimum 8-foot intervals to permit cleaning of duct interior.
- H. Fire dampers shall be UL listed damper 100-percent out of air stream. 160 degrees F UL listed fire link. Provide Ventlok insulated duct mounted access door for each fire damper.
- I. Combination Fire/Smoke Dampers: Unit shall be UL listed, damper 100 percent out of air stream, 1-1/2 hour fire rated or as required. 165 degrees F UL listed fusible link. Each combination fire/smoke damper shall be equipped with factory supplied duct smoke detector option and firestat option. Smoke detector to be field wired to actuator, factory mounted to sleeve. Provide vent lock insulated duct mounted access door for each damper, 12" x 18". 120 V, 60 Hz power required. Ruskin FSD60 or approved equal. Provide round transition duct connection (Ruskin Style CR) as required.
- J. Duct Attenuators/Silencers: Rink, IAC, United McGill or approved equal.
 - 1. Rectangular type silencer, casing shall be constructed from 22-gauge type #G-90 lock-former-quality galvanized steel. Interior partitions for rectangular silencers shall be not less than 26-gauge type #G-90 galvanized lock-former-quality perforated steel. Filler material shall be of inorganic mineral of a proper density to obtain the specified acoustic performance and be packed not less than 5% compression. Fill shall be inert, vermin and moisture proof. Length as indicated on the drawings, maximum 0.1-inch w.g. static pressure drop at rated flow.
 - 2. Submit certified test data on dynamic insertion loss, self noise power levels and aerodynamic performances for reverse and forward flow conditions.

2.06 PIPE, FITTINGS AND VALVES

- A. Condensate Drain Piping: Type "L" hard drawn copper with wrought copper fittings and 95-5 tin antimony (non-lead) soldered joints. Use 45-degree

elbows and cleanouts at all bends. Provide 2-inch deep p-traps.

- B. Aboveground Chilled Water Piping: Schedule 40 black steel pipe ASTM A 53 with cast iron screwed fittings, ASTM A 126 for pipes under 4 inches and welded fittings ASTM A 234 for larger pipes, except any line 2-1/2-inches or larger may be welded at Contractor's option. Provide welded neck flanges at all flanged valves and accessories. Grooved joint couplings may be used at Contractor's option (Victaulic or equal).
- C. Butterfly Valves: Lug type with iron body, bronze disc, 2-piece stainless steel stem, Buna-N seat with rigid phenolic liner backing, memory type locking infinite position throttling handle with position indicator and extended stem neck. Valves shall be capable of maintaining full pressure with downstream side removed. Valves 6" and larger shall have gear operator and handwheel.

2.07 PIPE SLEEVES

Piping sleeves through walls and floors shall be steel pipe or 18-gauge galvanized metal. Piping through sleeves of fire rated walls or plenum chambers shall be caulked tight with fiberglass material. Sleeves installed through drilled holes through concrete shall be grouted and finished on both sides. Exterior sleeves shall be caulked watertight.

2.08 PIPE HANGERS AND SUPPORTS

- A. Horizontal piping shall be hung with Grinnell No. 260 hanger or approved equal; vertical piping shall be supported with Grinnell No. 261 riser clamps or approved equal.
- B. Under no circumstances shall piping be supported from ductwork, equipment or electrical.

2.09 FLEXIBLE CONNECTION

Provide flexible pipe connectors for all mechanical equipment connections rated at 150 psig working pressure, metal reinforced and with restraining rods.

2.10 ACCESS PANELS

Provide access panels for all mechanical equipment requiring adjustment, servicing and routing maintenance. Access panels shall be 12-inch x 12-inch minimum size in walls and partitions, 24-inch x 24-inch minimum size for ceilings. Provide fire rated access panels to match rating of wall/ceiling where required.

2.11 INSULATION

- A. Apply in accordance with manufacturer's recommendations by skilled mechanics. Flame spread rating not to exceed 25 and a smoke development rating not to exceed 50.
- B. Condensate Drain Piping: Insulate condensate drain piping with one-inch thick Nomaco Imcolock polyolefin pipe insulation or accepted equivalent for pipes 7/8-inch and smaller. Apply vapor barrier to seal insulation ends and around valves, fittings, flanges and unions. Vapor barriers shall be provided in long runs of pipe at intervals not to exceed 15 feet. Installation shall be in accordance with manufacturer's latest recommendations.
- C. Chilled Water Piping (Aboveground): Insulate chilled water piping with foamglass insulation, Pittsburgh Corning insulation or approved equal. Apply vapor barrier to seal insulation ends and around valves, fittings, flanges and unions. Vapor barriers shall be provided in long runs of pipe at intervals not to exceed 15-feet. Insulation thickness: 1-1/2 inches thick for pipe sizes 1-1/4 inches and smaller; 2-inches thick for pipe sizes 1-1/2 inches to 4-inches; 3-inches thick for pipes larger than 4-inches.
- D. Insulate chilled water valves, fittings, and couplings with foamglass insulation, Pittsburgh Corning insulation or approved equal. Insulation thickness and density to match pipe insulation.
- E. On pipe insulation exposed to weather or the environment, apply 16 mil embossed aluminum jacket with 2-inch overlap at longitudinal and circumferential joints, secured in place with 3/4-inch x 0.015 gauge aluminum bands on 18-inch centers. Apply humped aluminum ells or fabricated 16 mil aluminum to fittings and band in place.
- F. Saddles: Provide 180 degree galvanized sheetmetal protective saddles at each hanger or support on insulated piping and shall be no less than 16 gauge and no less than 12 inches long. Insulation at saddles shall be 9 pcf density minimum.
- G. Shields: An aluminum shield shall be fitted tightly around each piece of pipe covering where exposed to injury in mechanical rooms. On vertical pipes, shield shall extend a height of 6-feet. Longitudinal seams shall be palled 1-inch or more secured with sheet-metal screws spaced 4-inches apart, except on vapor sealed coverings, bands shall be used.

2.12 SPECIAL TOOLS

If any part of equipment furnished under these specifications requires a special tool for assembly, adjustment, setting or maintenance thereof and such tool is not readily available on commercial tool market, furnish necessary tool with equipment as standard accessory.

2.13 AUTOMATIC CONTROL SYSTEM

- A. Electric type automatic control system. Provide all necessary accessories as required for a complete operable system.
- B. Electric control wiring, wiring connections and conduit required for installation of temperature control system as herein specified, shall be provided by DDC Contractor unless specifically shown on drawings or called for in the specifications to be by the Electrical Contractor. All wiring shall comply with requirements of local, National Electric Codes. Conduit exposed to weather shall be hot dipped galvanized steel pipe (rigid) conduit with its accessories (e.g. coupling, connectors, fittings, flexible conduits, etc.) rated for the outdoors and galvanic compatible with connections provided. All supports and their material shall also be rated for the outdoor where its metal material shall be hot dipped galvanized as minimum, where there shall be no bare cut or uncut steel without galvanized finish or multiple coatings of a rich zinc compound. All exterior to the interior space mounting brackets (e.g. unistrut) with its clamp, bolts, nuts and accessories (including anchors) shall be hot dipped galvanized steel where any cut edges or bolt/screw threads multi-coated with a zinc rich compound. All mounted brackets material shall not be dissimilar in material it is attached without adequate dielectric insulation between the materials.
 - 1. Electrical Metallic Tubing (EMT) is not allowed except for the following exceptions.
 - a. Above false ceilings in interior spaces. Interior spaces defined as all building interior spaces enclosed from the outdoors on all sides.
 - b. All chillers, HP, tanks, water filters, valves, temperature sensors, pressure sensors, flow meters, etc.) servicing water/liquids or requiring water or liquid cleaning maintenance shall use HDG rigid conduits, as well as its associated HDG water tight fittings, HDG water tight raceway, mounting brackets and anchors 2 feet above the equipment attached.
 - c. All electrical rooms in interior spaces, except where its room access doors is exposed to the outdoors (e.g. closet, etc.) within 6 feet, shall use HDG rigid conduits, as well as its associated HDG water tight fittings, HDG water tight raceway, mounting brackets and anchors.
 - d. All wiring shall be in EMT conduit in interior spaces except for when exposed on the occupant's interior wall (sensor or thermostat) where wire-mold is allowed below the ceiling.
 - 2. Flexible Conduit: Zinc-coated inside and outside; liquid-tight with factor fitting for, 3/4-inch minimum diameter.
 - 3. Outlet and Small Junction Boxes: Concealed boxes shall be pressed, zinc-coated steel, 4-11/16-inches square minimum nominal size, minimum depth 1-1/2-inches, with raised cover ring for devices set flush

- in drywall. Exposed boxes shall be cast metal, prime painted and enamel finished with hubs for conduit connection with covers.
4. Duct Smoke Detectors: Duct smoke detectors shall be addressable, photoelectric type. Provide auxiliary contact for fire alarm panel connection.

PART 3 - EXECUTION

3.01 GENERAL CONSTRUCTION REQUIREMENTS

- A. Space reserved for ducts, piping and necessary lighting above furred ceilings are critical. Install ducts and piping as close as possible to slab or structure above. Location of light fixtures cannot be changed. If space allocated is too small for ducts and piping, make necessary move to fit into general pattern. All duct modifications shall be accomplished using 45-degree fittings; 90-degree fittings shall not be used unless prior approval from the State Engineer is obtained. All changes shall be submitted to the State Engineer for approval.
- B. Do not scale drawings. Check all measurements at building and adjust work to fit into space allotted. Close cooperation between trades will be required. Any work without regard for work of other trades shall be moved without extra charge, if necessary to permit proper installation of other work.
- C. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route of each duct and pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate the structure and the work of other trades. When changing the size of ductwork, provide ducts having the same friction loss as the size of the duct shown on the Contract Documents. Furnish other trades with information to properly locate and size openings in the structure required for the work under this section. Furnish anchor bolts, sleeves, inserts and support required for the work under this section. Provide access panels for concealed items provided under this section that require maintenance, adjustment or inspection.

3.02 INSTALLATION

- A. Perform work using personnel skilled in the trade involved. Provide competent supervision. Furnish new equipment, fixtures, materials and accessories bearing the manufacturer's identification and conforming to recognized commercial standards. Provide OSHA approved guard or rails all around exposed moving machinery parts and around high-temperature equipment and materials. No piping, electrical conduit, ceiling supports or similar items shall be supported from equipment or ductwork. Provide additional materials and labor for a complete, operable (including starting, testing, balancing and adjusting), and fully accepted system at no extra cost to the State.

- B. Equipment: Install equipment in the space allotted with sufficient clearance for proper operation and maintenance. Where equipment differs in arrangement or connections from those shown, provide all required changes in appurtenances. Provide equipment accessories necessary for proper operation and support. Provide vibration isolators for all mechanical equipment as indicated hereinbefore.
- C. Piping: Conform to recognized commercial standards. Inspect all pipes inside and outside. Remove interior obstructions and ream out pipe ends. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Install valves with stems above horizontal. Provide proper support and adequate provisions for expansion, contraction, slope and anchoring. Provide dielectric unions between dissimilar metals. Have piping tested, inspected and approved before it is furred in, buried or otherwise hidden. Provide 24-gauge galvanized steel sleeves where pipes pass through structure, sufficiently large to provide 1/4-inch clearance around pipe. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeve and when it contacts concrete and CMU. Provide non-asbestos rope packing around all sleeves and seal with elastomeric caulk. All penetrations through the walls shall be packed with neoprene sponge, closed cell, conforming to ASTM D1056 Grade SCE41. Provide chrome-plated brass escutcheons, set tight on the pipe and to the wall where pipes are exposed in finished areas. Provide pre-manufactured resilient pipe clamps or 1/4-inch thick neoprene pads to vibration isolate pipe walls from refrigerant pipe clamps and supports when pipes are located in demising walls or ceiling/floors which separate living units. For pipes located in demising chase walls, do not bridge across the demising walls but secure pipes only to the side of the demising walls of the living unit serviced by the pipes. Perform all welding using qualified welders in accordance with American National Standards Institute's Code B31.1 and American Welding Society Standard B31.0.
- D. Piping System: Pipe Supports - Factory-fabricated by Elcen, Fee and Mason, Grinnel or Unistrut or accepted equivalent; no chains or straps permitted. Provide concrete inserts, beam clamps, channel framing, hanger rods and accessories required for proper pipe support. Ramset or explosive type anchors are not permitted. Support vertical piping with hanger at base of riser and with pipe clamp at each floor. At each support point on insulated pipe provide Owens-Corning Kaylo or accepted equivalent pipe insulation (minimum 9 pcf density) around pipe with 18-gauge sheet metal jacket, each 2 pipe diameters in length. Pipe Hanger - Steel clevis hanger with adjustable hanger rod; 3/8-inch for pipe 2-inches and smaller, 1/2-inch for pipe 2-1/2-inches through 3-1/2-inches and 5/8-inch for pipe 4-inches and larger. Groups of lines may be supported from steel channel with pipe clamps.
- E. Condensate Drain Piping System: Slope drain lines at 1/4-inch per foot unless otherwise directed. Provide a water seal (P-trap) with water column one-inch

greater than the total static pressure of the fan in inches of water. Provide cleanouts at all changes in direction.

- F. Chilled Water Piping System: Provide unions or flanges at all connections to equipment and accessories. At all low points in the piping system, provide drain consisting of 1/2 inch gate valve with hose adaptor. Provide air vents at all high points in the piping system; manual type unless otherwise indicated. Extend a discharge line to a drain from each vent. Provide chainwheel with guides on all valves in equipment rooms that are 8 feet or more in height. Provide chains extending to 5 feet above floor.

3.03 ELECTRICAL WORK

- A. Conform to the requirements of NFPA-70, National Electrical Code, and to the requirements of DIVISION 16 - ELECTRICAL of these specifications. Obtain equipment manufacturer's control wiring diagrams for the equipment furnished. Prepare a control and interlock control diagram for the complete system. Indicate terminal connection points to factory wired equipment. Submit control diagram to the State Engineer for review. Contractor shall supply and mount all motors and provide all control wiring and controls for equipment furnished by him except that shown on the Electrical Drawings. All power wiring, including final connection to the mechanical equipment shall be provided by the Electrical Contractor. Refer to DIVISION 16 - ELECTRICAL and to the electrical drawings as well as mechanical drawings for requirements and division of work for each application. Should any equipment supplied by the Mechanical Contractor require electrical service or wiring that is not shown on the Electrical Drawings, advise the Electrical Contractor of such changes and pay all costs for any additions or alterations necessary in the wiring or controls. All control devices must be installed to operate within the manufacturer's rated load and voltage. All control circuits must be through the respective equipment disconnect to ensure the control circuit being off when the equipment is off. Wiring materials and methods shall conform to DIVISION 16 - ELECTRICAL, to the applicable codes and to ASA, National Electrical Code and NEMA Standards and Specifications. All electrical conduits/junction boxes terminating in cold areas must be sealed with putty to prevent migration of warm humid air.
- B. Electric Motor Characteristics and Drive: Motor voltages shall be as indicated, and to be verified with the Electrical Contractor and his drawings. Use TEFC, high efficiency type motors. Service factor of 1.15 with wick oiled sleeve type bearings or grease packed ball bearings not to exceed 1800 RPM, unless otherwise indicated. V-belt drives designed for 150-percent of motor horsepower with provisions made to adjust belt tension. Where multiple V-belts are used, match the belts. 3/4-HP and larger motors shall have a minimum of 2 belts. Pulley diameters not smaller than 3-inches O.D. for A-belts, 5-inches for B-belts and 8-inches for C-belts. Drive ration shall not be greater than one to 7. All pulley cast iron or steel and properly aligned.

C. Motor Starters and Wiring:

1. Furnish motor starters, disconnect switches, necessary relays, and other devices, including remote push-button stations; deliver to Electrician for installation and wiring.
2. Furnish, install, wire and interconnect panels, relays, timers, and other necessary control devices; integrate with motor starting equipment to produce a complete control system.

3.04 DUCTWORK

- A. Duct Connections: Flexible at both discharge and inlet of air moving equipment, applied in accordance with manufacturer's instructions. Allow 2-inches of free space between collars connected.
- B. Keep ductwork openings closed with sheetmetal during construction to prevent injury, and take all possible precautions to keep interior of ducts, air intake chambers and fan housings free from dirt and dust.
- C. Dampers and Deflectors: Provide splitter, butterfly and louver dampers, deflecting vanes for control of air volume and direction, and for balancing system where indicated, specified and directed.
1. Dampers of galvanized steel, at least one gauge heavier than that for duct size in which damper is installed, reinforced where directed; with indicating quadrant in accessible location, and locking device for adjusting locking damper in position.
 2. Deflectors: Where fixed deflecting vanes are indicated, provide shop-fabricated blades; fit into side strips and screw or rivet to duct elbow in field.
 3. Provide 45-degree branch tap fittings for all branch lines.
- D. Duct Supports: Place hangers at changes in direction. Use strap hangers for ducts up to 30- inches wide; angle hangers for ducts over 30-inches wide. Strap hanger shall be one inch wide of 16-gauge galvanized sheet steel; extend down both sides of duct and turn under bottom at least 4-inches, fasten to side and bottom with sheetmetal screws. Angle hangers may be formed by extending vertical bracing angles or by rods passing through bottom bracing angles.
- E. Erect all ducts with necessary elbows, dampers, etc. and all fans, air outlets, filters, dampers, etc., furnished under other articles of this section. Cross-break ducts exposed to weather to shed water.
- F. Provide sizes, runs and connections of ducts that adhere to drawings as closely as possible. Install to indicate heights as permitted by structure. Fabricate ductwork in workmanlike manner with air tight joints, presenting smooth surface on inside, neatly finished on outside; construct with curves and

bends to ease flow of air.

G. Openings through construction required for ductwork will be provided by others; shop drawings shall locate such duct openings. Obtain approval in ample time to meet building construction schedule. Ductwork shall have rectangular cross section unless otherwise indicated. All exposed to weather ducts shall be cross broken to shed water and top of duct sloped 1/4-inch per foot.

H. Low Pressure Ductwork:

1. Details of construction and materials not specified herein shall be in accordance with ASHRAE Guide and SMACNA recommended and as approved.
2. Unless otherwise indicated, make inside radius of curves and bends not less than width of ducts. Where square elbows are used, provide fixed double radius turning vanes. Construct, brace and support ducts and air chambers so they will not sag or vibrate when fans are operating.
3. Fabricate, unless otherwise indicated or specified, in accordance with SMACNA "Duct Construction Standards", latest edition, for 2-inch pressure class. Ducts 18-inches wide and larger which are not insulated shall be cross broken. Distances between joints on any size duct shall not exceed 8-feet. Seal all ductwork airtight. No leakage permitted. Test ducts to constructed pressure class.
4. On roof mounted ductwork, crossbreak duct.

I. Medium Pressure Ductwork: Air conditioning supply air (variable air system only) from air handlers to variable air volume units.

1. Square and rectangular ducts: Construct of galvanized steel in accordance with the SMACNA High Velocity Duct Construction Standards, 2nd Edition.
2. Seal all joints and seams airtight in duct system with "Hardcast" tape and adhesive or approved equal. Gasket joints are allowable. No leakage permitted. Test ducts to 6-inch static pressure.
3. Internally line supply air ducts roof mounted ducts with 2-inches thick duct liner.
4. Provide interconnecting control wiring from variable air boxes to space sensors.
5. Contractor shall install at the inlet of each VAV damper unit, a straight rigid section of duct four times the diameter.

3.05 PIPE AND FITTINGS

A. Vertical lines shall be supported by a hanger in the horizontal line near the riser and riser clamp at floor. Groups of lines may be supported with approved hangers, brackets, supports constructed of angles or pipe. Saddles of not less than 13-gauge galvanized steel shall be 6-inches or 2 pipe diameters in length, whichever is greater.

- B. Piping shall be supported to maintain proper grading or pitch, to prevent vibration and to allow for expansion and contraction. Holes where piping passes through partitions, walls, ceiling or floor shall be caulked sleeves, and in finished areas, shall be covered with escutcheons to minimize sound travel.
 - 1. Chilled Water Piping: Piping systems shall be hydrostatically tested to 150 psi before branch lines are insulated or enclosed. All piping connected to equipment shall have a union to equivalent shut-off valve. Gage cocks and pressure gages shall be installed at the suction and discharge of pumps. Air vents shall be provided on all high points and drain valves provided on all low points of water piping system.
 - 2. Condensate Drain Piping: Shall slope in the direction of flow at 1/4-inch per foot unless otherwise approved.
- C. Spacing of hangers for steel pipe shall not exceed 8-feet on pipe 1-1/2-inches or smaller and not greater than 10-feet on larger pipes.

3.06 CORROSION PROTECTION COATINGS

- A. Since the coating specified herein are of a specialized nature, it is essential that only qualified and experienced applicators be acceptable for this type of work.
- B. A clean area, specialized equipment, techniques, including fog spray, are required to apply the coating properly, and without defects.
- C. Proper surface preparation is necessary. Surfaces shall be thoroughly cleaned and if there is evidence of rust or scaling on ferrous steel surfaces, they must be wire brushed, shot blasted or sandblasted, and primed with rust inhibitive primer. Non-ferrous surfaces shall be cleaned in preparation for the coating system.
- D. The most critical area in coating this type of equipment is the non-ferrous, extended surface heat exchanger (finned coils). It is essential that the coatings be sprayed uniformly and completely over all surfaces of the fins and tubes. This will require several passes through each side of the coil in order to gain effective penetration through the inner coil rows without excessive build-up of fins edges. Care should be taken not to coat too quickly inasmuch as heat exchange will be impaired if the coating is not applied in the thicknesses specified hereafter. Material viscosity must be adjusted to compensate for temperature and humidity conditions. Coat inside and outside of unit.
- E. In order to coat effectively, the entire apparatus being coated should be disassembled to the maximum degree without disturbing wiring or piping. Upon completion of the coating, the apparatus should be reassembled with care so that the coating surface is not damaged.

- F. Surfaces to be coated shall receive multiple passes of Siloxane coating with a total volume solids of 21.7-percent. Total dry film thickness shall not exceed 6-mils. All materials shall be applied in strict accordance with manufacturer's recommendations.
- G. The coating shall offer protection from all concentrations of salt solutions, fumes, splash, or spillage of dilute acids, alkalies, and other corrosive chemicals, as well as water, weathering, abrasion and radiation.
- H. Finned Tube Heat Exchangers:
1. Condenser finned tube coils shall be protected with Blygold Polual polyurethane aluminum pigmented coating. The coating product and process shall be performed only by a qualified applicator.
 2. Prior to coating, the coil shall be rinsed using a high pressure warm water spray system and bent fins shall be adjusted using a properly spaced fin comb. The coil shall then be degreased with a pH neutral detergent to remove manufacturing oils and soiling and again rinsed using a high-pressure warm water spray system. The coil must be completely dry prior to coating.
 3. A chromate-free conversion layer shall then be applied to the coil using an air assisted spray gun, achieving total coverage and penetration. The coil shall again be completely dry prior to proceeding to the next step. An aluminum-impregnated polyurethane topcoat shall be applied using air assisted spray equipment, ensuring total penetration and coverage without bridging or significantly affecting the heat transfer ability of the coil. The total dry thickness of the topcoat shall be 20 to 25 microns (0.020 to 0.025). The coating shall provide inherent protection against ultraviolet radiation and be temperature resistant up to 365 degrees Fahrenheit (180 degrees Celsius).
 4. The coating manufacturer shall be able to document the successful completion of accelerated product testing of a minimum 3000 hours in both salt spray (ASTM B117) and acetic salt spray tests (ASTM B287).
- I. Cabinet and Exterior Surfaces:
1. Unit cabinet shall be coated with Ameron PSX 700 Engineered Siloxane or accepted equivalent. Metal preparation to provide a surface profile that shall include degreasing and etching. Color shall be grey.
 2. The coating shall be applied to all exterior surfaces until a total of 6-8 mils D.F.T. is achieved. Coating shall be applied in strict accordance with coating manufacturer's recommendations.
 3. After the coating has totally cured, the equipment shall be assembled using care not to damage the coating during assembly. Fasteners shall be stainless steel with bonderized rubber washer attached. Any touch up required shall be performed in accordance with the manufacturer's recommendations.
 4. The coating shall be performed by a qualified and experienced applicator.

3.07 PIPE INSULATION SYSTEM

Install insulation system in accordance with manufacturer's recommendations using tradesmen skilled in this trade and approved by the insulation manufacturer. Provide insulation products with a composite (insulation, jacket and adhesive) fire and smoke hazard rating as tested under ASTM E84, NFPA 255 and UL 723, not exceeding a Flame Spread of 25 and Smoke Development of 50. AP Armaflex, Owens-Corning, Johns-Manville, Certainteed, Armstrong or accepted equivalent.

1. Condensate Drain Piping: Insulate condensate drain piping with one-inch thick Nomaco Imcolock polyolefin pipe insulation or accepted equivalent for pipes 7/8-inch and smaller. Apply vapor barrier to seal insulation ends and around valves, fittings, flanges and unions. Vapor barriers shall be provided in long runs of pipe at intervals not to exceed 15 feet. Installation shall be in accordance with manufacturer's latest recommendations.
2. Chilled Water Piping (Aboveground): Insulate chilled water piping with foamglass insulation, Pittsburgh Corning insulation or approved equal. Apply vapor barrier to seal insulation ends and around valves, fittings, flanges and unions. Vapor barriers shall be provided in long runs of pipe at intervals not to exceed 15-feet. Insulation thickness: 1-1/2 inches thick for pipe sizes 1-1/4 inches and smaller; 2-inches thick for pipe sizes 1-1/2 inches to 4-inches; 3-inches thick for pipes larger than 4-inches.
3. Insulate chilled water valves, fittings, and couplings with foamglass insulation, Pittsburgh Corning insulation or approved equal. Insulation thickness and density to match pipe insulation.
4. On pipe insulation exposed to weather or the environment, apply 16 mil embossed aluminum jacket with 2-inch overlap at longitudinal and circumferential joints, secured in place with 3/4-inch x 0.015 gauge aluminum bands on 18-inch centers. Apply humped aluminum ells or fabricated 16 mil aluminum to fittings and band in place.

3.08 AUTOMATIC CONTROL SYSTEM

- A. Automatic control system shall be electric and shall be furnished and installed by a qualified Controls Contractor specifically in this field. Controls Contractor shall have proven experience in design, installation, calibration and service of equipment. Provide relays, control dampers, switches, control wiring and conduit and other items necessary to perform the functions specified or required for proper sequencing and operation of system. Direct the Mechanical Contractor in the proper location and installation of control valves, control dampers, wells, flow switches and similar items installed by that trade. Provide identifying labels on all controls. Mount fan "on-off" switch 44-inches above floor unless otherwise indicated.
- B. Control and Interlock Wiring: Provide all control and interlock wiring. Obtain wiring diagrams for all equipment and prepare a complete control-wiring shop

drawing. Submit to State Engineer for approval in accordance with SECTION 01300 - SUBMITTALS. Conform to National Electrical Code requirements. All wiring shall be in pipe conduit. All exposed wiring shall be in galvanized pipe conduit, no EMT allowed for conduit exposed to weather. Provide PVC for conduit below grade.

- C. Set, test, calibrate, adjust and place in operation all equipment furnished by the Control Contractor. Upon completion of the operational test, inform the State Engineer in writing that the system is installed in accordance with the drawings and specifications and that the system has been calibrated and tested and is ready for use. Correct deficiencies observed after the facility is occupied.

3.09 BALANCE, ADJUST AND TESTING

- A. Scope: The Contractor shall obtain the services of an independent, NEBB certified and qualified test and balance agency that specializes in, and whose business is the testing and balancing of air conditioning and ventilation systems, to test mechanical systems to determine quantitative performance. Compare observed quantities with design quantities. Adjust systems to produce observed quantities that will conform to design quantities within tolerances specified. Balance the flow to conform to design, lock and mark adjustments, and leave systems in balance. Complete preliminary balancing, adjusting and testing prior to final inspection by the State Engineer and also perform final test and balance after building is occupied. Provide complete balancing, adjusting and testing at the end of the first year of the maintenance contract.
- B. Job Conditions: Ventilation and air conditioning equipment shall have been completely installed and shall be put into continuous operation as required to accomplish the test adjustment and balance work specified. Test, adjust and balance shall be performed when outside conditions approximate design conditions indicated for cooling functions.
- C. Certified Reports: Submit test reports on approved forms with certification by the testing engineer that the methods used and the results are as specified. Reports shall be on forms as approved by the State Engineer.
- D. Procedures: Air Systems - Test and balance systems in accordance with SMACNA manual for the Balancing and Adjustment of Air Distribution Systems.
 - 1. Preliminary: Size, type and manufacturer of air terminals and all tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations unless field tests show ratings to be impractical.
 - 2. Adjust all air diffusers to minimize drafts in all areas.
 - 3. Verification: Prepare summation of readings of observed CFM for each system, compare with required CFM and verify that duct losses are within specified allowable range.

4. Central System: Test and adjust fan rpm to design requirements within the limits of mechanical equipment provided. Record motor nameplate data and starter ratings. Make pilot tube traverse of main supply ducts and return ducts and obtain design cfm at fans with air conditioned space fully loaded. Test and record system static pressure, suction and discharge. Test and adjust system for design recirculated air, CFM.
 5. 8 copies of the complete test report shall be submitted to the State Engineer prior to final acceptance of the project.
 6. Balancing: Water piping systems shall be balanced to produce water quantities as indicated with all manual and automatic control valves open.
- E. Test Data: The Contractor shall provide the State Engineer 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 air conditioning system.
- F. Automatic Control System: In accordance with the control manufacturer's representative, set and adjust automatically operated devices to achieve required sequence of operations. Testing organization shall verify all controls for proper calibration and list those controls requiring adjustment by control system installer. Permanently mark set-point.
1. Submission of Reports: Fill in test results on approved report forms. Submit 3 certified copies of required test reports to the State Engineer for review.
 2. Adjust factory set pressure controller for inlet guide vanes in accordance with design conditions.
- G. System Performance Report: After conclusion of balancing operations, make temporary installation of portable recorders and simultaneously record summer temperatures and humidity at representative locations in each system and outdoors. Test location shall be as approved by the State Engineer. Recordings shall be made summer for a 5-day period, continuous over a weekend, and including at least one period of operation conditions within 2 degrees F DB of maximum summer design condition. Provide rebalancing within one year guaranteed to satisfy User's requirements. Coordinate with the State Engineer, all work required for this report. The State Engineer shall witness all testing requirements for this and all reports.
- H. Operational Acceptance Tests: In addition to the test and balance reports submitted by the Test and Balance Contractor, complete and submit the attached Operational Acceptance Test form. Coordinate with the State Engineer to witness all tests required under this and all other sections of these specifications.

3.10 FIELD QUALITY CONTROL

SOUTH TSA CHECKPOINT
KAHULUI AIRPORT
STATE PROJECT NO. AM1095-10
AIP PROJECT NO. 3-15-0006-##

Air Conditioning and Ventilation
15600-29

Pressure test ductwork at no less than 2-inches W.G. not sooner than 24-hours after sealer was applied to joints. Test system with blower, calibrated metering orifice and water gauge. Overall leakage shall not exceed 0.25 percent of total air quality.

3.11 CLEAN UP

Clean up the work provided under this section. Touch up with matching paint all damaged factory finishes. Adjust for quiet and effective operation.

3.12 PAINTING AND IDENTIFYING

The following items furnished under this section are to be painted and identified under SECTION 09911 – EXTERIOR PAINTING and SECTION 09912 INTERIOR PAINTING. Do not paint over name plates or other identifying labels. Painting of exposed bare metal surfaces in finished and exposed areas shall be provided herein if it is not specified under SECTION 09911 – EXTERIOR PAINTING and SECTION 09912 – INTERIOR PAINTING. Included in this work shall be bare metal registers, louvers, access panels for mechanical equipment, control covers and thermostat covers, sheetmetal ductwork jacket, piping, hangers, etc. Prepare surface as required in paint schedule. Provide 2 final coats matching adjoining surface finish.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
15600.1	Air Conditioning and Ventilation	Lump Sum
15600.2	Air Conditioning and Ventilation - Existing TSA Checkpoint Work (Phase 2)	Lump Sum
15600.3	Air Conditioning and Ventilation - Operations & Maintenance Service	Month

END OF SECTION

SECTION 15910 - DIRECT DIGITAL CONTROL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

- A. This Section includes control equipment, to be provided by Johnson Controls Inc. (JCI), for HVAC systems and components, including control components for cooling units not supplied with factory-wired controls.
- B. There are two (2) areas of the airport that will require air conditioning and ventilation; the enclosing of the existing TSA area (presently open air) and their new TSA building. Both TSA areas will require a DDC retrofit for the control of the new HVAC equipment required for occupant comfort.
- C. This section provides for new HVAC controls for the cooling and ventilation of the existing TSA area as it will be enclosed. A new TSA facility/building will also need controls for the cooling and ventilation.
- D. The control system for the new TSA facility (New TSA) shall consist of new JCI networked controllers and the existing JCI Metasys® (Metasys). The existing TSA facility (TSA) facility controllers will also be networked with the Metasys. The existing JCI Metasys web server with its network interface card shall gather data from this system and generate web pages accessible through the web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface. JCI shall coordinate with the State of Hawai'i for access (IP Address, if not directly networked to the existing Metasys) to a network, as needed for networking of the newly constructed TSA controls to the existing JCI Metasys system. The control modifications to the existing TSA are presently connected to the JCI Metasys server and does not require a new Metasys network connection, unless the control contractor, JCI, requires the replacement of older, unsupported modules. JCI shall maintain the existing control module(s) Metasys network connection when providing any upgrade to the present TSA area modules.
- E. The existing JCI Metasys web server with its network interface card shall gather data from this system and generate web pages accessible through the web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface. JCI shall coordinate with the State of Hawai'i for access (IP Address, if not directly networked to the existing JCI Metasys network) to a network, as needed for networking of the newly constructed TSA controls to the existing JCI Metasys

system. The control modifications to the existing TSA are presently connected to the JCI Metasys server and does not require a new Metasys network connection, unless the control contractor, JCI, requires the replacement of older, unsupported modules. JCI shall maintain the existing control module(s) Metasys network connection when providing any upgrade to the present TSA area modules.

- F. The Metasys system by JCI, shall have its server and software upgraded to its most current hardware and software with all security and updated patches provided. The existing database (including all trended data) shall be archived and secured prior to the replacement of the computer/server, its operating system and software. Throughout the warranty period, the contractor shall maintain manufacture's security and software updates.

1.03 DEFINITIONS

1. DDC: Direct digital control.
2. I/O: Input/output.
3. LAN: Local Area Network.
4. MS/TP: Master slave/token passing.
5. PC: Personal computer.
6. PID: Proportional plus integral plus derivative.
7. RTD: Resistance temperature detector.

1.04 SYSTEM PERFORMANCE

Comply with the following performance requirements:

1. Graphic Display: Display graphic with minimum 20 dynamic points with current data within 10 seconds.
2. Graphic Refresh: Update graphic with minimum 20 dynamic points with current data within 8 seconds.
3. Object Command: Reaction time of less than two seconds between operator command of a binary object and device reaction.
4. Object Scan: Transmit change of state and change of analog values to control units or workstation within six seconds.
5. Alarm Response Time: Annunciate alarm at workstation within 45 seconds. Multiple workstations must receive alarms within five seconds of each other.
6. Program Execution Frequency: Run capability of applications as often as five seconds, but selected consistent with mechanical process under control.
7. Performance: Programmable controllers shall execute DDC PID control loops, and scan and update process values and outputs at least once per second.
8. Reporting Accuracy and Stability of Control: Report values and maintain measured variables within tolerances as follows:

- a. Space Temperature: Plus or minus 1 deg F (0.5 deg C).
- b. Ducted Air Temperature: Plus or minus 1 deg F (0.5 deg C).
- c. Outside Air Temperature: Plus or minus 2 deg F (1.0 deg C).
- d. Dew Point Temperature: Plus or minus 3 deg F (1.5 deg C).
- e. Temperature Differential: Plus or minus 0.25 deg F (0.15 deg C).
- f. Relative Humidity (RH): Plus or minus 5.0% RH.
- g. CO2: Plus or minus 50 PPM
- h. CO: Plus or minus 5% of reading.
- i. Electrical: Plus or minus 5.0% of reading.

1.05 SEQUENCE OF OPERATION

See descriptions in the drawings and specifications to determine how the HVAC system is to be operated, monitored and controlled by the DDC system.

1.06 SUBMITTALS

- A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.
 - 1. DDC System Hardware: Bill of materials of equipment indicating quantity, manufacturer, and model number. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.
 - 2. Control System Software: Include technical data for operating system software, operator interface, color graphics, and other third-party applications. Operator interface shall be graphically based and shall include at least one graphic per piece of equipment or occupied zone.
 - 3. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.

- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Bill of materials of equipment indicating quantity, manufacturer, and model number.
 - 2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
 - 3. Wiring Diagrams: Power, signal, and control wiring.
 - 4. Details of control panel faces, including controls, instruments, and labeling.
 - 5. Written description of sequence of operation.
 - 6. Schedule of dampers including size, leakage, and flow characteristics.

7. Schedule of valves including flow characteristics.
8. DDC System Hardware:
 - a. Wiring diagrams for control units with termination numbers.
 - b. Schematic diagrams and floor plans for field sensors and control hardware.
 - c. Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations. Description of the various types of wire or cables with the designated function shall be provided.
9. Control System Software: List of color graphics indicating monitored systems, data (connected and calculated) point addresses, output schedule, and operator notations.
10. Controlled Systems:
 - a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
 - b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
 - c. Written description of sequence of operation including schematic diagram. Written documentation (copy in the enclosures) for the manual starting and stopping of the system in the event of system outage.
 - d. Points list.

1.07 DATA COMMUNICATION PROTOCOL CERTIFICATES

Certify that each proposed DDC system component complies with ASHRAE BACnet protocols and is compatible with the JCI Metasys system.

1.08 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Manual/Documentation: This manual or documentation is intended to provide a complete description of the HVAC system and DDC control system. The following information shall be provided in a 3-ring binder(s) unless mentioned otherwise:
 1. Description of HVAC System: Provide a general description of the HVAC system and major equipment that it is comprised of. Provide a list of installed equipment with the manufacturer's name and model/part number. The listed items shall be labeled such that it can be referenced to a particular piece of equipment on the as-built drawing (example: FCU-1, ACCU-1, EF-1 etc.). Information for the HVAC equipment should be furnished by catalog data or other submittals in other Division 15 specification sections.
 2. Description of DDC Control System: Provide a general description of the

DDC control system with list of parts with name of manufacturer and model/part number unless every item in the DDC as-built drawings already contain this information. Refer to DDC controls as-built drawings.

3. Control equipment catalog cuts providing description of equipment specifications (if applicable), software specifications, power and communication signal information, etc.
4. Maintenance instructions and lists of spare parts for each type of control device and compressed-air station components (if applicable).
5. Printout of pre-programmed operating parameters such as equipment start-stop times, room air temperature set point, alarm set points, etc.
6. Service Organization: Qualified service technicians by Johnson Controls Inc. only shall provide for the maintenance, repair and operation of the DDC control system.

B. Software and Firmware Operational Documentation: Include the following:

1. DDC Software operating and upgrade manuals.
2. DDC Program Software Backup: On a magnetic media, complete with data files.
3. Device address list.
4. Listing of all software applications required for operation of and accessing into the DDC control system.
5. Software license required by and installed for DDC Server, and if required workstations and control systems.

C. As-Built Drawings: A complete set of as-built drawings for the HVAC system is to be a combination of as-built design drawings and as-built control drawings which should show locations of all HVAC equipment and field installed accessories, how the systems are intended to operate and DDC control shop drawings which should show the manufacturer of equipment, network diagrams, communication protocols, all components, list of materials, etc.

1.09 QUALITY ASSURANCE

- A. Installer Qualifications: Johnson Controls Inc., Hawai'i Branch technicians and engineers who are trained and approved for installation of system components are required for this project.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with ASHRAE 135 for DDC system components.
- D. JCI shall provide for hardware and software by Johnson Controls Inc, Metasys.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.
- B. System Software: Update to the most version of the OS software that is compatible with Metasys and computer/server at Project completion.

1.11 COORDINATION

- A. Coordinate location of thermostats and other exposed control sensors with plans and room details before installation.
- B. Coordinate electrical power supply for all mechanical equipment, motors, field devices and DDC control components with the Electrical Consultant.
- C. Coordinate location of the building work station server (existing JCI server to be replaced) for the JCI/Metasys control system with the user and designer, including the provision for an internet enabled network connection. Show the location of this equipment on the drawings.

1.12 WARRANTY

- A. Warranty labor and materials for specified control system free from defects for a period of 1 year after final acceptance. Control systems failure during warranty period shall be adjusted, repaired or replaced at no additional cost or reduction in service. Warranty shall apply to all components and wiring applicable to the limits of this project scope.
- B. Work shall have a single warranty date even if the building or facility receives beneficial use due to early system start-up but without final completion, inspection and acceptance.
- C. The JCI shall have a local facility in the State of Hawaii. Emergency service shall be available on a 24 hour/7 day a week basis.

PART 2 - PRODUCTS

2.01 CONTROL SYSTEM

The existing server/workstation shall be replaced with a more current operating system, as compatible with JCI Metasys current or upgraded version. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multi-user, multitasking environment on token-passing network and programmed to control mechanical systems. An

operator workstation permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.

2.02 DDC EQUIPMENT

- A. Operator Workstation/server: One PC-based microcomputer with minimum configuration as follows:
1. The microcomputer shall be housed in a form factor enclosure that will not exceed the physical space of the existing computer.
 2. Motherboard: With 4 integrated USB 2.0 ports, integrated Intel Pro 10/100 (Ethernet), integrated audio, bios, and hardware monitoring.
 3. Processor: Intel Core-i7 or compatible AMD with minimum 2 Ghz clock speed.
 4. Random-Access Memory: 16 GB minimum.
 5. Graphics: Video adapter, minimum 1600 x 1200 pixels, 64-MB video memory, with TV out.
 6. Monitor: 17 inches (430 mm), LCD color.
 7. Keyboard: QWERTY, 105 keys in ergonomic shape.
 8. Hard-Disk Drive: Minimum of 1.0 TB internal hard drive and one matching capacity (e.g. 1.0 TB) external drive (mirroring).
 9. CD/DVD Read/Write Drive: 16x CD-RW/DVD.
 10. Mouse: Three button, optical, scroll.
 11. Uninterruptible Power Supply: 2 kVa.
 12. Operating System: Current Windows OS (as compatible with the current DDC software) with high-speed Internet access.
 13. ASHRAE 135 Compliance: Workstation shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
 14. Printer: Black and White Laser Printer:
 15. Application Software:
 - a. I/O capability from operator station.
 - b. System security for each operator via software password and access levels.
 - c. Automatic system diagnostics; monitor system and report failures.
 - d. Database creation and support.
 - e. Automatic and manual database save and restore.
 - f. Dynamic color graphic displays with up to 10 screen displays at once.
 - g. Custom graphics generation and graphics library of HVAC equipment and symbols.
 - h. Alarm processing, messages, and reactions.
 - i. Trend logs retrievable in spreadsheets and database programs.
 - j. Alarm and event processing.
 - k. Object and property status and control.
 - l. Automatic restart of field equipment on restoration of power.

- m. Data collection, reports, and logs. Include standard reports for the following:
 - 1) Current values of all objects.
 - 2) Current alarm summary.
 - 3) Disabled objects.
 - 4) Alarm lockout objects.
 - 5) Logs.

- n. Energy Calculations and Utility Recorded Data: Flow rates, temperatures, etc. measurements necessary to calculate cumulative average energy consumption can be set to record data at pre-determined intervals such as every 15 minutes, 30 minutes, 60 minutes, etc. for "X" number of days and re-settable on a recurring basis.
 - 1) Record electrical energy in KWH and electrical demand in KW via electrical submeter (non MECO).

- o. Other custom report development.
- p. Utility and weather reports.
- q. Workstation application editors for controllers and schedules.
- r. Maintenance management.
- s. Time Programs: Provide program to automatically adjust for leap years and make daylight savings time and standard time adjustments.

16. Custom Application Software:

- a. English language oriented.
- b. Full-screen character editor/programming environment.
- c. Allow development of independently executing program modules with debugging/simulation capability.
- d. Support conditional statements.
- e. Support floating-point arithmetic with mathematic functions.
- f. Contains predefined time variables.

- B. Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access and display panel; integral interface equipment; and backup power source.
 - 1. Units monitor or control each I/O point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator workstation or diagnostic terminal unit.
 - 2. Stand-alone mode control functions operate regardless of network status. Functions include the following:

- a. Global communications.
 - b. Discrete/digital, analog, and pulse I/O.
 - c. Monitoring, controlling, or addressing data points.
 - d. Software applications, scheduling, and alarm processing.
 - e. Testing and developing control algorithms without disrupting field hardware and controlled environment.
3. Standard Application Programs:
- a. Electric Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, night setback/setup, on-off control with differential sequencing, staggered start, antishort cycling, PID control, DDC with fine tuning, and trend logging.
 - b. HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy switchover.
 - c. Programming Application Features: Include trend point; alarm processing and messaging; weekly, monthly, and annual scheduling; energy calculations; run-time totalization; and security access.
 - d. Remote communications.
 - e. Maintenance management.
 - f. Units of Measure: Inch-pound and SI (metric).
4. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
5. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
- C. Local Control Units: Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.
- 1. Units monitor or control each I/O point, process information, and download from or upload to operator workstation or diagnostic terminal unit.
 - 2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 - a. Global communications.
 - b. Discrete/digital, analog, and pulse I/O.
 - c. Monitoring, controlling, or addressing data points.
 - 3. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
 - 4. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

- D. I/O Interface: Hardwired inputs and outputs may tie into system through controllers. Protect points so that shorting will cause no damage to controllers.
1. Binary Inputs: Allow monitoring of on-off signals without external power.
 2. Pulse Accumulation Inputs: Accept up to 10 pulses per second.
 3. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.
 4. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation with three-position (on-off-auto) override switches and status lights].
 5. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA) [with status lights, two-position (auto-manual) switch, and manually adjustable potentiometer].
 6. Tri-State Outputs: Provide two coordinated binary outputs for control of three-point, floating-type electronic actuators.
 7. Universal I/Os: Provide software selectable binary or analog outputs.
- E. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:
1. Output ripple of 5.0 mV maximum peak to peak.
 2. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.
 3. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.
- F. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:
1. Minimum dielectric strength of 1000 V.
 2. Maximum response time of 10 nanoseconds.
 3. Minimum transverse-mode noise attenuation of 65 dB.
 4. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.

2.03 UNITARY CONTROLLERS

- A. Unitized, capable of stand-alone operation with sufficient memory to support its operating system, database, and programming requirements, and with sufficient I/O capacity for the application.
- B. Configuration: Local keypad and display; diagnostic LEDs for power, communication, and processor; wiring termination to terminal strip or card connected with ribbon cable; memory with bios; and 72 -hour battery backup.
- C. Operating System: Manage I/O communication to allow distributed controllers to share real and virtual object information and allow central monitoring and

alarms. Perform scheduling with real-time clock. Perform automatic system diagnostics; monitor system and report failures.

- D. ASHRAE 135 Compliance: Communicate using read (execute and initiate) and write (execute and initiate) property services defined in ASHRAE 135. Reside on network using MS/TP datalink/physical layer protocol and have service communication port for connection to diagnostic terminal unit.
- E. Enclosure: Waterproof rated for operation at 40 to 150 deg F (5 to 65 deg C).

2.04 ALARM PANELS

- A. Unitized cabinet with suitable brackets for wall or floor mounting. Fabricate of 0.06-inch- (1.5-mm-) thick, furniture-quality steel or extruded-aluminum alloy, totally enclosed, with hinged doors and keyed lock and with manufacturer's standard shop-painted finish. Provide common keying for all panels.
- B. Indicating light for each alarm point, single horn, acknowledge switch, and test switch, mounted on hinged cover.
 - 1. Alarm Condition: Indicating light flashes and horn sounds.
 - 2. Acknowledge Switch: Horn is silent and indicating light is steady.
 - 3. Second Alarm: Horn sounds and indicating light is steady.
 - 4. Alarm Condition Cleared: System is reset and indicating light is extinguished.
 - 5. Contacts in alarm panel allow remote monitoring by independent alarm company.

2.05 ANALOG CONTROLLERS

- A. Step Controllers: 6- or 10-stage type, with heavy-duty switching rated to handle loads and operated by electric motor.
- B. Electric, Outdoor-Reset Controllers: Remote-bulb or bimetal rod-and-tube type, proportioning action with adjustable throttling range, adjustable set point, scale range minus 10 to plus 70 deg F (minus 23 to plus 21 deg C) , and single- or double-pole contacts.
- C. Electronic Controllers: Wheatstone-bridge-amplifier type, in steel enclosure with provision for remote-resistance readjustment. Identify adjustments on controllers, including proportional band and authority. Single controllers can be integral with control motor if provided with accessible control readjustment potentiometer.
- D. Fan-Speed Controllers: Solid-state model providing field-adjustable proportional control of motor speed from maximum to minimum of 55 percent and on-off action below minimum fan speed. Controller shall briefly apply full voltage, when motor is started, to rapidly bring motor up to minimum speed.

Equip with filtered circuit to eliminate radio interference.

- E. Receiver Controllers: Single- or multiple-input models with control-point adjustment, direct or reverse acting with mechanical set-point adjustment with locking device, proportional band adjustment, authority adjustment, and proportional control mode.
 - 1. Remote-control-point adjustment shall be plus or minus 20 percent of sensor span, input signal of 3 to 13 psig (21 to 90 kPa).
 - 2. Proportional band shall extend from 2 to 20 percent for 5 psig (35 kPa).
 - 3. Authority shall be 20 to 200 percent.
 - 4. Air-supply pressure of 18 psig (124 kPa), input signal of 3 to 15 psig (21 to 103 kPa) , and output signal of zero to supply pressure.
 - 5. Gages: 3-1/2 inches (89 mm) in diameter, 2.5 percent wide-scale accuracy, and range to match transmitter input or output pressure.

2.06 TIME CLOCKS

- A. Time clocks are not provided on this project. Scheduling of all modules for equipment shall be written to and maintained in the equipment DDC modules.

2.07 ELECTRONIC SENSORS

- A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.
- B. Thermistor Temperature Sensors and Transmitters:
 - 1. Accuracy: Plus or minus [0.5 deg F (0.3 deg C)] at calibration point.
 - 2. Wire: Twisted, shielded-pair cable.
 - 3. Insertion Elements in Ducts: Single point, [8 inches (200 mm)] long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft. (0.84 sq. m) .
 - 4. Averaging Elements in Ducts: 36 inches (915 mm) long, flexible; use where prone to temperature stratification or where ducts are larger than 10 sq. ft. (1 sq. m) .
 - 5. Room Sensor Cover Construction: Manufacturer's standard locking covers.
 - a. Set-Point Adjustment: Concealed.
 - b. Set-Point Indication: Concealed.
 - c. Thermometer: Concealed.
 - d. Orientation: Horizontal.
 - 6. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
- F. Room sensor accessories include the following:

1. Insulating Bases: For sensors located on exterior walls.
2. Guards: Locking, solid metal, ventilated.
3. Adjusting Key: As required for calibration and cover screws.

2.09 STATUS SENSORS

- A. Status Inputs for Fans: Differential-pressure switch with pilot-duty rating and with adjustable range of 0- to 5-inch wg (0 to 1240 Pa).
- B. Status Inputs for Pumps: Differential-pressure switch with pilot-duty rating and with adjustable pressure-differential range of 8 to 60 psig (55 to 414 kPa), piped across pump.
- C. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current.
- D. Voltage Transmitter (100- to 600-V ac): Comply with ISA 50.00.01, single-loop, self-powered transmitter, adjustable, with suitable range and 1 percent full-scale accuracy.
- E. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.
- F. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements.

2.10 THERMOSTATS

- A. Combination Thermostat and Fan Switches: Line-voltage thermostat with push-button or lever-operated fan switch.
 1. Label switches "FAN HIGH-MED-LOW-OFF".
 2. Mount on single electric switch box.
- B. Electric, solid-state, microcomputer-based room thermostat with remote sensor.
 1. Preferential rate control to minimize overshoot and deviation from set point.
 2. Set up for four separate temperatures per day.
 3. Instant override of set point for continuous or timed period from 1 hour to 31 days.
 4. Short-cycle protection.
 5. Programming based on every day of week.
 6. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, remote sensor, and fan on-auto.

7. Battery replacement without program loss.
8. Thermostat display features include the following:
 - a. Time of day.
 - b. Actual room temperature.
 - c. Programmed temperature.
 - d. Programmed time.
 - e. Duration of timed override.
 - f. Day of week.
 - g. System mode indications include "off," "fan auto," and "fan on."

2.11 CONTROL CABLE

- A. Control wiring for 24 volt circuits shall be insulated copper 18 AWG minimum and shall be rated for 300 VAC service.
- B. Analog signal wiring shall be 18 AWG single or multiple twisted pair. Each cable shall be 100 per cent shielded and have 20 AWG drain wire. Each wire shall have insulation rated to 300 VAC. Cables shall have an overall aluminum-polyester or tinned-copper (cable-shield tape), overall 20 AWG tinned copper cable drain wire and overall cable insulation rated to 300 VAC. Install analog signal wiring in conduit separate from AC power circuits. Circuits operating at more than 100 volts shall be in accordance with DIVISION 16 Electrical.
- C. Optical cables shall be duplex 900 mm tight-buffer construction designed for intra-building environments. Sheath shall be UL listed OFNP in accordance with NEC Article 770. Optical fiber shall meet the requirements of FDDI, ANSI X3T9.5 PMD for 62.5/125mm. Field terminate optical fibers with ST type connectors. Connectors shall have ceramic ferrules and metal bayonet latching bodies.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that power supply is available to control units and operator workstation.
- B. Verify that pipe-, and equipment-mounted devices are installed before proceeding with installation.

3.02 INSTALLATION

- A. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.

- B. Connect and configure equipment and software to achieve sequence of operation specified.
- C. Verify location of thermostats, and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches (1220 mm) above the floor.
- D. Install averaging elements in ducts and plenums in crossing or zigzag pattern.
- E. Install guards on thermostats in the following locations:
 - 1. Entrances.
 - 2. Public areas.
 - 3. Where indicated.
- F. Install labels and nameplates to identify control components. Nameplates shall be permanently attached to HVAC control panel doors. For each field mounted piece of equipment, a plastic or metal engraved tag with equipment name and point identifier shall be attached.

3.03 ELECTRICAL WIRING AND CONNECTION INSTALLATION

- A. Install raceways, boxes, and cabinets according to Division 16 for Raceways and Boxes.
- B. Install building wire and cable according to Division 16 Electrical.
- C. Install signal and communication cable as indicated below:
 - 1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
 - 2. Install exposed cable in raceway.
 - 3. Install concealed cable in raceway.
 - 4. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
 - 5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
 - 6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.
 - 7. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.
- D. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.
- E. Connect hand-off-auto selector switches to override automatic interlock

controls when switch is in hand position.

3.05 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage JCI representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
 - 2. Test and adjust controls and safeties.
 - 3. Test calibration of electronic controllers by disconnecting input sensors and stimulating operation with compatible signal generator, if owner required.
 - 4. Test each point through its full operating range to verify that safety and operating control set points are as required.
 - 5. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
 - 6. Test each system for compliance with sequence of operation.
 - 7. Test software and hardware interlocks.
- C. DDC Verification:
 - 1. Verify that instruments are installed before calibration, testing, and loop or leak checks.
 - 2. Check instruments for proper location and accessibility.
 - 3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
 - 4. Check temperature instruments and material and length of sensing elements.
 - 5. Check DDC system as follows:
 - a. Verify that DDC controller power supply is from emergency power supply, if applicable.
 - b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
 - c. Verify that spare I/O capacity has been provided.
 - d. Verify that DDC controllers are protected from power supply surges.
- D. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

3.06 ADJUSTING

- A. Calibrating and Adjusting:

1. Calibrate instruments.
 2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
 3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
 4. Control System Inputs and Outputs:
 - a. Check analog inputs at 0, 50, and 100 percent of span.
 - b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
 - c. Check digital inputs using jumper wire.
 - d. Check digital outputs using ohmmeter to test for contact making or breaking.
 5. Temperature:
 - a. Calibrate resistance temperature transmitters, by offset, at operating range of operation using a precision-resistance source.
 6. Provide diagnostic and test instruments for calibration and adjustment of system.
 7. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.
- B. Adjust initial temperature set points.
- C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance (or by online remote network connection) in adjusting system to suit actual occupied conditions. Provide up to three visits to Project during other than normal occupancy hours for this purpose.

3.07 COMMISSIONING

The Commissioning Agent shall be responsible for commissioning the DDC system as specified in the commissioning section of the specifications.

3.08 TRAINING

- A. The controls contractor shall provide the following training services:
1. One day of on-site orientation by a field engineer who is fully knowledgeable of the specific installation details of the project. This orientation shall, at a minimum, consist of a review of the project as-built drawings, the control system software layout and naming conventions,

- and a walk through of the facility to identify panel and device locations.
2. General: Provide training course schedule, syllabus, and training materials 15 days prior to the start of training. Conduct training courses for designated personnel in the maintenance and operation of the HVAC and DDC system. Orient training to the specific system being installed under this contract. Use operation and maintenance manual as the primary instructional aid. Operational and maintenance manuals shall be provided for each trainee with four additional sets, two sets delivered for archiving at the project site, one set for the mechanical contractor, and one set for the design engineer. Training manuals shall include an agenda, defined objectives and a detailed description of the subject matter for each lesson. Furnish audio-visual equipment and all other training materials and supplies. A training day is defined as 8 hours of classroom or lab instruction, excluding break and lunch periods, Monday thru Friday, during the daytime shift in effect at the training facility. For guidance, assume the attendees will have a high school education and are familiar with HVAC systems. The minimum amount of training for this project shall be 24 hours.
 3. Operator Training: Operator training shall include the detailed review of the control installation drawings, points list, and equipment list. The instructor shall then walk through the building identifying the location of the control devices installed. For each type of systems, the instructor shall demonstrate how the system accomplishes the sequence of operation.
 4. From the workstation, the operator shall demonstrate the software features of the system. As a minimum, the operator demonstrate and explain logging on, setting passwords, setting up a schedule, trend, point history, alarm, and archiving the database.
 5. Maintenance Training: The system maintenance course shall be taught at the project site within one month after the completion of the operators training. The course shall last for one 8 hour training day. The course shall include answering questions from the last training session, trouble shooting and diagnostics, repair, instructions, preventive maintenance procedures and schedules, and calibration procedures.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for DDC Controls Integration with Existing System, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for DDC Controls Integration with Existing System required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
15910.1	Direct Digital Control Systems	Lump Sum
15910.2	Direct Digital Control Systems - Existing TSA Checkpoint Work (Phase 2)	Lump Sum
15910.3	DDC Controls Integration with Existing System	Allowance

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 PRICE.

END OF SECTION

DIVISION 16 – ELECTRICAL

SECTION 16011 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. The Contractor under this Division shall provide all labor, materials, equipment, supervision and services required for the construction of the electrical systems. The finished installations shall be complete, operable and shall include all work specified herein and shown on the Drawings.
- B. The work shall include complete testing of all equipment and wiring at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment. All systems shall be properly adjusted and in working order at time of final acceptance.
- C. All concrete, steel reinforcement, miscellaneous metal-work, earthwork, painting, grouting, patching, and water proofing shall conform to the applicable requirements of the detailed equipment specifications as prescribed in appropriate sections.
- D. It is the intent of these Specifications and other Contract Documents to require an installation complete in every detail. Consequently, the Contractor will be responsible for minor details or for any special construction which may be found necessary to properly furnish, install, adjust, test, and place in successful and continuous operation the entire electrical system.

1.03 DESCRIPTION OF WORK

Work specified in this Division shall include, but not be limited to the following:

- 1. Secondary (600V class) distribution system, including metering equipment, panelboards, overcurrent protection devices, and feeders.
- 2. Complete electrical system wiring including branch circuits, luminaires, switches, receptacles, outlets and control devices.
- 3. Complete lighting and control systems, including time switches, lighting contactors and control stations.
- 4. Raceways and cabling for telephone and data distribution systems, including termination equipment.

5. Power wiring for electrically-operated equipment and appliances.
6. Complete fire alarm system modifications.
7. Power and control wiring for access control systems.
8. Testing.
9. Training (where identified in specs).
10. As-built drawings on reproducible mylar.

1.04 REFERENCES

Comply with the applicable requirements of the following standards unless otherwise indicated:

1. Comply with local ordinances; National Electrical Code; applicable regulations of the National Board of Fire Underwriters; Americans with Disabilities Act; specifications of ANSI, NEMA, UL, and IPCEA; and regulations of the respective utility companies.
2. In the event of conflict between pertinent codes and regulations, and the requirements of the referenced standards, or those indicated in Specifications and on drawings, the provisions of the more stringent shall govern.

1.05 RELATED WORK

- A. Division 1 - GENERAL REQUIREMENTS.
- B. Division 2 - SITE CONSTRUCTION.
- C. Division 3 - CONCRETE.
- D. Division 8 - DOORS AND WINDOWS.
- E. Section 09911 – EXTERIOR PAINTING.
- F. Section 09912 – INTERIOR PAINTING.
- G. Section 10440 - SIGNAGE
- H. Division 14 – CONVEYING SYSTEMS
- I. Division 15 - MECHANICAL.

1.06 PERMITS AND INSPECTION

- A. All permits required by local ordinances shall be obtained and paid for by the Contractor.

1.07 COORDINATION

- A. Refer to all project Drawings and to all Sections of the project Specifications. Coordinate and fit all work accordingly so that all electrical outlets and equipment will be properly located and readily accessible. The Drawings indicate the relation of wiring and connections and must not be scaled for exact locations. Verify all construction dimensions at the project and make changes necessary to conform to the building as constructed. Work improperly installed due to lack of construction verification shall be corrected at the Contractor's expense.
- B. Work shall be scheduled to avoid delays, interferences, and unnecessary work. If any conflicts occur necessitating departures from the Drawings and Specifications, details of departures and reasons therefor shall be submitted immediately for consideration by the Owner.
- C. Work shall be coordinated with the State for the transport, storage and installation of all of Government Furnished-Contractor Installed (GFCI) equipment.

1.08 SUBMITTALS

Submit shop drawings and catalog cuts of the equipment and products identified in each Division 16 technical section for approval in accordance with Section 01300 - SUBMITTALS. Each submittal shall be prepared with a SUMMARY SHEET attached to each copy identifying all items included in the submittal. Incomplete submittals and those without SUMMARY SHEETS will be returned without review.

1.09 DELIVERY, HANDLING AND STORAGE

- A. Deliver all materials of this Division in manufacturer's original unopened packages or containers with label intact and legible.
- B. Use means necessary to protect the materials of this section before, during and after installation; to protect the installed work and materials of all other trades; and to protect the original structure, work and materials of the State.
- C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the State.

1.10 WARRANTY

- A. Installation shall be complete in every detail as specified and ready for use. Any items supplied by Contractor developing defects of design, construction, or quality within one year of final acceptance by Owner shall be replaced by such new materials, apparatus or parts to make such defective portion of the

complete system conform to the true intent and meaning of the Drawings and Specifications at no additional cost to the State. Lamps shall be warranted for 50 percent of rated lamp life.

- B. The warranty shall be countersigned by the General Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS AND WORKMANSHIP

- A. All materials shall conform to the latest issue of all applicable standards as established by NEMA, NFPA, ANSI, IEEE, IES, ASTM and Underwriters' Laboratories, and shall bear the manufacturer's name and trade name and when available, the Underwriters' Label.
- B. Within 20 days after the contract has been awarded, or as otherwise directed, forward to the Owner a complete list of all materials and equipment proposed for installation. The intent to use the exact makes specified does not eliminate the responsibility of submitting such a list. List shall include sufficient information to permit ready and complete identification. After the work is completed, Contractor shall provide drawings showing the as-built conditions.
- C. Neat appearances in the finished work will be required. Only experienced electrical workers shall be employed for the electrical installation.
- D. All work not installed and completed in accordance with the latest rules and regulations of the NEC, OSHA, NESC, ADAAG, and all local ordinances shall be removed and reinstalled correctly at the Contractor's expense.

2.02 EXISTING SYSTEMS

- A. Modifications to existing fire alarm system shall be compatible with and integrated into the existing Simplex airport-wide fire alarm system.
- B. Modifications to existing access control system shall be compatible with and integrated into the existing Simplex airport-wide access control systems.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install all electrical materials and equipment in accordance with manufacturer's recommendations and as approved by the Owner for the seismic requirements indicated on the structural drawings.

- B. Cut, break, drill and patch as required to install electrical system. Repair any surface damaged or marred by notching, drilling or any other process necessary for installation of electrical work. Patch any damaged surfaces to match the existing surface. Provide fire stopping for new penetrations where noted and where required by the code.
- C. All wiring and overcurrent devices for equipment furnished by other trades are sized for a contemplated equipment size. If equipment other than contemplated and indicated on the plan is provided, the Contractor shall be responsible for providing the required wiring, switches, and overcurrent devices at no cost to the State. The Contractor shall submit the proposed revisions to the electrical design to the Owner for approval.
- D. The Electrical Contractor shall coordinate his work with other trades to avoid conflicts with mechanical, structural, baggage handling, and architectural elements of this project.
- E. The Electrical Contractor shall coordinate his work with the State to avoid conflicts with or disruption of airport and airline operations.

3.02 JOBSITE CONDITIONS

- A. These specifications are accompanied by construction drawings including building and site plans of all trades showing locations of all outlet, switches, service runs, feeder runs, devices, and other electrical equipment. The locations are approximate and before installing, study adjacent architectural details and make installation in most logical manner. Any device may be relocated within 10'-0" before installation at direction of Owner without additional cost to the State.
- B. Before installing, verify all dimensions and sizes of equipment.
- C. Verify that electrical system may be installed in strict accordance with the original design, the Drawings and Specifications and the manufacturer's recommendations.
- D. In the event of discrepancy, immediately notify the Owner. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.03 CONNECTIONS TO MECHANICAL EQUIPMENT AND ALL EQUIPMENT PROVIDED BY OTHER TRADES

- A. Electrical Contractor shall provide conduit, wiring and all electric connections from building wiring to motors for heating, ventilation, air conditioning, and other equipment, including connections to all switches, motor protection devices, baggage handling systems motor control panels, as specified by other trades.

- B. Electrical Contractor shall ascertain from other trades furnishing motor-driven equipment, the exact size and type of all motors, the exact locations of such equipment and the proper point where electrical connections should be brought through the floors or walls, as the case may be. Locations shown are diagrammatic only; correct locations shall be the full responsibility of the Electrical Contractor.
- C. Install individually mounted starters furnished for motors under other Divisions or Separate Contracts. Provide and install safety switches as necessary for each such motor.
- D. All control devices and control wiring shall be provided as described in the installation manuals of equipment and/or the Drawings and Specifications of other trades and disciplines.
- E. Electrical Contractor shall make connections to baggage handling systems (BHS) with feeders that energize BHS motor control panels. Branch circuit and control wiring from and between BHS motor control panels and to BHS motors, sensors, actuators, etc., shall be by BHS Contractor. All electrical work and materials provided by the BHS Contractor shall be governed by the requirements of these electrical specifications.
- F. Electrical Contractor shall coordinate installation of Government Furnished-Contractor Installed (GFCI) equipment with Owner and the State selected equipment supplier prior to installation, including proper mounting and termination points. Any damage to GFCI equipment as a result of the Contractor's lack of coordination prior to installation shall be corrected by the Contractor at no additional cost to the State.

3.04 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS

- A. Submit written certification that electrical systems are complete and operational. Submit certification with Contractor's request for final review.
- B. At the time of final review of electrical work, demonstrate the operation of electrical systems. Provide labor, apparatus and equipment for systems' demonstration. The various test shall be under the direction and supervision of the Owner.
- C. The Contractor shall provide all test equipment, materials, labor, and temporary power hook-ups to perform start-up and all tests as required to obtain final field acceptance from the State. All tests shall be conducted in the presence of the Owner or his representative. All test procedure shall conform to this specification and applicable standards the ANSI, IEEE, NEMA, OSHA, NFPA, etc.
- D. The Contractor shall be responsible for all tests and test record. Testing shall be performed by and under the immediate supervision of the Contractor. Test

record shall be kept for each piece of equipment. Copies shall be furnished to the Owner for his review and/or approval.

- E. A visual inspection of all electrical equipment, to check for the foreign material, tightness or wiring and connection, proper grounding, matching nameplate charts with specification, etc., shall be made prior to actual testing.
- F. After demonstration of systems, submit to the Owner 6 sets of keys for electrical equipment locks.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured or 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 16100 - ELECTRICAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

Section 16011 - GENERAL ELECTRICAL REQUIREMENTS, applies to this section with additions and modifications specified herein.

1.03 APPLICABLE PUBLICATIONS

The publications cited within this specification form a part of this specification to the extent referenced. Unless otherwise indicated, most recent edition of the publication with current revisions and amendments will be enforced.

1.04 SUBMITTALS

- A. Submit shop drawings and catalog cuts of the following equipment for approval in accordance with Section 01300 - SUBMITTALS. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. **Incomplete submittals and those without summary sheets will be returned without review.**

1. Shop Drawings: Panelboards.
2. Manufacturer's Data:
 - a. Overcurrent protection devices.
 - b. Panelboards.
 - c. Cabinets.
 - d. Safety switches.
 - e. Dry-type transformers.
 - f. Fuses.

- B. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Materials shall be new and those items listed by the Underwriters' Laboratories shall bear "UL" label of approval.
- B. Brand names, manufacturer's names and catalog numbers indicate standard of design and quality required. Acceptable manufacturers for electrical apparatus include General Electric, Siemens, Square D, and Eaton/Cutler-Hammer. All apparatus supplied shall bear the name of the approved manufacturer on its nameplates. Substitute materials may be used if pre-qualified prior to bidding by the Owner.
- C. Electrical equipment and luminaires shall be supplied through the manufacturer's designated representative by a local distributor.
- D. Proof of compliance shall be furnished when shop drawings are submitted.
- E. All apparatus shall be of the same manufacture.
- F. Where electrical apparatus is to be installed outside of totally enclosed rooms, NEMA 4X Type 316 stainless steel housings shall be provided.

2.02 RACEWAYS

- A. Rigid Steel Conduit: Rigid steel, zinc-coated inside and outside, for use with threaded fittings. ANSI C80.1.
- B. Intermediate Metal Conduit (IMC): Rigid steel, zinc-coated inside and outside, for use with threaded fittings. UL 1242.
- C. Electrical Metal Tubing (EMT): Thin walled steel tubing, zinc-coated. ANSI C80.3.
- D. Flexible Metal Conduit: Flexible steel conduit; zinc-coated inside and outside, smooth inside walls, liquid-tight with factory fittings for liquid-tight installation. Provide bushings with bonding jumper lugs for flexible conduit in excess of six feet in length. UL 360.
- E. Innerduct: Thin wall corrugated High Density Polyethylene (HDPE), sized as noted, 0.035-inch minimum wall thickness, orange, integral pullstring. Carlon Corrugated HDPE or equivalent.

2.03 BOXES

- A. Outlet and Small Junction Boxes: Nominal 4 inches square by 2-1/8 inches minimum depth exclusive of plaster ring, pressed steel, galvanized for corrosion protection. Exposed boxes and boxes exposed to the weather shall be cast steel, Type FS.
- B. Extension Rings for Outlet Boxes: Pressed steel, zinc-coated for corrosion protection.

2.04 CONDUCTORS

- A. Solid or stranded copper, sizes according to American Wire Gauge Wire, as shown on Drawings and #12 AWG minimum unless otherwise indicated. Solid conductors only for #10 AWG and smaller. All wiring shall be color-coded.
- B. Branch Circuits: Type THWN.
- C. Luminaire Wires: Per NEC.
- D. Conductors Larger than #8 AWG: XHHW-2.
- E. Conductors for Equipment Connection: Stranded flexible type.
- F. Low-Voltage Connectors and Terminals: Wire connectors and terminals for use with copper conductors shall conform to UL 486A.

2.05 WIRING DEVICES

- A. Switches: Ivory, 20A, 120/277V, non-mercury quiet type specification grade with nylon body.
- B. Duplex Convenience Receptacles: Ivory, 20A, 125V, nylon body, specification grade, grounding type, unless otherwise noted. Special color for special applications as noted.
- C. Quadruplex Convenience Receptacles: Ivory, 20A, 125V, nylon body, specification grade, grounding type, unless otherwise noted. Special color for special applications as noted.
- D. Ticket Counter Technology Receptacles: Orange, 20A, 125V, nylon body, specification grade, grounding type, unless otherwise noted.
- E. Ground Fault Interrupters: Receptacle type similar to duplex convenience receptacle except UL listed per UL 943 with 6 milliampere ground fault sensing circuit. Feed-through type with test and reset buttons.

2.06 DEVICE PLATES

- A. Stainless steel (302) plate for all areas, unless otherwise indicated.

- B. For Exterior Use: Flip-open covers, high grain non-metallic, plastic or fiberglass. Color to match adjacent finish. Cover shall be capable of closing with a plug cap connected to the receptacle.

2.07 PANELBOARDS

- A. Mounting, voltage rating, main bus capacity, breaker complement and lugs as specified on drawings, complete with housing, door, trim, lock and typewritten circuit directory. Provide ground bus for all panels.
- B. Panelboards should have copper bussing with bolt-on, molded case circuit breakers. Provide 1-inch-per-pole breakers, half-size breakers not allowed. Circuit breaker complement short circuit ratings shall be fully rated. Use of series rated equipment will not be permitted.
- C. All locks shall be common-key type. Furnish 6 sets of keys to the Owner.
- D. Panel housing and entire circuit breaker complement shall be of the same manufacture.
- E. Distribution panelboards shall be 30-inch minimum width.

2.08 ENCLOSED CIRCUIT BREAKERS, SAFETY SWITCHES AND MANUAL TRANSFER SWITCH

- A. Circuit breakers, unless otherwise shown, shall be molded case, toggle mechanism operated, with no-fuse ambient-compensated thermal-magnetic overload automatic trip units for overcurrent and short-circuit protection, interchangeable trip units when available and contacts rated to interrupt short-circuit currents as specified on Drawings. Non-automatic breakers shall have short circuit withstand ratings as specified on Drawings. Provide shunt trip and key interlocking accessories where indicated. Multi-pole breakers shall have single, common operating handle for all poles.
- B. Safety switches shall be heavy-duty grade, horsepower rated and sized as indicated or as to match branch circuit overcurrent device rating.
- C. Manual transfer switch be heavy-duty grade, horsepower rated and sized as indicated or as to match feeder circuit overcurrent device rating.
- D. Enclosures for breakers and switches to be NEMA 1, for interior locations and NEMA 4X Type 316 stainless steel for locations designated weatherproof.

2.09 DRY TRANSFORMERS

- A. General: Dry transformers shall be totally metal enclosed ventilated two winding type, with six 2-1/2 percent taps, 2-FCAN, 4-FCBN unless otherwise noted. Temperature rise shall be 115 degrees C on a 220 degree C insulation system, and the transformer shall be rated and labeled for 10 percent continuous overload. Oversize or derated

transformers not acceptable. Sound ratings shall not exceed NEMA Standards for nominal size indicated. Provide K-factor rated transformers as indicated. All dry type transformers shall be TP-1 rated for energy efficiency.

- B. Vibration Mounts: All transformers shall be provided with internal vibration isolators. Transformers rated 30kVA and larger shall be provided with external vibration isolators between the transformer and mounting surface.
- C. Transformer Connections: Provide flexible conduit connections to transformer casing for primary and secondary feeders.

2.10 HARDWARE, SUPPORTS, BACKING, ETC.

- A. Provide all hardware, supports, backing and other accessories necessary to install electrical equipment. Wood materials shall be treated against termite, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be brass or bronze.
- B. Bolts, nuts, washers, and screws used for outside shall be high quality stainless steel or brass.
- C. Ground Rods: Ground rods shall be copper clad steel type, 3/4-inch diameter, 10 feet long, sectional type, and conform to UL 467.

PART 3 - EXECUTION

3.01 RACEWAYS

- A. Use conduits with approved coupling and connectors. All cuts square, using saw. Ream the ends. Bends made with approved tools. Reject flattened or crushed conduit. No running thread. Bushing and two locknuts at connection to boxes and enclosures.
- B. All raceways shall be blown and swabbed after installation to remove any water, then immediately sealed to prevent water infiltration during construction. Raceways must remain sealed except when pulling conductors. If water is discovered during the warranty period, the Contractor shall remove water from raceways and associated boxes at no additional cost to the State.
- C. Exposed conduit runs to be parallel and/or perpendicular to architectural and structural elements. Galvanized rigid steel conduit or IMC only permitted for installation up to 7 feet above finished interior floor.
- D. Electrical Metallic Tubing (EMT): Acceptable for exposed, indoor installation as indicated above and for all concealed indoor installations with the following exceptions:
 - 1. EMT permitted for exposed branch circuit installation indoors of electrical rooms and vault only, above 7 feet.
 - 2. EMT not permitted for feeder circuits between electrical rooms.

3. EMT not permitted in/under grade slab.
 4. EMT not permitted in walls that are in contact with earth.
 5. EMT not permitted for circuits higher than 600-volt class.
 6. EMT not permitted for exposed installation in baggage handling areas.
 7. Provide factory-made transitions between rigid conduit and EMT. Use only compression type, concrete tight couplings.
 8. Field-paint exposed tubing with corrosion-resistant paint.
- E. Minimum conduit diameter shall be 3/4-inch trade size except that 1/2-inch conduit will be permitted for branch circuit (non-signal) raceways with a maximum of two current carrying conductors #10 AWG and smaller.
- F. Provide nylon pullstring of 200-pound minimum tensile strength in all empty conduits in excess of 15 feet in length.
- G. Conceal all raceways unless otherwise noted on the drawings.
- H. Conduits crossing expansion joints shall be provided with appropriate couplings or flexible conduit jumpers as required to accommodate a one-inch movement between structural elements in all horizontal directions from the static, design position.

3.02 BOXES

- A. Plumb and securely fasten. Flush boxes - exactly flush; apply form oil so that stray concrete can be removed readily. Remove all debris from interior.
- B. Install boxes serving opposite sides of walls a minimum of 6 inches apart to minimize noise transmission.

3.03 CONDUCTORS

- A. Lubricants: Non-wax type, chemically neutral to insulation and sheath. Mechanical means for pulling to be torque-limiting type and not be used for #2 AWG and smaller wires.
- B. No-solder pressure connectors or crimp connections for #8 AWG and larger wires. Remove all sharp points that can pierce tape. Reinsulate according to wire manufacturer's directions.
- C. Clean all raceways, boxes, and enclosures before pulling wires and cables. Form neatly in enclosures for minimum of cross-overs.
- D. Cables used for fire alarm and other electronic equipment shall be clearly and permanently tagged to show junction and destination. Cables shall be pulled and fastened securely so as to avoid sharp bends and prevent rubbing against sharp corners and shall be fastened to suitable hardware in a manner to prevent injury or physical distortion of cable. Splices, fittings, and connectors shall be indicated on the system layout to facilitate system servicing.

3.04 MISCELLANEOUS DETAILS

- A. Provide necessary foundations, supports, backing, etc., for all raceways and equipment. Attach to wood and steel by screws or bolts. Attach to concrete by expansion anchors. Powder charge driven studs and anchors shall not be used.
- B. Clean all surfaces of enclosures and equipment.
- C. Close all unused knockout holes.

3.05 PAINTING

- A. Wipe clean of dirt, oil, grease, etc., with rag and solvent, prime and finish to match surrounding finish. Do not paint over nameplate. Paint as specified in Section 09911 – EXTERIOR PAINTING and Section 09912 – INTERIOR PAINTING.
- B. All surface-mounted boxes, enclosures, exposed raceways, and signal backboards shall be painted to match the color of surrounding or as otherwise designated by the Owner.
- C. Do Not field-paint metering equipment, circuit breakers, panelboards, and safety switches.

3.06 IDENTIFICATION

- A. All overcurrent protection devices, enclosures, and cabinets shall be provided with plastic plate identifying itself and its use.
 - 1. Identify all panelboards, switchboard breakers, self-contained breakers, and safety switches where not mounted on equipment.
 - 2. Time Switches, Contactors, Cabinets and Junction boxes 12-inches and larger. (i.e. RELAY “2A”, “Time Switch”)
- B. Plastic plate shall be laminated black and white, engraved 1/4-inch high lettering to expose black layer. Identification plates for emergency system shall be laminated red and white plastic plate. Plate shall be riveted to the cover and located directly below device handle, or top side of door.
- C. CAUTION SIGNS shall be provided as required by Ordinances and/or by OSHA.
- D. Provide computer printed system identification label for all exposed power and communication distribution conduits (2-inches and larger) within baggage handling area to match existing labeling scheme. Minimum one-inch high lettering indicating designated system. Coordinate exact wording of signage with Owner prior to installation. Provide at termination points and at not more than 100 LF on center along the length of the exposed conduit.

3.07 TESTING

- A. Upon completion of this portion of work, and prior to its acceptance by the State, make all required tests and secure all required approval from agencies having jurisdiction. Any deficiencies found shall be rectified and work affected by such deficiencies shall be completely retested at Contractor's expense. Written notification of all proposed tests shall be provided to the Owner a minimum of 14 days prior to the date of the test.
- B. Perform an operational test after completion of the installation in the presence of the Owner, to assure proper operation of all items of work. Remove all grounds and shorts. Balance feeder loads.
- C. Measure resistance of grounding system and furnish 3 copies of results to the Owner.
- D. Distribution Conductors 600 Volt Class: Test all 600-volt class conductors to verify that no short circuits or accidental grounds exist. Make tests using an instrument which applies a voltage of approximately 500 volts to provide a direct reading in resistance.
- E. Test Report: Provide three copies of each test report to the Owner.
 - 1. 600-volt cables (identify each cable and test result).

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16100.1	Electrical Work	Lump Sum
16100.2	Electrical Work - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 16208 - ENGINE GENERATOR

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

This Section includes, but is not limited, to the following items:

1. Diesel engine-generator set including but not limited to exhaust system, cooling system, fuel system, starting system, and the generator control/alarm systems.
2. Testing and maintenance requirements.

1.03 RELATED WORK

- A. Section 16011 - GENERAL ELECTRICAL REQUIREMENTS applies to this section with additions and modifications specified herein.
- B. Section 16100 - ELECTRICAL WORK applies to this section with additions and modifications specified herein.

1.04 APPLICABLE PUBLICATIONS

The publications cited in this specification form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Unless otherwise indicated, most recent edition of the publication with current revisions and amendments will be enforced.

1.05 INTENT

- A. This specification describes the equipment required. It does not cover all phases of manufacture or assembly. The Contractor shall assume the responsibility for providing well-integrated units of high quality.
- B. Equipment, materials, installation, and workmanship shall be in accordance with the required and advisory provisions of NEPA. Materials not normally furnished by the manufacturer of the equipment shall be provided in accordance with other sections of DIVISION 16 - ELECTRICAL unless otherwise noted.

1.06 STANDARDS AND CODES

- A. The equipment covered by this specification shall be designed, tested, and assembled in accordance with the applicable standards of ANSI, IEEE and NEMA, as minimum requirements for all items.
- B. The equipment shall comply with NEC, OSHA and all pertinent Federal, State and Local Codes, regulations and ordinances, including UL approval if required.

1.07 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Equipment Data:
 - 1. Provide complete specifications of all proposed equipment including fuel consumption data, outline drawings showing approximate dimensions, weights and complete performance data.
 - 2. A complete physical and technical description of the excitation system regulation system, cooling system, etc. shall be provided.
 - 3. A statement is required that the equipment to be furnished will be in accordance with this specification. Any exceptions must be listed in detail.
 - 4. Seismic Qualification Certification: Submit certification that the generator will withstand seismic forces as required for the site conditions. Seismic certification shall be third-party certified and based on testing.
- C. Shop Drawings:
 - 1. Equipment List.
 - 2. General arrangements and mounting details, including location and size of all connections and foundation requirements.
 - 3. Drawings and/or catalog cuts showing complete layouts, details, dimensions, weights, and installation instructions of sets and accessories, including lubrication-oil cooler, radiator, exhaust silencer, transfer pump, turbo-charger, fuel oil storage tank, etc.
 - 4. Schematic and wiring diagrams of all power, control, filtering, monitoring, metering and any other circuiting.
 - 5. Outlines, front view, sections of control panel and main circuit breaker.
 - 6. Battery, chargers, and connection diagrams.
 - 7. Fuel oil, lube oil, cooling water piping and wiring diagram.
 - 8. Concrete pad recommendation, layout, and stub-up locations of electrical fuel systems.
 - 9. Factory sound test results and manufacturer certification to demonstrate compliance with sound pressure level requirements at 23 feet from sides and top of sound attenuated enclosure.
 - 10. Manufacturer-certified test results and logs of rated load tests at rated power factor.

11. Certification of compliance with EPA emission specifications.
 12. Manufacturer-certified vibration isolation system.
 13. Electrical drawings showing routing and fitting locations.
- D. Terminal block and lug numbers for all external connections shall be same as shown on the elementary diagrams and shall be identified in a manner to distinguish them from internal interconnecting points.
- E. Shop drawings shall have sufficient information so that they may be considered for approval without reference to detail drawings. No shop drawings will be considered for approval which, in the opinion of the State Engineer, is contingent upon approval of other features for approval if such features are not incorporated into the shop drawings. If changes or corrections are necessary, resubmit the corrected shop drawings using the same procedures as the original submission. It is understood that the approval of the Contractor's shop drawings, whether general or detailed, is a general approval relating only to their sufficiency and compliance with the intention of the design and shall not excuse or constitute an acceptance of errors, discrepancies, or omissions, or waiver of detailed requirements.
- F. Operating Instructions: Submit operating instructions as stipulated in item entitled "OPERATION AND MAINTENANCE MANUALS" hereinbelow.
- G. Warranty: Submit warranty as stipulated in item entitled "WARRANTY" hereinbelow.
- H. Maintenance Service Contract: Submit maintenance service contract as stipulated in item entitled "MAINTENANCE SERVICE CONTRACT" hereinbelow.

1.08 OPERATION AND MAINTENANCE MANUALS

Submit in accordance with Section 01300 - SUBMITTALS. The manual shall include the following:

1. Operating instructions and maintenance procedures for all components.
2. Recommended spare parts list containing information of components, manufacturer's name and catalog number and price.
3. Approved and certified shop drawings.
4. Certified test log of engine-generator data taken during Check Out and Acceptance Testing.

1.09 MATERIAL

- A. All materials and parts comprising the units herein specified shall be new and unused, of current manufacture, and of the highest grade, free from all defects or imperfections affecting performance. Workmanship shall be of the highest grade, in accordance with modern practice.

- B. The unit shall be the product of a firm regularly engaged in the manufacture of engines and generators and shall meet the requirements of the specifications set forth herein. It must be of a standard model in regular production at the manufacturer's place of business.

1.10 PARTS AND SERVICE

- A. The diesel electric generator set shall be such that it can be properly maintained and serviced without the necessity of the User carrying expensive part stocks, or being subjected to the inconvenience of long periods of interrupted services due to lack of available parts.
- B. The vendor shall specify nearest location of permanent parts depots in the State of Hawaii from which the parts may be obtained in necessary quantities at any time during the day or night. The engine supplier shall have complete parts and factory authorized service facilities and technicians on Oahu with 24-hour trouble call.

1.11 WARRANTY

- A. The Contractor shall warranty all equipment which he provides for a period of two year from the date of final project acceptance.
- B. The Contractor shall promptly correct any deficiencies in the equipment provided which occur during the warranty period at the site at no additional cost. This shall include all costs for material and labor for all such corrective work.

1.12 MAINTENANCE SERVICE CONTRACT

- A. The Contractor shall provide extended testing and maintenance services for the engine generator system for a period of two year from the date of final project acceptance. See paragraph 3.05.
- B. The Contractor shall include all material, equipment and labor costs for performing maintenance work in his Bid.

PART 2 - PRODUCTS

2.01 DIESEL ENGINE-GENERATOR SET

- A. The engine-generator system shall be complete factory assembled, installed, wired, tested, conforming with the National Electrical Code.

- B. Engine-generator set shall be certified to Stationary Emergency Certified exhaust emission levels in accordance with U.S. EPA emissions standards and regulations.
- C. Engine shall be capable of starting as a fully compression-ignition engine on No. 2 diesel fuel at any condition within 0 degrees F to 120 degrees F at sea level. The engine shall accelerate to rated speed and accept full load within 10 seconds maximum. Diesel engines requiring premium fuel will not be considered.
- D. Critical Speeds: Complete engine-generator set shall be free of critical speeds of either a major or minor order which would endanger or impair satisfactory operation of the sets.
- E. Rating:
1. Engine-generator set shall be capable of producing the indicated kilowatts of standby power at 0.8 lagging power factor of three-phase, the 480/277 service voltage, 60 Hertz AC without adverse effects when operating at 1800 rpm under any ambient conditions from 0 degrees F to 120 degrees F at sea level.
 2. Engine shall have a useful shaft output (all accessory power subtracted) of not less than 100 percent of the generator input requirement (output/certified efficiency) based on its cataloged and certified maximum horsepower, whichever is less.
 3. Rating of the diesel generator set shall be based on operating of the set at rated generator RPM when equipped with all necessary operating accessories such as air cleaners, radiator pumps, radiator fans, lubricating oil pump, fuel transfer pump, fuel injection pump, jacket water pump, governor, AC generator and exciter.
- F. Performance:
1. Frequency: Upon completion or removal of full-rated load in one step, set shall recover to stabilized speed within 5 seconds after full rated load is applied in one step and the frequency shall vary by not more than 6 percent (4 Hertz). Under steady-state conditions, the maximum frequency minus the minimum frequency shall not exceed 0.25 hertz.
 2. Voltage: Under steady-state conditions, the voltage regulation shall not exceed 0.5 percent for any load between no load and full load, at any constant ambient temperature between minus 20 degrees F and 120 degrees F. Upon completion of full-rated load in one step, the voltage shall vary by not more than 16 percent and shall recover to within the steady-state modulation band within 3 seconds. Generator set shall have a motor starting capability of 858 SKVA with a maximum instantaneous voltage dip of no more than 30 percent based on NEMA MG-1 standard. Motor starting data based on sustained voltage dip shall not be acceptable.

- G. Load Characteristics: The generator set shall be capable of supporting non-linear loads and uninterruptible power supplies connected to the standby power bus. Maximum subtransient reactance of the generator set shall be 10 percent. Units which cannot meet the subtransient restriction will be rejected as unsuitable for service.
- H. Control Characteristics:
1. Engine-generator set shall be capable of manual or automatic operation. The engine control circuits shall be designed for 24 volts DC. Dedicated pushbuttons (Run-Stop-Auto) shall be provided for the system.
 2. Manual Operation: Pushing the "Run" button shall cause the set to start and accelerate to governed speed. Pushing the "Stop" button shall cause the starting circuits to open and the set to shut down.
 3. Automatic Operation: Pushing the "AUTO" button, set shall start upon the closure of a pair of electrical contacts provided for that purpose. The set shall be actuated through such contacts and will have load transferred to it by an automatic transfer control switching scheme. Upon re-energization of the normal source, load will be removed from the set by the automatic transfer control switching scheme. Engine shall be stopped automatically after a 5-minute cool-down unloaded running time.

2.02 MALFUNCTION AND ALARM

- A. Engine: Running of the engine-generator set shall be protected by the following malfunction circuitry:
1. Crank Failure: In the "AUTOMATIC" mode, the engine shall be required to make 4 cranking attempts of 10 seconds duration, with a 10-second reset period and 30-second time delay between cranking attempts. After 4 unsuccessful cranking attempts, the cranking circuit of the malfunctioning engine shall automatically open, the engine shall shut down, a malfunction warning light on its control panel shall go on and an audible alarm shall sound. A reset button shall be provided to permit further cranking attempts.
 2. Overspeed: Should the engine, for any reason, reach a speed 10 percent or more above the governed speed, the set shall shut down by means independent of the governor, the main circuit breaker shall be tripped, and the warning light shall illuminate as in subparagraph entitled "Crank Failure" above. An audible alarm shall also be sounded.
 3. Low Oil Pressure: Should the lube oil pressure of the engine fall below a preset limit, the same actions shall occur.
 4. High Cooling-Water Temperature: Should the jacket water temperature of engine rise above preset double limits, the following shall occur. As the water temperature rises above the first limit, an audible alarm shall be sounded. A temperature rise above the second limit shall result in the shutdown of the set.

- B. Generator and Field: Running of engine-generator set shall also activate alarming/protection circuitries for the following electrical malfunctions:
1. Protection loss of excitation, on the generator, complete with current transducer.
 2. Pre-alarm voltage relay for abnormal generator under/over voltage.
 3. Alarm for generator breaker tripped by overcurrent.
 4. All alarms shall be in the forms of visual warning lights and audible horn with silencing button.

2.03 STARTING SYSTEM

- A. Engine-cranking motor shall be powered by a 12-volt, heavy duty, lead acid storage battery, as recommended by the engine manufacturer, having sufficient capacity to crank the engine at constant firing speed in minimum room temperature of 0 degrees F for a minimum of 4 cranking attempts. Batteries shall have an ampere-hour capacity (to a terminal voltage of 0.65 volts per cell) as recommended by the engine manufacturer, each battery shall give 100 percent of rated capacity after 200 cycles of charge and discharge, or shall have a minimum nominal ampere hour capacity of 100 at 10-hour rate whichever is higher.
- B. The battery set shall be provided with all intercell connections and connecting cables to the charger and generator.
- C. Battery installation shall include a battery rack and a 10-ampere (minimum) battery charger of the automatic solid-state dual-rate type, with magnetic amplifier control from a Zener voltage reference for operation on 120-volt, single phase AC. Charger shall be automatic dual-rate, DC voltmeter, DC ammeter, pilot lights for high-rate and float-charging indication. Fused AC and DC circuit protection. The charger shall have a DC cranking circuit disconnect relay.
- D. Battery Alarms: Battery installation shall have alarm provisions for NFPA 110 alarms - high battery voltage, low battery voltage, AC fail, and charger fail. Audible alarm device shall consist of a horn mounted on the generator control panel.
- E. The starting pinion shall disengage automatically when engine starts. Glow plugs shall be provided if required.

2.04 CONTROL PANELS

Local Control Panel: The local control panel shall be provided in a generator set mounted enclosure with continuous hinged door and lock. Use of analog or digital metering acceptable. Control panel shall contain, but not be limited to the following:

1. Voltmeter, 2 percent accuracy.
2. Ammeter, 2 percent accuracy.
3. Ammeter/Voltmeter phase options
4. Frequency meter.
5. Starting controls.
6. Panel illumination lights and switch.
7. Voltage level adjustment.
8. Engine oil pressure gauge and fuel pressure gauge.
9. Engine water temperature gauge and lube-oil temperature gauge.
10. Engine speed adjust.
11. Fault indicators for all alarms listed in item entitled "MALFUNCTION AND ALARM" hereinabove.
12. Low fuel level alarm.
13. Fuel tank leak alarm.
14. Three dedicated buttons marked "Run", "Stop" and "Auto".
15. Digital tachometer.
16. Running time meter.
17. Emergency stop (fuel shut-off) pushbutton.
18. Start and glow plug switch, if required.
19. Panduit and supports for all panel internal wirings.

2.05 GENERATOR

- A. Generator shall be a rotating-field, 3-phase, 4-wire synchronous machine with the indicated continuous rated with kilowatt rating noted on Drawings, at 0.8 lagging power factor, with 480/277 volts wye connected, 4-wire system, 60 hertz AC, when operating at rated speed, and shall be of the single ball-bearing drip-proof, self-ventilated, protected type. The generator insulation system shall be totally encapsulated with Class "H" insulation. Temperature rise shall not exceed NEMA standard. Generator shall be coupled to the engine flywheel through a flexible steel disc. Engine and generator combination shall be mounted on a common structural steel base.
- B. The exciter shall be of the brushless type, using a rotating rectifier bridge circuit. Brushes commutators or slip rings will not be permitted. The rectifying unit shall be mounted on the generator rotor shaft and shall supply the field excitation current for the generator. The exciter shall have a capacity to provide field current for the generator at 125 percent of rated capacity and shall be capable of carrying, without injury, momentary loads of 300 percent of its rated current.
- C. The regulator shall employ a programmable volts per Hertz regulation characteristic with adjustable slope (volts/Hertz), adjustable constant voltage corner frequency and adjustable under voltage corner frequency. Sensing shall be 3-phase true RMS. The regulator shall be environmentally sealed.

D. Generator Characteristics:

1. Voltage adjustment range - 50 percent of rated voltage.
2. Telephone influence factor (TIF) - 50 (1960) weighting.
3. Radio and TV interference - negligible.

E. Acceptable Manufacturers: Caterpillar, Cummins or approved substitute.

2.06 ENGINE

A. Engine shall be single-acting, full compression-ignition engine with 3 cylinders. It shall have a 4-stroke cycle, direct injection of fuel into cylinders or pre-combustion chamber and shall be water-cooled. It may be either vertical in line or V configuration but shall have trunk pistons. It may be turbo-charged.

1. The crankshaft shall be of forced steel, statically and dynamically balanced.

B. Pistons shall be aluminum alloy with cast-iron top ring bands and chrome-faced rings.

C. The flywheel, ring gear and flywheel housing shall be of the appropriate SAE construction and shall be designed to fulfill the specified speed regulation and performance requirements.

D. Turbo- charger for engine (if used) shall be driven by engine exhaust gas and shall have the turbine and blower wheels on a shaft with ball bearings and grease fittings. Turbo- charger shall be easily removable.

E. Governor: Engine shall have electrical (solid state) speed-sensing governor, equipped for future load sharing control. The governor shall be capable of maintaining +/-6 RPM and shall have a transient response time of not more than 3 seconds to restore to steady-state conditions from the application of 100 percent load.

F. The engine shall be provided with all flexible connections of the size, length, and type recommended by the engine manufacturer. Connections shall be provided by fuel intake, fuel return, cooling water outlet, cooling water inlet, radiator, and exhaust.

G. Acceptable Manufacturers: Caterpillar, Cummins or approved substitute.

2.07 SOUND ATTENUATED ENCLOSURE

The complete diesel engine generator set, including generator control panel, engine starting batteries and fuel oil tank, shall be enclosed in a factory assembled, sound attenuated enclosure mounted on the fuel tank base.

1. A weather resistant, sound attenuated enclosure of stainless steel Type 316 with electrostatically applied powder coated baked polyester paint. The enclosure shall have a resulting maximum sound level of 74 dBa at 23 feet with the genset running under full load. It shall consist of a roof, side walls, and end walls. The roof shall be sloped to prevent water ponding and rubbish accumulation. Openings/louvers in the enclosure shall be protected from rodent entry with stainless steel wire mesh with openings no larger than 1/4-inch. Fasteners shall be stainless steel. Maximum sound level rating of 74 dBa may be obtained by averaging measured sound levels at 23 feet distance from all enclosure surfaces.
2. Enclosure Sound Attenuation: Acoustical foam shall be provided between all supports and inside doors and sound baffles on air intake and air discharge. The silencer shall be inside the sound attenuated enclosure.
3. Provide pad-lockable access doors and externally mounted emergency stop button. Access doors shall be provided fronting equipment that will require frequent/regular inspection or maintenance.
4. Refer to the Drawings for dimensional requirements.

2.08 FUEL SYSTEM

- A. Fuel system shall include replaceable primary and secondary filters, a fuel-control unit, and engine-driven fuel pump capable of a 5-foot lift plus friction on its suction side and of producing the required discharge pressure with a fuel supply check valve and flexible fuel connections.
- B. Fuel Filters: Fuel system shall be equipped with fuel filters having replaceable elements which may be removed easily from their housing for replacing without breaking any fuel line connections or disturbing the fuel pumps or any part of the engine. All fuel filters shall be located for convenient access.
- C. Fuel Lines: Fuel lines, between injection pumps and valves, shall be of heavy seamless tubing; and, to prevent irregularity of fuel injection, and shall be of the same length for all cylinders.
- D. Injection Pump and Valves: Injection pumps and injection valves shall be a type not requiring adjustment in service, and shall be capable of easy replacement by ordinary mechanics. Engine shall have a mechanical injection pump or pumps and a pressure-activated injection valve for each cylinder, any one of which shall be easily removed and replaced from parts stock. The fuel-injection pump or pumps shall be of the engine-driven, positive-action, constant-stroke type, lubricated by the engine oil. A means of controlling manifold pressure shall be provided. Provide spill kit.
- E. Fuel Sub Base Tank: Provide a double wall stainless steel outerwall Type 316 sub-base tank constructed to meet all local codes and requirements. A fuel tank base capacity for a minimum of 50-hour generator run time at full load shall be provided as an integral part of the enclosure. It shall be contained in a rupture

basin with 110 percent capacity. The tank shall meet UL142 standards. A locking fill cap, a mechanical reading fuel level gauge, low fuel level alarm contact, and fuel tank rupture alarm contact shall be provided. Normal vent piping shall be external to the enclosure and terminate no less than 8 feet above top of tank and no less than 12 feet above finished grade. Interior tank surfaces shall be coated with a solvent based thin-film rust preventative. Provide fuel spill kit.

2.09 COOLING SYSTEM

- A. Engine shall be furnished with a cooling system having sufficient capacity for cooling the engine when it is delivering full-rated load in an ambient temperature not to exceed 120 degrees F.
- B. Pumps: Engine shall be equipped with an engine-driven, centrifugal-type pump for circulating water through the engine jacket, cylinder heads and radiator.
- C. Control: Engine shall be provided with thermostatic bypass valve placed in the jacket water outlet between the engine and the cooling source. This valve shall maintain the jacket water temperature as recommended by the engine manufacturer, under all load conditions.
- D. Radiator: Engine shall be provided with a skid base mounted radiator, with fan guard and core guard, of a type and capacity as recommended by the engine manufacturer.
- E. Anti-Freeze: The engine cooling system shall be filled with solution of 50 percent ethylene glycol and 50 percent water.

2.10 LUBRICATION

- A. Engine shall have a forced-feed lubrication system. The lube oil system shall include a sump of not less than 3 gallons capacity, a dipstick and drain. The sump vent shall not require external plumbing.
- B. The lube-oil pump shall be of the gear-type, engine-driven, and shall supply oil under pressure to main bearings, crank-pin bearings, pistons, piston pins, timing gears, camshaft bearings and valve rocker mechanism, and all other internal moving contact surfaces of metal.
- C. The lubrication system shall be an integral part of the engine-reduction assembly, shall be air-cooled, or water cooled, but shall require no external plumbing or radiators.
- D. Effective lubricating oil filters shall be provided and so located and connected that lubricating oil is continuously filtered and cleaned. Filter shall be accessible, easily removed and cleaned and shall be equipped with a spring-

loaded bypass valve as an insurance against stoppage of lubricating oil circulation in the event the filter becomes clogged.

- E. Engine shall have a suitable lubrication oil cooler, either air-cooled or water-cooled to ensure proper performance and engine life. The submission for approval shall state size and capacity of the lube oil cooler as well as the inlet and outlet temperature.

2.11 EXHAUST SYSTEM

Verification of the ability to meet emission specifications shall be made available from the engine manufacturer.

2.12 SAFETY CONTROLS, GAUGES, AND ALARMS

- A. The engine shall be equipped with automatic safety controls which will shut down the engine in the event of low lubrication oil pressure, high water temperature, overcranking and overspeed.
- B. The engine shall be equipped with an automatic safety control which shall actuate a visible alarm in the event of approached low oil pressure, high water temperature, and overspeed with dry contacts for remote alarms wired to terminal strips.
- C. The engine shall be equipped with the following panel-mounted gauges: Jacket water temperature, lubricating oil pressure, fuel pressure, service meter (hour meter), and tachometer, etc.

2.13 SHOP INSTALLATION

Contractor shall furnish all necessary labor, material, and equipment required for complete installation and integration, including, but not limited to, the following:

1. Diesel Generator: Install the diesel generator to set with I.B.C. certified vibration isolators and neoprene acoustical pads, leveling devices, vertical and horizontal limit stops, approved by the set manufacturer.
2. Generator Starting System: Install the battery, battery rack and battery charger in accordance with battery and charger vendor's instruction manual. Provide all wirings for the entire starting system including engine starting cable between the battery system and diesel-generator per engine starting requirement. All cables shall be copper.
3. Local Control Panel: Panel shall be installed, wired, and tested at equipment supplier's shop. Interconnections to equipment/devices inside the enclosure shall enter the cabinet from the top of the cabinet. Outgoing power/control wirings to branch circuit panelboard, ATS, etc. shall enter the control cabinet from the bottom.

4. Identification: All wire shall be clearly tagged with wire markers to indicate its origin and the circuit it feeds. Tags on the panels shall be of 1/16-inch thick by 3/4-inch wide, by 3 inches long with contrasting engraved lettering. Signal and control wiring shall be identified by means of labels, which shall indicate the panel letter and circuit number from where it originates. Provide a one-inch by 3-inch (minimum) engraved Bakelite designation plate for all panels. All plates and labels shall be black with white lettering unless indicated otherwise. Provide engraved Bakelite designation plates for all separately mounted breakers, control relays, pilot light meters, etc. in control panels. Plates are to conform to the above requirements and indicate the equipment served. Bakelite designation plates shall be fastened to the aforementioned equipment with oval head brass machine screws. The minimum letter size shall be 1/4-inch high.

2.14 PAINT AND SPARES

- A. The manufacturer's standard practice of painting shall be used. All equipment shall be free from rust, scale, manufacturing residue and foreign material prior to painting. One gallon of touch-up paint shall be provided.
- B. One set of spare oil, fuel, and air filters shall be provided in a non-metallic locking container.

2.15 SUPPORTS AND MISCELLANEOUS

- A. The complete assembled engine-generator set will be field installed on a concrete equipment pad. Anchor bolts and templates for the assembly shall be furnished by the vendor 2 weeks after drawing approval. Disassembly of generator, engine, skid base, and radiator will be permitted to facilitate installation.
- B. The isolation system shall reduce the vibration transmitted to the adjacent floor slab by 95 percent or better. The manufacturer shall certify that the vibration isolation system will reduce the vibration to the limits specified.
- C. Provide space heater with operating voltage as recommended by the generator manufacturer. Heater capacity shall be as recommended by the generator manufacturer to aid in keeping generator insulation dry.

PART 3 - EXECUTION

3.01 INSTALLATION

Installation shall conform to the applicable requirements of IEEE C2, NFPA 30, NFPA 37, and NFPA 70.

3.02 START-UP SERVICE

- A. Contractor shall include in his bid the service of the vendor's system/service engineer who fully understands the entire assembly/integration of the system, to assist in final piping/wiring checkout and to perform load and operational tests.
- B. The bid shall include 3 complete days of service plus all out-of-pocket expenses. In the case of an unsatisfactory test result, vendor shall provide all parts and labor to repair the system and to continue the start-up and test procedure until the systems operation proved meeting the specification at no extra cost to the project. Reactive/Resistive load banks shall be used to provide testing at the rated 0.8 power factor. Non Reactive 0.8PF load bank testing will not be approved.
- C. The startup technician(s) shall be on-island and factory trained and approved.

3.03 PREREQUISITES FOR CHECK OUT AND ACCEPTANCE TESTING

- A. Completion of the following requirements is mandatory prior to scheduling for acceptance tests for the engine-generator set and auxiliary equipment.
- B. Preliminary Operations: The vendor's system/service engineer shall conduct manufacturer recommended start-up procedures and tests to verify that the engine-generator set and auxiliary equipment are ready for functional acceptance tests. Give the State Engineer 10 working days advance notice that preliminary operations will be conducted. After preliminary operation has been successfully conducted, the vendor's system/service engineer will notify the State Engineer in writing stating the engine-generator set and auxiliary equipment are ready for acceptance tests.
- C. Checkout and Acceptance Test Procedure: Test procedure shall be prepared by the vendor's system/service engineer specifically for the engine-generator set and auxiliary equipment. The test agenda shall cover the requirements specified in item entitled "CHECK OUT AND ACCEPTANCE TESTING" hereinbelow. The test procedure shall indicate in detail how tests are to be conducted. A statement of the tests that are to be performed without indicating how the tests are to be performed is not acceptable. Indicate what work is planned on each workday and identify the calendar dates of the planned workdays. Specify what additional technical support personnel is needed, such as factory representatives for major equipment. Specify on which testing workday each technical support personnel are needed. Data recording forms to be used to document test results are to be submitted with the proposed test procedure. A list of test equipment and instruments shall also be included in the test procedure.
- D. Test Equipment: Test equipment and instruments shall be on hand prior to scheduling field tests or, subject to State Engineer approval, evidence shall be

provided to show that arrangements have been made to have the necessary equipment and instruments on site prior to field testing.

- E. Coordinate check out and acceptance tests with the requirements of Section 16100 – ELECTRICAL WORK.

3.04 CHECK OUT AND ACCEPTANCE TESTING

- A. The equipment included in this specification shall be tested and assembled in accordance with the rules of the ANSI, IEEE, and NEMA when applicable. Tests shall simulate typical operating conditions.
- B. An on-site test hereby specified, for the generator set and associated subsystem shall be conducted in the presence of the State Engineer or his representative. Written notice shall be given to State Engineer at least 10 working days in advance of testing.
- C. Certified test log of engine-generator set showing the following data taken at and within specified parameters. On-site reactive/resistive load banks shall be used to provide testing at 0.8 power factor.
 - 1. Operate generator continuously under the following load conditions:
 - a. 50 percent load - 2 hours
 - b. 100 percent load - 2 hours
 - 2. Four repetitive 5-minute cycles of one-step application and removal of full load.
 - 3. Voltage and frequency readings taken during test to be permanently recorded by chart recorded or light beam oscillograph of sufficient response and resolution to verify generator output characteristics specified.
 - 4. Time lag from normal power failure to operation at rated voltage and frequency with no load and 100 percent load.
 - 5. Half Hourly Log: Fuel consumption and water and exhaust gas temperatures.
 - 6. Statement indicating accessories and auxiliaries used, ambient temperature, elevation and location.
- D. A complete operational test shall be made including generator, fuel system, cooling system, protection, and alarming system, etc. All interlocks and protective features shall be checked out.
- E. If the system fails to meet the tests specified, then any additional tests required shall be made at no expense to the State.

- F. Contractor shall provide loadbank with power factor adjustment capability, fuel, and required accessories and instruments, and other consumable products for all tests at no additional cost to the State.
- G. Base fuel tank shall be completely filled, at the Contractor's cost, upon completion of all on-site testing.

3.05 EXTENDED OPERATIONAL TESTING AND MAINTENANCE SERVICE

- A. Extended maintenance service work shall be provided by the Contractor for a two year period from project acceptance. All materials, equipment, and labor to perform the prescribed maintenance shall be included in the Bid.
- B. The Contractor shall include in his bid the service of the vendor's authorized field service engineer and/or mechanic to provide quarterly and annual maintenance interval work as outlined below. Service work performed shall include the listed items in addition to any recommended work identified in the operations and maintenance manual for the equipment.
- C. Quarterly Service Requirements:
 - 1. Before Starting the Engine:
 - a. Perform all "Weekly Before Starting the Engine Maintenance" procedures per Operations and Maintenance Manual first.
 - b. Walk-Around Inspection: Inspect engine, radiator and generator for debris, loose or broken fittings, hoses or wires and guards. Repair as necessary.
 - c. Cooling System: Check coolant level. Maintain level within 1/2 inch to bottom of filler neck or proper level on sight gauge (if equipped). Replace coolant element (if equipped) or add liquid coolant conditioner.
 - d. Fuel System: Drain water and sediment from tank. Change fuel filters.
 - e. Air Cleaner Element: Inspect and clean or replace element.
 - f. Governor: Check and maintain oil level (if required).
 - g. Engine Crankcase: Check oil level. Maintain oil level between the ADD and FULL marks on the "Engine Stopped" side of the dipstick.
 - h. Crankcase Breather: Clean.
 - i. Linkages: Check and adjust all linkages, if necessary. Lubricate all linkage fittings with MPM grease.
 - j. Engine Protective Devices: Check; test for proper operation.
 - k. Batteries: Clean top of batteries. Check electrolyte level (unless maintenance free). Check for loose connections.
 - l. Engine: Wipe down; clean as needed.
 - m. Generator: Check for moisture, dust, oils, greases and debris on main stator windings, exciter and PMG. Clean as needed. Check

- generator windings with megohmmeter and record readings for reference.
- n. Generator Bearing: Inspect generator bearing and bracket. Lubricate generator bearing.
2. With Engine Running:
- a. Perform all “Weekly with Engine Running Maintenance” procedures per Operation and Maintenance Manual first.
 - b. Start the Engine: Operate the engine and check all gauges, oil pressure, fuel pressure, rpm (frequency), generated voltage and engine jacket water temperature, for correct readings.
 - c. Engine Crankcase: Check the oil level. Maintain the oil level between the ADD and FULL marks on the “Engine Running” side of the dipstick.
 - d. Generator Louvers: Check for proper operation (able to open and close freely).
 - e. Generator Air Inlet Filter (If Equipped): If differential pressure exceeds 0.6 inches of water, stop the engine and clean the elements by soaking in hot water with detergent. Rinse with clear water. Recharge the elements with a thin layer of lightweight machine oil (WD-40 or equivalent).
 - f. Engine Mounts: Inspect for proper installation and loose fasteners. Check for proper torque.
 - g. Leaks and Noises: Check for leaks and unusual noises. NOTE: Engine must be stopped before making necessary repairs.
3. After Stopping the Engine:
- a. Perform all “Weekly After Stopping the Engine Maintenance” procedures per Operation and Maintenance Manual first.
 - b. Walk-Around Inspection: Repair or adjust. Make repairs or adjustments to the engine and generator set as necessary. Report any malfunction and make necessary repairs.
 - c. Scheduled Oil Sampling (SOS): Obtain sample for analysis.
 - d. Generator Air Inlet Filter (If Equipped): Remove the filter elements and soak in hot water with detergent until clean. Rinse with clear water. Recharge the elements with a thin layer of lightweight machine oil (WD-40 or equivalent).
 - e. Battery Charger: Record charging amperage and volt readings.
 - f. Automatic Switches (If Equipped): Check that all switches are in proper position for automatic start.
 - g. Base fuel tank shall be completely filled, at the Contractor’s cost, upon completion of quarterly maintenance procedures.

D. Annual Service Requirements:

1. Before Starting the Engine:

- a. Perform all Quarterly Maintenance Procedures described above.
- b. Valve Lash: Check, adjust if necessary. Refer to the engine Service Manual for proper procedure and settings.

2. With Engine Running:

- a. Perform all Quarterly Maintenance Procedures described above.
- b. Load Test: Load the engine to minimum of 30 percent of rated load using building load. Operate at this level for minimum of 2 hours. After approximately one hour, record the readings of all gauges: oil pressure, fuel pressure, oil level rpm (frequency), generated voltage, service meter and engine jacket water temperature.

3. After Stopping the Engine:

- a. Perform all Quarterly Maintenance Procedures described above.
- b. Engine Oil and Filter(s): Change oil. Replace filter(s), cut old filter open and inspect for foreign material.

3.06 TRAINING COURSE

- A. The Contractor shall conduct an on-site training course for operating staff and maintenance personnel as designated by the State.
- B. The training period shall consist of a total of 8 hours of normal working time.
- C. The initial training sessions shall be 4 hours in duration and shall start after the system is functionally completed but prior to final acceptance tests.
- D. The remaining 4 hours of instructional time shall be scheduled at the discretion of the State within one year of initial operation and acceptance of the equipment.
- E. Training shall concentrate on operation, maintenance, and troubleshooting procedures of the installed system.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16208.1	Engine Generator	Lump Sum
16208.2	Engine Generator – Operations & Maintenance Service	Month

END OF SECTION

SECTION 16301 - UNDERGROUND ELECTRICAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

This section includes, but is not limited to, the underground electrical infrastructure system. The underground infrastructure system includes the provision for structures, ductlines, and conductors.

1.03 RELATED WORK

Section 16011 - GENERAL ELECTRICAL REQUIREMENTS applies to this section with additions and modifications specified herein.

1.04 APPLICABLE PUBLICATIONS

The publications cited within this specification form a part of this specification to the extent referenced. The publications may be referred to in the text by the basic designation only. Unless otherwise indicated, most recent edition of the publication with current revisions and amendments will be enforced.

1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Manufacturer's Data and Shop Drawings:
 - 1. Sealing material.
 - 2. Warning Tape.
- C. Test reports as required in item entitled "FIELD QUALITY CONTROL" hereinbelow.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

Materials and equipment shall conform to the respective specifications and standards and to the specifications herein. Electrical ratings shall be as indicated.

1. Conduit, Ducts, and Fittings:

- a. Plastic Duct for Concrete Encasement: UL 651, Schedule 40.
- b. Conduit Sealing Compound: Compounds for sealing ducts and conduit shall have a putty-like consistency workable with the hands at temperatures as low as 35 degrees F, shall neither slump at a temperature of 300 degrees F, nor harden materially when exposed to the air. Compounds shall adhere to clean surfaces of fiber or plastic ducts; metallic conduits or conduit coatings; concrete, masonry, or lead; any cable sheaths, jackets, covers, or insulation materials; and the common metals. Compounds shall form a seal without dissolving, noticeably changing characteristics, or removing any of the ingredients. Compounds shall have no injurious effect upon the hands of workmen or upon materials. Inflatable bladders may be used as an option.
- c. Fittings:
 - 1) PVC Conduit Fittings: UL 514B, UL 651.
 - 2) PVC Duct Fittings: NEMA TC 9.

2.02 LOW VOLTAGE INSULATED CONDUCTORS AND CABLES

- A. Insulated conductors shall be rated 600 volts and conform to the requirements of NFPA 70, including listing requirements. Wires and cables manufactured more than 24 months prior to date of delivery to the site shall not be accepted. Service entrance conductors shall conform to UL 854, type USE.
- B. Conductor Types: Cable and duct sizes indicated are for copper conductors unless otherwise noted. Conductors No. 10 AWG and smaller shall be solid copper. Conductors No. 8 AWG and larger shall be stranded copper. All conductors shall be copper.
- C. Conductor Material: Unless specified or indicated otherwise or required by NFPA 70, wires in conduit, other than service entrance, shall be 600-volt, Type XHHW-2 or RHW conforming to UL 44. Copper conductors shall be annealed copper complying with ASTM B3 and ASTM B8.
- D. In Duct: Cables shall be single-conductor cable.
- E. Cable Marking:
 1. Insulated conductors shall have the date of manufacture and other identification imprinted on the outer surface of each cable at regular intervals throughout the cable length.

2. Each cable shall be identified by means of a fiber, laminated plastic, or non-ferrous metal tags, or accepted equivalent, in each handhole, junction box, and each terminal. Each tag shall contain the following information; cable type, conductor size, circuit number, circuit voltage, cable destination and phase identification.
3. Conductors shall be color coded. Conductor identification shall be provided within each enclosure where a tap, splice, or termination is made. Conductor identification shall be by color-coded insulated conductors, plastic-coated self-sticking printed markers, colored nylon cable ties and plates, heat shrink type sleeves, or colored electrical tape. Control circuit terminations shall be properly identified. Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutrals shall be white with a different colored (not green) stripe for each. Color of ungrounded conductors in different voltage systems shall be as follows:
 - a. 208/120 Volt, 3-Phase:
 - 1) Phase A - black.
 - 2) Phase B - red.
 - 3) Phase C - blue.
 - b. 480/277 volt, 3-phase:
 - 1) Phase A - brown.
 - 2) Phase B - orange.
 - 3) Phase C - yellow.

2.03 GROUNDING AND BONDING

- A. Driven Ground Rods: Provide copper-clad steel ground rods conforming to UL 467 solid stainless steel ground rods not less than 3/4 inch in diameter by 10 feet in length. Sectional type rods may be used for rods 20 feet or longer.
- B. Grounding Conductors: Stranded-bare copper conductors shall conform to ASTM B8, Class B, soft-drawn unless otherwise indicated. Solid-bare copper conductors shall conform to ASTM B1 for sizes No. 8 and smaller. Insulated conductors shall be of the same material as phase conductors and green color-coded, except that conductors shall be rated no more than 600 volts. Aluminum is not acceptable.

2.04 CONCRETE

Provide concrete in accordance with DIVISION 2 - SITE CONSTRUCTION.
Provide concrete for encasement of underground ducts with 3000 psi minimum 28-day compressive strength.

2.05 WARNING TAPE

Preprinted polyethylene tape, 4 mil thick, detectable foil-backed red color, 3-inch minimum width, imprinted with "CAUTION BURIED ELECTRICAL LINE BELOW".

2.06 DUCT SEAL

Pliable, non-toxic material used for application around conductors in raceways to minimize moisture and rodent/insect infiltration. Must be re-enterable material allowing for removal/reapplication after initial installation. Non-drying, non-cracking, non-corrosive material that will not adversely affect raceway and conductors. Provide duct seal at all apparatus and risers to prevent water infiltration via duct system.

PART 3 - EXECUTION

3.01 INSTALLATION

Install equipment and devices in accordance with the manufacturer's published instructions and with the requirements and recommendations of NFPA 70 and IEEE C2 as applicable.

3.02 CABLE INSPECTION

Prior to installation, each cable reel shall be inspected for correct storage positions, signs of physical damage, and broken end seals. If end seal is broken, moisture shall be removed from cable prior to installation in accordance with the cable manufacturer's recommendations.

3.03 UNDERGROUND CONDUIT AND DUCT SYSTEMS

- A. Depths to top of the conduit shall be in accordance with NFPA 70. Run conduit in straight lines except where a change of direction is necessary. Numbers and sizes of ducts shall be as indicated. Ducts shall have a continuous slope downward toward underground structures and away from buildings, laid with a minimum slope of 3 inches per 100 feet. Depending on the contour of the finished grade, the high-point may be at a terminal, a handhole, or between handholes. Short-radius 90-degree duct bends may be used only for pole or equipment risers, unless specifically indicated as acceptable. The minimum manufactured bend radius shall be 18 inches for ducts of less than 3-inch diameter, and 36 inches for ducts 3 inches or greater in diameter. Otherwise, long sweep bends having a minimum radius of 25 feet shall be used for a change of direction of more than 5 degrees, either horizontally or vertically. Both curved and straight sections may be used to form long sweep bends, but the maximum curve used shall be 30 degrees and manufactured bends shall be

used. Ducts shall be provided with end bells whenever duct lines terminate in structures.

- B. Treatment: Ducts shall be kept clean of concrete, dirt, or foreign substances during construction. Field cuts requiring tapers shall be made with proper tools and match factory tapers. A coupling recommended by the duct manufacturer shall be used whenever an existing duct is connected to a duct of different material or shape. Ducts shall be stored to avoid warping and deterioration with ends sufficiently plugged to prevent entry of any water or solid substances. Ducts shall be thoroughly cleaned before being laid. Plastic ducts shall be stored on a flat surface and protected from the direct rays of the sun.
- C. Conduit Cleaning: As each conduit run is completed, for conduit sizes 3 inches and larger, draw a flexible testing mandrel approximately 12 inches long with a diameter less than the inside diameter of the conduit through the conduit. After which, draw a stiff bristle brush through until conduit is clear of particles of earth, sand and gravel; then immediately install conduit plugs. For conduit sizes less than 3 inches, draw a stiff bristle brush through until conduit is clear of particles of earth, sand and gravel; then immediately install conduit plugs.
- D. Multiple Conduits: Separate multiple conduits by a minimum distance of 2 inches, except that light and power conduits shall be separated from control, signal, and telephone conduits by a minimum distance of 3 inches. Stagger the joints of the conduits by rows (horizontally) and layers (vertically) to strengthen the conduit assembly. Provide plastic duct spacers that interlock vertically and horizontally. Spacer assembly shall consist of base spacers, intermediate spacers, ties, and locking device on top to provide a completely enclosed and locked-in conduit assembly. Install spacers per manufacturer's instructions, but provide a minimum of 2 spacer assemblies per 10 feet of conduit assembly.
- E. Duct Encased in Concrete: Construct underground duct lines of individual conduits encased in concrete. Do not mix different kinds of conduit in any one duct bank. Concrete encasement surrounding the bank shall be rectangular in cross-section and shall provide at least 3 inches of concrete cover for ducts. Separate conduits by a minimum concrete thickness of 2 inches, except separate light and power conduits from control, signal, and telecommunications conduits by a minimum concrete thickness of 3 inches. Before pouring concrete, anchor duct bank assemblies to prevent the assemblies from floating during concrete pouring. Anchoring shall be done by driving reinforcing rods adjacent to duct spacer assemblies and attaching the rods to the spacer assembly. Provide color, type and depth of warning tape as indicated in the drawings.
- F. Partially Completed Duct Banks: During construction wherever a construction joint is necessary in a duct bank, prevent debris such as mud, sand, and dirt from entering ducts by providing suitable conduit plugs. Fit concrete envelope of a partially completed duct bank with reinforcing steel extending a minimum of 2 feet back into the envelope and a minimum of 2 feet beyond the end of the envelope. Provide one No. 4 bar in each corner, 3 inches from the edge of the

envelope. Secure corner bars with 2 No. 3 ties, spaced approximately one foot apart. Restrain reinforcing assembly from moving during concrete pouring.

3.04 CABLE PULLING

- A. Test existing duct lines with a mandrel and thoroughly swab out to remove foreign material before pulling cables. Pull cables down grade with the feed-in point at the manhole or buildings of the highest elevation. Use flexible cable feeds to convey cables through handhole opening and into duct runs. Do not exceed the specified cable bending radii when installing cable under any conditions, including turn-ups into equipment and other enclosures. Cable with tape shield shall have a bending radius not less than 12 times the overall diameter of the completed cable. If basket-grip type cable-pulling devices are used to pull cable in place, cut off the section of cable under the grip before splicing and terminating.
- B. Cable Lubricants: Use lubricants that are specifically recommended by the cable manufacturer for assisting in pulling jacketed cables.

3.05 GROUNDING SYSTEMS

- A. Provide grounding system as indicated, in accordance with NFPA 70 and IEEE C2, and as specified herein.
- B. Grounding Electrodes: Provide cone pointed driven ground rods driven full depth plus 6 inches, installed to provide an earth ground of the appropriate value for the particular equipment being grounded. If the specified ground resistance is not met, an additional ground rod shall be provided in accordance with the requirements of NFPA 70 (placed not less than 6 feet from the first rod). Should the resultant (combined) resistance exceed the specified resistance, measured not less than 48 hours after rainfall, the Owner shall be notified immediately.
- C. Grounding Connections: Make grounding connections which are buried or otherwise normally inaccessible, by exothermic weld or compression connector.
 - 1. Make exothermic welds strictly in accordance with the weld manufacturer's written recommendations. Welds which are "puffed up" or which show convex surfaces indicating improper cleaning are not acceptable. Mechanical connectors are not required at exothermic welds.
 - 2. Make compression connections using a hydraulic compression tool to provide the correct circumferential pressure. Tools and dies shall be as recommended by the manufacturer. An embossing die code or other standard method shall provide visible indication that a connector has been adequately compressed on the ground wire.

- D. Grounding Conductors: Provide bare grounding conductors, except where installed in conduit with associated phase conductors. Ground cable sheaths, cable shields, conduit, and equipment with No. 6 AWG. Ground other noncurrent-carrying metal parts and equipment frames of metal-enclosed equipment. Ground metallic frames and covers of handholes and pull boxes with a braided, copper ground strap with equivalent ampacity of No. 6 AWG.

3.06 EXCAVATING, BACKFILLING, AND COMPACTING

Provide in accordance with NFPA 70 and DIVISION 2 - SITE CONSTRUCTION.

3.07 FIELD QUALITY CONTROL

- A. Performance of Field Acceptance Checks and Tests: Perform in accordance with the manufacturer's recommendations, and include the following visual and mechanical inspections and electrical tests, performed in accordance with NETA ATS.

1. Grounding System:

- a. Visual and Mechanical Inspection: Inspect ground system for compliance with contract plans and specifications
 - b. Ground Rods: Test ground rods for ground resistance value. Use a portable ground testing megger to test each ground or group of grounds. The instrument shall be equipped with a meter reading directly in ohms or fractions thereof to indicate the ground value of the ground electrode under test. Provide one copy of the megger manufacturer's directions for use of the ground megger indicating the method to be used.
2. Mandrel Test: After new ductline is complete, draw bristle brush through ductline and perform mandrel test. Mandrel shall be a wooden plug, 8 inch minimum length, with a diameter 1/2 inch less than duct inside diameter. Perform test on all new ducts 2 inch and larger.
3. Test all 600-volt class conductors to verify that no short circuits or accidental grounds exist. Make tests using an instrument which applies a voltage of approximately 500 volts to provide a direct reading in resistance.

- B. Test Report: Provide 3 copies of each test report to the Owner.

1. 600-volt cables (identify each cable and test result).
2. Grounding electrodes and systems (identify electrodes and systems, each test). Minimum ground resistance shall be 10 ohms.

- C. Follow-Up Verification: Upon completion of acceptance checks and tests, the Contractor shall show by demonstration in service that circuits and devices are in good operating condition and properly performing the intended function. As an exception to requirements stated elsewhere in the contract, the Owner shall be given 5 working days advance notice of the dates and times of checking and testing.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16301	Underground Electrical Work	Lump Sum

END OF SECTION

SECTION 16510 - INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section 16011 - GENERAL ELECTRICAL REQUIREMENTS, applies to this section, with the additions and modifications specified herein.
- B. The work includes providing luminaires and battery-powered units and systems for interior use, including accessories. Materials not normally furnished by manufacturers of these devices are specified in Section 16100 - ELECTRICAL WORK.

1.03 APPLICABLE PUBLICATIONS

The publications listed within this specification form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Unless otherwise indicated, most recent edition of publication with current revisions and amendments will be enforced.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01300 - SUBMITTALS.
- B. Data, shop drawings, and reports shall employ the terminology, classifications, and methods prescribed by the IES Lighting Handbook, as applicable, for the lighting system specified.
 - 1. Manufacturer's Data:
 - a. Luminaires, including lamps and drivers
 - b. Lighting contactors
 - c. Photocell switch and time switch
 - d. Exit lights
 - e. Emergency lighting equipment
 - f. Occupancy sensors
 - g. Electronic dimming ballast
 - h. Dimming ballast controls
 - i. Lighting control panels and low voltage control stations

- j. Modular dimming control panels and preset lighting control station
2. Shop Drawings:
 - a. Luminaire assemblies
 - b. Remote mounted ballasts/drivers or battery packs
 - c. Lighting control panels and control stations and project specific wiring/control diagrams
 3. Operations and Maintenance Manual: Submit operations and maintenance manual as stipulated in paragraph "OPERATIONS AND MAINTENANCE MANUAL" hereinbelow.
 4. Qualifications of the lighting control system manufacturer as stipulated in paragraph "QUALITY ASSURANCE" hereinbelow.
 5. Warranty: Provide as stipulated in paragraph "WARRANTY" hereinbelow.
- C. LEED Submittals: Submit LEED submittal requirements according to Section 01352 – LEED REQUIREMENTS, Paragraph 1.06, Item F, LEED Documentation Submittals.

1.05 OPERATIONS AND MAINTENANCE MANUAL

Submit operation and maintenance data showing all light fixtures, control modules, control zones, occupancy sensors, light level sensors, power packs, dimming ballasts, schematic diagrams and all interconnecting control wire, conduit, and associated hardware. Submit documentation that includes contact information, summary of procedures, and the limitations and conditions applicable to the project.

1.06 QUALITY ASSURANCE

- A. Lighting Control System Manufacturer: Minimum 10 years' experience in manufacture of architectural lighting controls.
- B. Lighting Control System Components: Listed by UL specifically for the required loads. Provide evidence of compliance upon request.

1.07 WARRANTY

- A. Provide manufacturer's warranty covering 5 years with factory commissioning on dimming system modules and drivers from date of purchase.
- B. Provide manufacturer's warranty covering 2-year parts and labor, and 8-year limited warranty to repair and replace defective equipment applicable to daylight sensors, occupancy sensors, wall stations and bus supply.

PART 2 - PRODUCTS

2.01 LED LIGHTING FIXTURES

- A. Provide lighting fixtures specifically engineered for LED light sources and drivers. Use of linear or screw-base retrofit LED light sources is not acceptable. LED lighting fixtures shall carry a minimum manufacturer's warranty of 5 years.
- B. LED Light Sources:
 - 1. Correlated Color Temperature (CCT) shall be in accordance with NEMA ANSLG C78.377: Nominal CCT: 4000 degrees K, unless otherwise specified.
 - 2. Color Rendering Index (CRI): Shall be greater than or equal to 80 unless otherwise indicated.
 - 3. Color Consistency: Manufacturer shall utilize a maximum 4-step MacAdam ellipse binning tolerance for color consistency of LEDs used in luminaires.
- C. Luminaire LED Power Supply Units (Drivers):
 - 1. LED Power Supply Units (Drivers): UL 1310. LED Power Supply Units (Drivers) shall meet the following requirements:
 - a. Minimum efficiency shall be 85 percent.
 - b. Shall be rated to operate between ambient temperatures of minus 22 degrees F and 104 degrees F.
 - c. Shall be designed to operate on the voltage system to which they are connected, typically ranging from 120V to 277V nominal.
 - d. Operating frequency shall be: 60 Hz.
 - e. Power Factor (PF) shall be greater than or equal to 0.90.
 - f. Total Harmonic Distortion (THD) current shall be less than or equal to 20 percent.
 - g. Shall be mounted integral to luminaire. Remote mounting of power supply is not allowed unless noted.
 - h. Power supplies in luminaires shall be UL listed with a sound rating of "A".
 - i. Shall be dimmable, and compatible with a standard dimming control circuit of 0 - 10V or other approved dimming system as indicated.
 - j. Shall be equipped with over-temperature protection circuit that turns light source off until normal operating temperature is achieved.

2. Digital Control, Five Percent Dimming:
 - a. Dimming Range: 100 to 5 percent measured output current.
 - b. Typically dissipates 0.2 W standby power at 120V and 0.3 W standby power at 277V.
 - c. Complies with FCC requirements of CFR, Title 47, Part 15, for commercial applications at 120-277V.
 - d. Constant Current Reduction (CCR) dimming method.
 - e. Total Harmonic Distortion (THD): Less than 21 percent at full load; complies with ANSI C82.11.
 - f. Constant Current Drivers: Support for downlights and pendant fixtures in select currents from 350 mA to 1.4 A to ensure a compatible driver exists.
 - 1) Support LED arrays up to 35 W.
 - g. Lutron EcoSystem 5-Series or approved equivalent.

2.02 RECESS- AND FLUSH-MOUNTED FIXTURES

Provide type that can be relamped from the bottom. Access to ballast or driver shall be from the bottom. Trim for the exposed surface of flush-mounted fixtures shall be as indicated. Delete thermal insulation immediately surrounding recessed luminaires.

2.03 SUSPENDED FIXTURES

Provide hangers capable of supporting twice the combined weight of fixtures supported by hangers. Provide with swivel hangers to ensure a plumb installation. Hangers shall be cadmium-plated steel with a swivel-ball tapped for the conduit size indicated. Hangers shall allow fixtures to swing within an angle of 45 degrees. Brace pendants 4 feet or longer to limit swinging with a 2-way bracing system. Single-unit suspended fluorescent fixtures shall have twin-stem hangers. Multiple-unit or continuous row fluorescent fixtures shall have a tubing or stem for wiring at one point and a tubing or rod suspension provided for each unit length of chassis, including one at each end. Rods shall be a minimum 1/4- inch diameter.

2.04 TIME SWITCH

Astronomic dial type or electronic type, arranged to turn "ON" at sunset and turn "OFF" at predetermined time between 8:30 p.m. and 2:30 a.m. or sunrise, automatically changing the settings each day in accordance with seasonal changes of sunset and sunrise. Provide switch rated 120 or 277 volts, having automatically wound spring mechanism or capacitor, to maintain accurate time

for a minimum of 15 hours following power failure. Provide time switch with a manual on-off bypass switch. Housing for the time switch shall be surface-mounted, NEMA 1 enclosure conforming to NEMA ICS 6.

2.05 EXIT SIGNS

UL 924, NFPA 70, and NFPA 101. Exit signs shall be type as indicated.

2.06 EMERGENCY LIGHTING EQUIPMENT

- A. UL 924, NFPA 70, and NFPA 101. Provide lamps in wattage indicated.
- B. Fluorescent Emergency System: Each system shall consist of an automatic power failure device, cover-mounted test switch and pilot light, and fully automatic solid-state charger in self-contained power pack. Charger shall be either trickle, float, constant current or constant potential type, or a combination of these. Battery shall be sealed electrolyte type. Battery shall operate unattended and require no maintenance for a period of not less than 5 years. System shall be capable of operating a dead fluorescent lamp, and capable of providing a minimum 1450 lumens with one lamp.

PART 3 - EXECUTION

3.01 INSTALLATION

Set luminaires plumb, square, and level with ceiling and walls, in alignment with adjacent luminaires, and secure in accordance with manufacturer's directions. The insulation shall meet with the requirement of NFPA 70. Provide rods or wires for luminaire support under this section of the specifications.

3.02 GROUNDING

Ground noncurrent-carrying parts of equipment as specified in Section 16100 - ELECTRICAL WORK. Where the copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.03 FIELD TESTS

- A. Operating Test: Upon completion of the installation, conduct an operating test to show that the equipment operates in accordance with the requirements of this section.

- B. Insulation Resistance Tests: Perform as specified in Section 16100 - ELECTRICAL WORK, both before and after connection of luminaires and equipment.
- C. Ground Resistance Tests: Perform as specified in Section 16100 - ELECTRICAL WORK.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16510.1	Interior Lighting	Lump Sum
16510.2	Interior Lighting - Existing TSA Checkpoint Work (Phase 2)	Lump Sum

END OF SECTION

SECTION 16722 - INTERIOR ADDRESSABLE FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section 16011 - GENERAL ELECTRICAL REQUIREMENTS applies to this section, with the additions and modifications specified herein.
- B. Provide modifications to extend a complete addressable fire alarm system for the renovated spaces and electrical vault. Modification to consist of addition of a SLC power supply, addressable control module, addressable pull stations, addressable smoke detectors, and alarm audio-visual indicators. Provide wiring materials under this section as specified in Section 16100 - ELECTRICAL WORK, with the additions and modifications specified herein. Provide materials and equipment that are current products of one manufacturer regularly engaged in the production of such equipment and compatible with the existing Johnson Controls system.

1.03 APPLICABLE PUBLICATIONS

The publications listed within this specification form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Unless otherwise indicated, most recent edition of publication with current revisions and amendments will be enforced.

1.04 COMPLIANCE

The fire alarm system shall be configured in accordance with NFPA 72. The equipment furnished shall be compatible and be UL listed or FM approved or listed by a nationally recognized testing laboratory in accordance with the applicable NFPA standards.

1.05 QUALIFICATIONS OF INSTALLER

Prior to installation, submit data showing the Contractor has successfully installed interior addressable fire alarm systems of the same type and design as specified herein, or that he has a firm contractual agreement with a subcontractor having such required experience. The data shall include the

names and locations of at least 2 installations where the Contractor, or the subcontractor referred to above, has installed such systems. The Contractor shall indicate the type and design of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 18 months.

1.06 MANUFACTURER AND MANUFACTURER'S REPRESENTATIVE

- A. Fire Alarm System shall be compatible with the existing Johnson Controls system. Alternative vendors must be pre-qualified prior to Bid Opening. Substitution by manufacturers not pre-qualified prior to Bid Opening will not be permitted.
- B. Manufacturer model numbers identified herein shall be used to establish features and quality of products used. Only equivalent products of specified manufacturers and pre-qualified manufacturers approved prior to Bid Opening will be permitted. Being listed as an acceptable manufacturer or approved as a pre-qualified manufacturer in no way relieves obligation to provide all equipment and features in accordance with these specifications.
- C. Furnish the services of a NICET certified addressable fire alarm system manufacturer's representative or technician, experienced in the installation and operation of the type of system being provided, to supervise the testing, including formal testing, and adjustment of the system.

1.07 SUBMITTALS

Submit shop drawings and catalog cuts of the following equipment for approval in accordance with Section 01300 - SUBMITTALS. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. Incomplete submittals and those without summary sheets will be returned without review.

- 1. Manufacturer's Data:
 - a. SLC Field Charger/Power Supply
 - b. Addressable manual stations
 - c. Addressable Detectors
 - d. Audio-visual signalling indicators
 - e. Individually addressable module
- 2. Shop Drawings:
 - a. Provide drawings that clearly and completely indicate the function of the addressable control panel and devices connected thereto. Indicate termination points of devices and indicate the interconnection of modules required for proper operation of the

- system. Indicate interconnection between modules and devices connected thereto. Drawings shall be not less than 11 inches by 17 inches.
- b. Installation drawings showing location and layout of all fire alarm equipment, electrical power supply panels, wiring counts and conduit runs from the control panel to all associated equipment.
 - c. Submit NICET certifications of the shop drawing preparer and the field technician that will supervise installation and perform system testing.
3. Field Tests: Submit record of field tests in format consistent with NFPA recommendations. Test reports to be signed by the NICET certified technician on-site.

1.08 WARRANTY AND CERTIFICATE

- A. The Contractor shall warranty and certify in writing all work in this section for period of one year. Should any equipment or material fail due to defective equipment, material or workmanship within this period, the Contractor shall replace the item at no cost to the State.
- B. The one-year warranty shall start from the date of final project acceptance.
- C. If, during the one-year warranty period, the new fire alarm system is inoperative or deficient and requires repair, the one-year warranty period shall be extended for additional 30 days after repair of the system.

1.09 SPARE PARTS

- A. Spare parts shall be directly interchangeable with the corresponding components of the installed system. Spare parts shall be suitably packaged and identified by nameplate, stamping, or tagging. Furnish the following:
 1. Four keys or tools for resetting manual stations
 2. Four keys for locks of control panels or cabinets
 3. Smoke Sensors: Furnish 2 sensors each of the type installed.
 4. Sensor Bases: Furnish 2 bases each of the type installed.
 5. Audio-Visual Signalling Device: Furnish 2 each of the type of device installed.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

All components of each new system shall be furnished by a single manufacturer, shall be of current design and shall be in regular and recurrent

production. Provide design, materials, and devices for a protected premises fire alarm system, complete, conforming to NFPA 72, except as otherwise or additionally specified herein.

2.02 SYSTEM DESIGN

- A. System Operation: System shall be a complete, supervised, noncoded, addressable multiplex fire alarm system conforming to NFPA 72. The entire system shall operate in the alarm mode upon actuation of any alarm initiating device. The system shall remain in the alarm mode until all initiating device(s) are reset and the fire alarm control panel is manually reset and restored to normal. The system shall provide the following functions and operating features:
1. The FACP and fire alarm control units, if used, shall provide power, annunciation, supervision and control for the system.
 2. Provide Class A, Style 7, single mode fiber peer-to-peer network.
 3. Provide Class B, Style 4, signaling line circuits.
 4. Provide Class B, Style Y, notification appliance circuits.
 5. Provide Class B, Style Y speaker circuits.
 6. Provide electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control panel.
 7. Provide an audible and visual trouble signal to activate upon a single break or open condition, or ground fault which prevents the required operation of the system. The trouble signal shall also operate upon loss of primary power (AC) supply, absence of a battery supply, low battery voltage, or removal of alarm or supervisory panel modules. Provide a trouble alarm silence feature which will silence the audible trouble signal, without affecting the visual indicator. After the system returns to normal operating conditions, the trouble signal shall again sound until the trouble is acknowledged. A smoke sensor in the process of being verified for the actual presence of smoke shall not initiate a trouble condition.
 8. Provide a notification appliance silencing switch which, when activated, will cause the notification appliances to cease operating, but not affect the liquid crystal display. This switch shall be overridden upon activation of a subsequent alarm.
 9. Provide alarm verification capability for smoke sensors.
 10. Provide program capability via switches in a locked portion of the FACP to bypass the automatic notification appliance circuits. Operation of a switch shall indicate a trouble condition on the FACP display.
 11. All alarm, supervisory, or trouble signals shall be automatically transmitted to other networked panels.
 12. Alarm functions shall override trouble or supervisory functions. Supervisory functions shall override trouble functions.
 13. The system shall be field programmable. All programmed information shall be stored in non-volatile memory.
 14. The system shall be capable of operating, supervising, and/or monitoring both addressable and non-addressable alarm and supervisory devices.

15. The system shall sustain the maximum system capacity on the number of addressable devices which may be in alarm simultaneously.
 16. An alarm signal shall automatically initiate the following functions:
 - a. Visual indication of the device operated on the main fire alarm control panel (FACP), FACP for the affected building and remote annunciator.
 - b. Continuous actuation of all alarm notification appliances.
 17. A supervisory signal shall automatically initiate the following functions:
 - a. Transmission of a supervisory signal to the other networked panels.
 - b. Visual indication of the device operated on the main fire alarm control panel (FACP), FACP for the affected building and remote annunciator.
 18. A trouble condition shall automatically initiate the following functions:
 - a. Transmission of a trouble signal to the other networked panels.
 - b. Visual indication of the system trouble on the main FACP, FACP for the affected building and remote annunciator.
- B. Amplifiers: Any amplifiers, preamplifiers, tone generators, digitalized voice generators, and other hardware necessary for a complete, operational, textural audible circuit conforming to NFPA 72 shall be housed in a fire alarm control unit, terminal cabinet, or in the main fire alarm control panel. Each amplifier shall have 2 channels; one to broadcast a fire alarm signal and the other for paging. A backup amplifier shall be provided in the event that the main amplifier fails. The backup amplifier shall have the capacity to continue successful operation of "one" failed amplifier.
- C. The Voice Notification System shall comply with the requirements of NFPA 72 for Emergency Voice/Alarm Communications System requirements ISO 7240-16, IEC 60268-16, except as specified herein. The system shall be a multi-channel voice notification system incorporating user selectability of a minimum 8 distinct sounds for tone signaling, and the incorporation of a voice module for delivery of prerecorded messages. All audible alarms and messages shall be synchronized throughout the campus. Textural audible appliances shall produce a slow whoop tone for 3 cycles followed by a voice message that is repeated until the control panel is reset or silenced. Automatic messages shall be broadcast through all speakers. The visual strobes and audible message shall automatically be broadcast throughout all buildings. A live voice message shall override the automatic audible output through use of a microphone input at the main fire alarm control panel.
1. The microphone shall incorporate a Push-To-Talk (PTT) microphone and shall incorporate microphone override of any tone generation or prerecorded messages.
 2. When using the microphone, live messages shall be broadcast through the Campus. The system shall be capable of operating all speakers at

the same time. The digitalized voice message shall consist of a non-volatile (EPROM) microprocessor-based input to the amplifiers. The microprocessor shall actively interrogate circuitry, field wiring, and digital coding necessary for the immediate and accurate rebroadcasting of the stored voice data into the appropriate amplifier input. Loss of operating power, supervisory or any other malfunction that could render the digitalized voice spare module inoperative shall automatically cause the slow whoop tone to take over all functions assigned to the failed unit.

3. Messages shall utilize a male and female voice and shall be similar to the following:
 - a. 1000 Hz tones (one second on, 1/2 second off, one second on, 1/2 second off, one second on.
 - b. Male voice "Attention, Attention, Attention." Female voice "May I have your attention please. A fire has been reported on the Campus. Please walk to the nearest exit and evacuate the building." (Provide a 2 second pause.) "Attention, Attention, Attention (repeat the message)."
- D. Overvoltage and Surge Protection: Provide a factory approved surge suppressor at power inputs to control panels, on all signaling line circuits, conforming to UL 1449. Suppressor shall be hybrid MOV type providing a maximum clamping voltage of 500 volts and a 150 joule minimum energy dissipation capacity.
- E. Fire Alarm Control Panel (FACP): Provide complete control panels fully enclosed in lockable steel enclosures as specified herein. All operations required for testing or for normal care and maintenance of the systems shall be performed from the front of the enclosure. The voice evacuation system shall be 100 percent integrated into the FACP and UL listed as a complete assembly. FACP shall provide power, supervision, control, and logic for the entire system, utilizing solid state, modular components, internally mounted and arranged for easy access. FACP shall be suitable for operation on a 120 volt, 60 hertz, normal building power supply. Provide panel with supervisory functions for power failure, internal component placement, and operation. Visual indication of alarm, supervisory or trouble initiation on the fire alarm control panel shall be a 2 inch by 4-3/4 inch backlight LCD display capable of displaying graphics and a 6-line text display.
 1. Cabinet: Install control panel components in cabinets large enough to accommodate all components and also to allow ample gutter space for interconnection of all panels as well as all field wiring. The enclosure shall be identified by an engraved laminated phenolic resin nameplate. Lettering on the nameplate shall say "FIRE ALARM CONTROL PANEL" and shall not be less than 0.50 inch high. Provide prominent rigid plastic or metal identification plates for all lamps, circuits, meters, fuses, and switches. The cabinet shall be provided in a sturdy steel housing, complete with backbox, hinged steel door with cylinder lock, and surface-mounting provisions.

2. Control Panel Modules: Provide power and control modules to perform all functions of the FACP. Provide audible signals to indicate any alarm, supervisory or trouble condition. The alarm signals shall be different from the trouble signal. Connect all circuit conductors entering or leaving the panel to screw-type terminals with each terminal marked for identification. Locate diodes and relays, if any, on screw terminals in the FACP.
3. Silencing Switches: Provide an alarm silence switch at the FACP which will silence the audible signal but not affect the visual alarm indicator. Provide trouble and supervisory silencing switch which will silence the audible trouble and supervisory signal, but not extinguish the visual indicator. This switch shall be overridden upon activation of a subsequent alarm.
4. Memory: Provide each control unit with non-volatile memory and logic for all functions. The use of long-life batteries, capacitors or other age-dependent devices shall not be considered as equal to non-volatile processors, PROMS or EPROMS. The control panel shall have the ability to store a minimum of 2000 events in a log stored in a battery-protected memory.
5. Service Mode: The FACP shall have a service mode to permit the arming and disarming of individual detection or output devices as well as manually operating output devices. Status of these devices shall be displayed upon command or printed on a printer. FACP shall remain 100 percent operational and capable of responding to an alarm condition while in the routine maintenance mode. The FACP shall automatically return to the normal mode after a predetermined time (one hour) in the event the panel remains unattended in the service mode.
6. Field Programmability: Provide control units and control panels that are fully field programmable for control, initiation, notification, supervisory and trouble functions of both input and output. The system program configuration shall be menu driven. All system changes shall be password protected.
7. Input/Output Modifications: The FACP shall contain features which allow the bypassing of input devices from the system or the modification of system outputs. These control features shall consist of a panel mounted keypad. Any bypass or modification to the system shall indicate a trouble condition on the FACP.
8. Resetting: Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory or trouble condition on the system still exists.
9. FACP shall include two 250-point signaling line circuit (SLC) addressable modules, four notification appliance circuits (NACs) at 3 amperes each, six speaker circuits of 150 watts total at 70 volts, dedicated backup amplifier and 24 volt programmable selector switches. All FACP's shall be expandable to 32 peer-to-peer nodes. The voice evacuation system must be integrated into the FACP and not a separate stand-alone unit.
10. FACP shall allow for termination of single-mode fiber optic cable, using SC connectors, to allow for network communication of fire alarm panels. The FACP shall also support copper wire connections for network communication where indicated.

11. Digital Alarm Communicator Transmitter (DACT): Provide DACT at the main fire alarm control panel that is compatible with the fire alarm system supervising station selected by the State. Transmitter shall have a means to transmit alarm, supervisory, and trouble conditions via a single transmitter. Transmitter shall have a source of power for operation which conforms to NFPA 72. Transmitter shall be capable of initiating a test signal daily at any selected time. Transmitter shall be arranged to seize telephone circuits or utilize radio communications in accordance with NFPA 72.
12. The FACP shall be Simplex Model 4100 Fire Alarm System or approved equivalent.

F. Electric Power:

1. Primary Power: Provide primary power for the FACP from the normal AC service to the building where shown on the drawings. Power shall be 120 VAC service, transformed through a 2-winding, isolation type transformer and rectified to low voltage DC for operation of all circuits and devices. Make the service connection for the FACP at the location indicated. Provide a red and white engraved plastic sign permanently affixed to each panel identifying the power service location, panel, and breaker. Each circuit breaker shall be marked "FIRE ALARM SYSTEM," provided with a red and white engraved plastic sign permanently affixed to the circuit breaker enclosure or panelboard and provided with a lockable handle or cover.
2. Emergency Power Supply: Provide for system operation in the event of primary power source failure. Transfer from normal to auxiliary (secondary) power or restoration from auxiliary to normal power shall be automatic and shall not cause transmission of a false alarm.
 - a. Batteries: Provide rechargeable, maintenance-free, lead-acid gelled electrolyte sealed batteries as the source for emergency power to the FACP and extender panels. Batteries shall contain suspended electrolyte. The battery system shall be maintained in a fully charged condition by means of a solid state battery charger. Provide an automatic transfer switch to transfer the load to the batteries in the event of the failure of primary power. Batteries shall have lead bolt-on or wing-nut-type terminals. Batteries with fast-tab terminals are unacceptable. House batteries within the control panel. Separate cells to prevent contact between terminals of adjacent cells and between terminals and other metal parts. Batteries shall have a clear or transparent battery shell which clearly displays the liquid level within the battery.
 - b. Capacity: Provide the batteries with sufficient capacity to operate the system under supervisory and trouble conditions, including audible trouble signal devices for 24 hours and audible and visual signal devices under alarm conditions for an additional 15 minutes.
 - c. Battery Charger: Provide a solid state, fully automatic, variable charging rate battery charger. The charger shall be capable of

providing 150 percent of the connected system load and shall maintain the batteries at full charge. In the event the batteries are fully discharged the charger shall recharge them back to full charge within 48 hours. Provide pilot light to indicate when batteries are manually placed on a high rate of charge as part of the unit assembly if a high rate switch is provided.

- G. Addressable Interface Devices: The addressable monitor device shall provide an addressable input interface to the FACP for monitoring normally-open or normally-closed contact devices such as independent smoke detection systems, etc.
1. Addressable Monitor Modules: Addressable Monitor Module shall be provided to connect supervised conventional initiating device or zone of supervised conventional initiating devices, including but not limited to duct smoke detectors and other such devices. Monitor module shall mount in a 4-11/16-inch square, 2-1/8-inch deep electrical box and shall be capable of Style B supervised wiring to the initiating device. Monitor module shall provide address setting means switches and store an internal identifying code which the control panel shall use to identify the type of devices. Monitor module shall contain an integral LED that flashes each time the monitor module is polled.
 2. Addressable Control Modules: Addressable Control Module shall be provided to connect supervised conventional notification device or zone of notification devices that require an external power supply, such as audio-visual alarms, to one of the 2 wire analog loop cards in a Style Z configuration. The control module shall be capable of operating as a relay (dry contact Form C), to control auxiliary functions. The module shall mount in a 4-11/16-inch square, 2-1/8-inch deep electrical box and shall be capable of Style B supervised wiring to the indicating or control device. The module shall provide address setting means switches and store an internal identifying code which the control panel shall use to identify the type of devices. Module shall contain an integral LED that flashes each time the module is polled.
 3. Isolation Modules: Provide isolation modules to isolate wire-to-wire short circuits on a loop and limit the number of other modules or sensors that are incapacitated by the short circuit fault. Place isolator modules at signaling line circuit T-taps where the T-tap will contain more than 5 addressable devices, and located such that not more than 30 addressable devices are connected between isolation modules. If a wire-to-wire short occurs, the module shall automatically open the circuit. On repair of the short, the module shall automatically reconnect the isolated section of the signaling line circuit. The module shall mount in a 4-11/16-inch square, 2-1/8-inch deep electrical box. Module shall contain an integral LED that flashes each time the module is polled and illuminates steadily to indicate that a short has been detected and isolated.

H. Analog Smoke Sensors:

1. Monitoring: FACP shall individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.
2. Environmental Compensation: The FACP shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.
3. Programmable Sensitivity: Photoelectric Smoke Sensors shall have 3 sensitivity levels ranging from 0.2 percent to 3.7 percent, programmed and monitored from the FACP.
4. Sensitivity Testing Reports: The FACP shall provide sensor reports that meet NFPA 72 calibrated test method requirements. The reports shall be viewed on a CRT Display or printed for annual recording and logging of the calibration maintenance schedule.
5. The FACP shall continuously perform an automatic self-test on each sensor which will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.

- I. Audible Alarm Notification: By voice evacuation and tone signals on loudspeakers in areas as indicated on drawings.

2.03 ADDRESSABLE MANUAL PULL STATIONS

Addressable double-action type, red LEXAN or metal, and finished in red with molded, raised-letter operating instructions of contrasting color. Station will mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units.

2.04 SMOKE SENSORS

- A. General: Comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems." Include the following features:
 1. Factory Nameplate: Serial number and type identification.
 2. Operating Voltage: 24 VDC, nominal.
 3. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
 4. Plug-In Arrangement: Sensor and associated electronic components are mounted in a module that connects to a fixed base with a twist-locking plug connection. Base shall provide break-off plastic tab that can be removed to engage the head/base locking mechanism. No special tools shall be required to remove head once it has been locked. Removal of the

detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control unit.

5. Each sensor base shall contain an LED that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the detector head LED shall be on steady.
 6. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5 percent obscuration for photoelectric sensor, 135-degrees F and 15-degrees F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.
 7. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.
 8. Removal of the sensor head for cleaning shall not require the setting of addresses.
- B. Type: Smoke sensors shall be of the photoelectric type.

2.05 ADDRESSABLE ALARM-NOTIFICATION APPLIANCES

- A. Addressable Notification Appliances: The Contractor shall furnish and install Addressable Notification Appliances and accessories to operate on compatible signaling line circuits (SLC).
1. Addressable Notification appliance operation shall provide power, separate control, and supervision of horns and strobes over a single pair of wires. The controlling channel (SLC) digitally communicates with each appliance and receives a response to verify the appliance's presence on the channel. The channel provides a digital command to control appliance operation. SLC channel wiring shall be unshielded twisted pair (UTP), with a capacitance rating of less than 60 pf/ft and a minimum 3 twists (turns) per foot.
 2. Class B (Style 4) notification appliances shall be wired without requiring traditional in/out wiring methods; addressable "T" Tapping shall be used. Up to 63 appliances can be supported on a single channel.
 3. Each Addressable notification appliance shall contain an electronic module and a selectable address setting (in addition to its notification appliance circuit) to allow it to occupy a unique location on the channel. This on-board module shall also allow the channel to perform appliance diagnostics that assist with installation and subsequent test operations. A visible LED on each appliance shall provide verification of communications and shall flash with the appliances address setting when locally requested using a magnetic test tool.
- B. Addressable Controller: Addressable Controller shall supervise Channel (SLC) wiring, communicate with and control addressable notification appliances.

- C. Visible/Only: Addressable strobe shall be listed to UL 1971. The V/O shall consist of a clear or nominal white xenon flash tube and associated lens/reflector system. The V/O enclosure shall mount directly to standard single gang, double gang or 4-inch square electrical box, without the use of special adapters or trim rings. Appliances shall be wired with UTP conductors, having a minimum of 3 twists per foot. V/O appliances shall be provided with different minimum flash intensities of 75cd and 110cd. Flash intensity shall be per recommendation of the NICET certified engineer, but subject to the concurrence of the Owner. Provide a label inside the strobe lens to indicate the listed candela rating of the specific Visible/Only appliance.
- D. Speaker/Visible: Combination Speaker/Visible (S/V) units combines the speaker and visible functions into a common housing. The S/V shall be listed to UL 1971 and UL 1480. Addressable functionality controls visible operation, while the speaker operates on a 25VRMS or 70.7VRMS NAC.
1. Twisted/shielded wire is required for speaker connections on a standard 25VRMS or 70.7VRMS NAC using and UTP conductors, having a minimum of 3 twists per foot is required for addressable strobe connections.
 2. The following taps are available: 0.25W, 0.50W, 1.0W and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 84dBA at 10 feet. The speaker tap selected shall produce a sound that exceeds the prevailing sound level in the space by at least 15dBA or exceeds any maximum sound level with a duration of 60 seconds by 5dBA, whichever is louder. Sound levels for the alarm signals shall not exceed 120dBA.
 3. The S/V shall have a frequency response of 400 to 4000 Hz for Fire Alarm and 125 to 12kHz for General Signaling.
 4. The S/V installs directly to a 4-inch square, 1 1/2-inch deep electrical box with 1 1/2-inch extension.
- E. All visible alarm notification devices shall have synchronized strobes. The maximum pulse duration shall be two-tenths of one second with a maximum duty cycle of 40 percent. The alarm flash rate shall be a minimum of one Hz and a maximum of 3 Hz.
- F. Isolator Module: Isolator module provides short circuit isolation for addressable notification appliance SLC wiring. Isolator shall be listed to UL 864. The Isolator shall mount directly to a minimum 2 1/8-inch deep, standard 4-inch square electrical box, without the use of special adapter or trim rings. Power and communications shall be supplied by the Addressable Controller channel SLC; dual port design shall accept communications and power from either port and shall automatically isolate one port from the other when a short circuit occurs. The following functionality shall be included in the Isolator module:
1. Report faults to the host FACP.
 2. On-board Yellow LED provides module status.

3. After the wiring fault is repaired, the Isolator modules shall test the lines and automatically restore the connection.
- G. Accessories: The Contractor shall furnish the necessary accessories.

2.06 SLC FIELD CHARGER/POWER SUPPLY

- A. The Contractor shall furnish and install a remote SLC field charger/power supply to support the additional signaling line circuits (SLC) being added under this project. Power supply shall interface with addressable control module to monitor and control new SLCs.
- B. UL 1481. SLC field charger/power supply shall consist of a filtered, regulated 24VDC output that is capable of being configured to drive up to 4 Notification Appliance Circuits (NACs). Unit will be self contained with an integral supervised battery charger and installed in a lockable cabinet. Power supply, battery and NACs shall be fully supervised. Johnson Controls FCPS-24 or pre-approved equivalent.

2.07 ANNUNCIATION

- A. Modify graphic annunciators with new maps.
- B. Modify and build new graphics in the Johnson Controls Metasys head end at all graphic workstations throughout the airport.

2.08 WIRING

Provide in accordance with NFPA 70 and NFPA 72A. Conductors shall be copper. Conductors for 120-volt circuits shall be No. 12 AWG minimum; single conductors for low-voltage dc circuits shall be No. 12 solid AWG minimum. Conductors shall be color-coded. Provide wiring in rigid metal conduit or intermediate metal conduit, except electrical metallic tubing conduit may be provided in dry locations not enclosed in concrete or where not subject to mechanical damage. Conceal conduit in finished areas of new construction and wherever practicable in existing construction. Identify conductors within each enclosure where a tap, splice, or termination is made. Identify conductors by plastic-coated, self-sticking, printed markers or by heat-shrink type sleeves. Wire the alarm initiating and notification signal devices so that removal will cause the system trouble device to sound. Pigtail or "T" tap connections to alarm initiating devices, horns, strobes, and fire warning light are not acceptable. Each conductor used for the same specific function shall be distinctively color coded. Each circuit color code wire shall remain uniform throughout circuit.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.
- B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
 - 1. Factory trained and certified personnel.
 - 2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
 - 3. Personnel licensed or certified by state or local authority.

3.02 EQUIPMENT INSTALLATION

Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient manual stations, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.

3.03 WIRING INSTALLATION

- A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electrical Code (NEC).
- B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
- C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

3.04 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
- B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:
 - 1. Factory trained and certified.
 - 2. National Institute for Certification in Engineering Technologies (NICET) fire alarm certified.
 - 3. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
- C. Pretesting: Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.
- D. Final Test Notice: Provide a 30-day minimum notice in writing when the system is ready for final acceptance testing.
- E. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log.
- H. Final Test, Certificate of Completion, and Certificate of Occupancy: Test the system as required by the Base Fire Chief and Owner in order to obtain a certificate of occupancy.

3.05 CLEANING AND ADJUSTING

- A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.
- B. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to 3 visits to the site for this purpose.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Interior Addressable Fire Alarm System Integration with existing Fire Alarm System, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for added Interior Addressable Fire Alarm System Integration with existing Fire Alarm System required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16722.1	Interior Addressable Fire Alarm System	Lump Sum
16722.2	Interior Addressable Fire Alarm System - Existing TSA Checkpoint Work (Phase 2)	Lump Sum
16722.3	Interior Addressable Fire Alarm System Integration with Existing Fire Alarm System	Allowance

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 PRICE.

END OF SECTION

SECTION 16740 – BUILDING TELECOMMUNICATION SYSTEMS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This section specification is intended to provide qualified Contractors with a detailed description of the passive cabling infrastructure for the telecommunication systems, as well as pathways and spaces, which shall be provided for this project. The structured cabling system will be utilized to support telephone, data, and CATV within the new facilities. All new telecommunications infrastructure shall conform to the ANSI/TIA/EIA documents referenced within this section. In addition, all new telecommunications infrastructure supporting TSA within the new TSA checkpoint area shall conform to the requirements identified within the TSA Structured Cabling System Guidelines and the TSA Checkpoint Requirements and Planning Guide (CRPG). Materials not normally furnished by manufacturers of these devices are specified in Section 16100 – ELECTRICAL WORK.
- B. Related sections include the following:
1. SECTION 01330 – SUBMITTALS
 2. SECTION 16100 – ELECTRICAL WORK, applies to this section with additions and modifications specified herein

1.03 REFERENCES

- A. The publications cited within this specification form a part of this specification to the extent referenced. Unless otherwise indicated, most recent edition of the publication with current revisions and amendments will be enforced
1. NFPA 70 – National Electrical Code, 2020.
 2. ANSI/TIA-568.0-E – Generic Telecommunications Cabling for Customer Premises.
 3. ANSI/TIA-568.1-E – Commercial Building Telecommunications Cabling Standard.
 4. ANSI/TIA-568.2-D – Balanced Twisted-Pair Telecommunications Cabling and Components Standard.
 5. ANSI/TIA-568.3-E – Optical Fiber Cabling and Components Standard.
 6. ANSI/TIA-569-E – Telecommunications Pathways and Spaces.
 7. ANSI/TIA-598-D – Optical Fiber Cable Color Coding.

8. ANSI/TIA-606-D – Administration Standard for Telecommunications Infrastructure.
9. ANSI/TIA-607-D– Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
10. TSA Checkpoint Requirements and Planning Guide (CRPG) with Appendix A, September 30, 2022.
11. TSA Structured Cabling System Guidelines, November 29, 2018.

1.04 SUBMITTALS

- A. Submit shop drawings and manufacturer's data of the following equipment for approval in accordance with Section 01300 – SUBMITTALS. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. Incomplete submittals and those without summary sheets will be returned without review.
- B. Shop Drawings:
 1. Telecommunication System Design Drawings – RCDD Approved
 2. Telecommunication Space Drawings – RCDD Approved.
- C. Manufacturer's Data:
- D. Telecommunications Cabling and Connectors.
 1. Fiber Optic Cabling and Connectors.
 2. Termination Equipment, including patch panels and termination blocks.
 3. Telecommunication Outlets, including outlet box, faceplates, and jacks.
 4. Equipment Cabinets/Racks, including power strip.
- E. Qualifications:
 1. Telecommunications System Designer of Record.
 2. Telecommunications Contractor.
- F. Test Reports: Telecommunication system cabling test reports.
- G. Record Documentation.
- H. Labeling: Telecommunication cabling system labeling scheme.

1.05 MANUFACTURER'S STANDARD OF QUALITY

- A. It is the intent of these specifications and applicable drawings to identify the essential requirements related to the voice and data wiring system and the quality of materials, construction, design, and overall workmanship. All manufacturers shall meet these minimum requirements.

- B. All of the products referenced in this section may be substituted with a product of the same or better operating specifications if substitution request is submitted and approved in accordance with the Special Provisions. Contractor shall list all apparatus or material substitutions, and provide sufficient product information or specifications, to illustrate product is equivalent to those specified herein.
- C. Products From Other Manufacturers: The products of other manufacturers that meet or exceed the material, construction, and standard of quality specified hereinafter shall be submitted for approval in accordance with the substitution request requirements set forth the GENERAL CONDITIONS, the SPECIAL PROVISIONS, and the requirements below:
 - 1. Manufacturers requesting substitution approval shall submit evidence of at least two years of experience for type of products covered in this specification. Catalogs and technical data identifying conformance to the specifications shall be submitted for substitution approval.
 - 2. The acceptance of any other manufacturer's product shall not relieve the Contractor of his responsibility for providing a complete and functioning voice and data wiring system.

1.06 QUALITY ASSURANCE

- A. Brand names, manufacturer's names and catalog numbers indicate standard of design and quality required. Acceptable manufacturers for electrical apparatus include Belden, Berktek, Commscope, Corning, Legrand, Leviton, Ortronics, Superior Essex, Systimax, Siemon, Suttle and Tyco Electronics. All apparatus supplied shall bear the name of the approved manufacturer on its nameplates. Substitute materials may be used if pre-qualified prior to bidding by the Engineer.
- B. Preparation of design drawings and submittals shall be done under the supervision of a BICSI Registered Communications Distribution Designer (RCDD). RCDD shall be currently employed by the Contractor. Sub-contracting personnel with RCDD accreditation is not acceptable unless there is a written commitment to work on this project at time of bid.
- C. All Contractor personnel shall be fully trained and qualified to perform the tasks associated with the installation, termination and testing of UTP and fiber optic cable including but not limited to fusion splicing, fiber optic connector termination and the proper operation of cabling test devices (i.e. Optical Time Domain Reflectometer and Cable Analyzer). Contractor shall submit a list of personnel qualified to perform such activities for bid evaluation.
- D. To ensure the appropriate expertise and past experience with the products being provided, the installation contractor shall be trained and certified by the manufacturer for installation and testing of their products.

1.07 SHOP DRAWINGS

- A. Contractor shall provide RCDD approved shop drawings in accordance with ANSI/TIA-606-C. As a minimum, the Contractor shall provide the following drawings:
1. T1 – Building Floorplans with Building Area/Serving Zone Boundaries, Backbone Systems, and Horizontal Pathways: Drawing shall indicate the location of entrance facilities, telecommunication spaces, serving zones, vertical backbone diagrams, access points, pathways, grounding system, and other systems than need to be viewed from the complete building perspective.
 2. T2 – Serving Zones / Building Area Drawings – Drop Locations and Cable Identification (ID's): Enlarged plan showing building area or serving zone. These drawings show drop locations, telecommunication spaces, access points and detail call outs for common equipment rooms and other congested areas.
 3. T3 – Telecommunication Space Drawings – Detailed layout of Telecommunication Spaces: Provide telecommunication space drawings which as a minimum include telecommunications room plan views, pathway layouts (cable tray, racks, equipment cabinets, etc.), mechanical/electrical utility support layout, rack/cabinet elevations, and backboard elevations. Drawings shall show layout of applicable equipment including incoming cable connector blocks, space for building protectors, outgoing cable connector blocks, patch panels, equipment spaces, and cabinet/racks. Drawings shall also include a complete list of equipment and material, equipment rack/cabinet details, proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of work including clearance for maintenance and operation.
 4. T4 – Typical Detail Drawings: Detailed drawings of symbols and typical details for faceplate labeling/identification, faceplate types, faceplate population installation procedures, detail racking, and raceways.

1.08 RECORD DOCUMENTATION

- A. In addition to the standard close out documentation, Contractor shall provide T5 drawings including documentation on installed cables and termination hardware in accordance with ANSI/TIA-606-C. T-5 drawings shall include schedules to show information for cutovers and cable plant management, patch panel layouts and cover plate assignments, cross-connect information and connecting terminal layout as a minimum. Provide hard copy documentation for the following t5 drawings as a minimum:
1. Cables: A record of installed cable shall be provided in accordance with ANSI/TIA-606-C. The cable records shall include only the required data fields in accordance with ANSI/TIA-606-C. Include manufacture date of cable with submittal.

2. Termination Hardware: A record of installed patch panels, cross-connect points, distribution frames, terminating block arrangements and type, and outlets shall be provided in accordance with ANSI/TIA-606-C. Documentation shall include the required data fields as a minimum in accordance with ANSI/TIA-606-C.

1.09 DEFINITION OF TERMS

- A. Apparatus: Generally used herein to include the inter-building cable system, station wiring, cable racks, wiring and equipment frames, cross connect equipment and wiring adapters, information outlets and faceplates, designation strips, materials, supplies or whatsoever that may be purchased, together with the usual appropriate fittings, attachments, appurtenances, and appliances required for the intended operation.
- B. Work Specification: The technical specification describing the Scope of Work, including the engineering, furnishing, delivery, installation and testing of the telecommunication wiring system.
- C. Intra-building Wiring System: A wiring system, which includes necessary apparatus, providing communications within a building.
- D. Inter-building Wiring System: A wiring system, which includes necessary apparatus, providing communications between more than one building.

1.10 WARRANTY

- A. Contractor shall warrant the installation and provide an application/manufacture's warranty in addition to the standard Installation, Workmanship, and Equipment Warranty.
 1. Application/Manufacturer's Warranty: Contractor shall extend an Application/Manufacturer's warranty to the Owner. This warranty guarantees that any application up to 10Gbps will run on this wiring system for a period of at least 20 years. As an example, Commscope (Systemax Solutions) offers the SYSTIMAX product's exclusive SYSTIMAX 20-year product and applications warranty. Contractor shall register the installation with the manufacturer to secure such extended warranties and assurances.
 2. Installation Warranty: Contractor shall warrant to the Owner that the installation, workmanship, equipment, and/or material to be furnished herein shall be new and free from defects in material and workmanship for a period of no less than two years from the date of system acceptance; and will be of the kind and quality designated or described herein and shall perform in the manner set forth in the Contract. At time of acceptance, Contractor shall guarantee that the Owner shall be in sole ownership and title to all materials and equipment, which shall be free of any encumbrance or claims imposed by a third party.

- B. If it appears within two years from the date of acceptance, and/or title passage that the installation, workmanship, equipment and/or material furnished hereunder does not meet the warranties specified above and the Owner notifies the Contractor promptly, the Contractor shall thereupon correct any defect, including non-conformance with the Contract, without delay and expense to the Owner.
- C. If Contractor is obliged to correct defects as specified above, the warranty period for the repaired or replacement part shall be warranted for the remaining warranty term, as determined by the original date of acceptance.
- D. The Owner shall also be entitled to all Manufacturer's warranties and guarantees associated with the apparatus or materials provided by the Contractor.
- E. Faults or problems caused by equipment damage occurring after the initial installation as a result of accidental physical abuse, or misuse on the part of the Owner will be: 1) handled as an exception to this warranty agreement; 2) repaired by the Contractor; and 3) billed in accordance to their standard maintenance and repair rates, provided these rates are reasonable and acceptable to the Owner.
- F. In either instance, the suspected cause of the problem will not serve to delay prompt resolution of the fault.
- G. If abuse or misuse is the suspected cause, and costs to correct the problem are estimated to be less than \$100, evidence of such abuse or misuse shall be documented by the Contractor and the problem shall be resolved immediately by the Contractor. Contractor will be reimbursed by the Owner for this work.
- H. In the event the cost is estimated to be more than \$100, the Contractor shall document any evidence of abuse or misuse and provide the Owner a written estimate of charges to correct the problem. The Owner will then decide whether to accept the charges and provide notice to proceed.

PART 2 – PRODUCTS

2.01 COMPONENTS

- A. UL or third party certified. Provide a complete system of telecommunications cabling and pathway components using star topology and support structures, pathways, and spaces complete with conduits, pull wires, terminal boxes, outlets, cables, junction boxes, and backboards. Fixed cables and pathway systems for telecommunications systems shall be UL listed or third party independent testing laboratory certified, and shall comply with NFPA 70.

2.02 PATHWAYS (BACKBONE AND HORIZONTAL)

- A. ANSI/TIA-569-D and Addenda. Pathways shall be conduit and cable tray installations as specified in Section 16100 – ELECTRICAL WORK. Provide grounding and bonding as required by the National Electrical Code (NFPA 70) and ANSI/TIA-607-C.
- B. Work Area Pathways: Provide minimum one (1) 1”C between each information outlet location and cable tray or comm room. Comply with the National Electrical Code (NFPA 70) and ANSI/TIA-569-D and Addenda.
- C. Cable Runways. UL Listed. Tubular steel cable runway with flat black powder coat finish. Runway shall be ladder type with 1 1/2-inch stringer height with welded rungs. Stringer side rail shall conform to the minimum chemical and mechanical properties of ASTM A513 Grade 1008 steel. Cable runway rungs shall be constructed of ASTM A1011 SS Grade 33 structural steel. Each rung shall be 1/2-inch by 1-inch steel c-channel shape with radiused edges. Runway shall be sized as noted on the drawings. Cable runways shall be supported at no more than 5-ft on center. Cable runways only used in telecommunications rooms.
- D. Fabric Mesh Innerduct: Multi-cell textile fabric innerduct for use within telecommunications distribution ducts/conduits. Provide multi-cell, stiff, fabric mesh with pullstring. Multi-cell fabric mesh shall have uninterrupted, shared, sewn spline to prevent twisting. Size and configurations as indicated. Innerduct shall be installed in accordance with manufacturer’s recommendations. Interior innerduct installed within accessible ceiling areas shall be plenum rated. Exterior innerduct installed in exterior overhead/underground ductlines shall be suitable for that environment and rated for wet location installation. Maxcell or approved equivalent

2.03 TELECOMMUNICATIONS CABLING

- A. Cabling shall be UL listed for the application and shall comply with ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, ANSI/TIA-568.3-D and NFPA 70. Provide a labeling system for cabling as indicated on the drawings and as required by ANSI/TIA-606-C and UL 969. All TSA IT telecommunications infrastructure shall be installed and labeled in accordance with TSA Structured Cabling System Guidelines. Cabling manufactured more than 12 months prior to date of installation shall not be used.
- B. Exterior Backbone Cabling:
 - 1. Exterior Backbone Optical Fiber Cabling: TIA-492CAAA, TIA-492E000, TIA-492AAAA-A, TIA-492-AAAB, TIA-42D000-A, ICEA S-87-640, ANSI/TIA/EIA-568-C.3, UL 1666, and NFPA 70. Exterior backbone cabling shall be suitable for overhead and underground duct applications within wet locations. Cable jacket shall be imprinted with the manufacturer, fiber count, fiber type, and aggregate length at regular intervals not to exceed 40-

inches. The cable cordage jacket, fiber, unit, and group color shall be in accordance with ANSI/TIA/EIA-598-C.

- a. Single mode optical fiber, minimum 12-strands, 8/125-micron indoor/outdoor rated loose tube gel-free fiber optic cable with a nonconductive optical fiber plenum (OFNP) or a nonconductive optical fiber riser (OFNR) rating in accordance with NFPA 70. Type OFNP cable may be substituted for type OFNR cables.
 - b. Multi-mode optical fiber, minimum 12-strands, 50/125-micron, laser optimized (OM3) indoor/outdoor rated loose tube gel-free fiber optic cable with a nonconductive optical fiber plenum (OFNP) or a nonconductive optical fiber riser (OFNR) rating in accordance with NFPA 70. Type OFNP cable may be substituted for type OFNR cables. Multi-mode optical fiber, as a minimum, shall have a 3500/500 MHz-km modal bandwidth, capable of supporting 10Gigabit Ethernet (10GBASE-SR up to a minimum distance of 400-meters, and conforms to ANSI/TIA/EIA-492AAAA or AAAB standard.
2. Exterior Telephone Backbone Cabling: UL444, FCC Part 68 compliant. Exterior telephone backbone cabling shall be suitable for direct burial and underground duct applications within wet locations. Copper backbone cable shall be a filled cable insulated with a solid polyolefin insulation, a corrugated coated aluminum shielding, and an overall black polyethylene jacket and shall be manufactured to RDUP PE-39 standards. Copper backbone cable shall have solid conductor 24-AWG, 100-ohm, Category-3 UTP, pair counts as required. Pairs shall be formed into 25-pair binder groups covered with a thermoplastic jacket. Cable shall be imprinted with manufacturer's name or identifier, gauge of conductor, transmission performance rating (category designation) at regular intervals not to exceed 2-feet. Color coding shall comply with industry standard for 25-pair cables. Superior Essex SEALPIC-F (RDUP PE-39) or approved equivalent.

C. Interior Backbone Cabling:

1. Interior Backbone Optical Fiber Cabling: ICEA S-83-596, ANSI/TIA-568.3-D, UL 1666, and NFPA 70. Cable jacket shall be imprinted with the fiber count, fiber type, and aggregate length at regular intervals not to exceed 40-inches. The cable cordage jacket, fiber, unit, and group color shall be in accordance with ANSI/TIA/EIA-598-C.
 - a. Single mode optical fiber, strand count as noted, 8/125-micron indoor/outdoor rated loose tube gel-free fiber optic cable with a nonconductive optical fiber plenum (OFNP) or a nonconductive optical fiber riser (OFNR) rating in accordance with NFPA 70. Type OFNP cable may be substituted for type OFNR cables.
 - b. Multi-mode optical fiber, strand count as noted, 50/125-micron, laser optimized (OM4) indoor/outdoor rated loose tube gel-free fiber optic cable with a nonconductive optical fiber plenum (OFNP) or a nonconductive optical fiber riser (OFNR) rating in accordance with

NFPA 70. Type OFNP cable may be substituted for type OFNR cables. Multi-mode optical fiber, as a minimum, shall have a 3500/500 MHz-km modal bandwidth, capable of supporting 10Gigabit Ethernet (10GBASE-SR up to a minimum distance of 400-meters, and conforms to ANSI/TIA/EIA-492AAAA or AAAB standard.

2. Interior Telephone Backbone/Riser Cabling: UL444, FCC Part 68 compliant. Copper backbone cable shall be solid conductor 24-AWG, 100-ohm, Category-3 UTP, pair counts as required. Pairs shall be formed into 25-pair binder groups covered with a thermoplastic jacket. Cable shall be imprinted with manufacturer's name or identifier, flammability rating, gauge of conductor, transmission performance rating (category designation) at regular intervals not to exceed 2-feet. Provide communications plenum (CMP) or riser (CMR) rated cabling in accordance with NFPA 70. Plenum rated (CMP) cable may be substituted for CMR cabling. Color coding shall comply with industry standard for 25-pair cables.

D. Horizontal Cabling:

1. Horizontal Voice/Data Cabling: Comply with NFPA 70, NEMA WC 63.1, ICEA S-90-661 and performance characteristics in ANSI/TIA-568.1-D.
 - a. Horizontal UTP Copper: ANSI/TIA-568.2-D, NFPA 70, UTP (unshielded twisted pair), 100-ohm. Provide four each individually twisted pair, minimum 24 AWG conductors, Category-6, plenum (CMP) rated with a PVC jacket. Cables and connectors shall be color coded and labeled as indicated.

2.04 TELECOMMUNICATIONS OUTLET BOXES

- A. As specified in Section 16100 – ELECTRICAL WORK. Mount flush in new finished walls at height specified for outlet receptacles. Depth of boxes shall be large enough to allow manufacturers' recommended conductor bend radii.

2.05 TELECOMMUNICATIONS OUTLET/CONNECTOR ASSEMBLIES

- A. Outlet/Connector UTP Copper: Outlet/connectors shall comply with FCC Part 68.5, ANSI/TIA-568.1-D, and ANSI/TIA-568.2-D.
 1. Telephone/Data outlet/connectors shall be UL1863 listed, non-keyed, 8-pin modular, constructed of high impact rated thermoplastic housing and shall be third party verified and shall comply with ANSI/TIA-568.2-D Category-6 requirements. Outlet/connectors provided for UTP cabling shall meet or exceed the requirements for the cable provided. Outlet/connectors shall be terminated using a Type 110 IDC PC board connector, color-coded for both T568A and T568B wiring. TSA IT outlet/connectors shall be wired T568B.

UTP outlet/connectors shall comply with ANSI/TIA-568.2-D for 200 mating cycles.

- B. Cover Plates: Telecommunications cover plates shall comply with UL 514C, ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, and ANSI/TIA-568.3-D; flush design constructed of 302 stainless or brass material to match electrical receptacles. Stenciled lettering for voice and data circuits shall be provided using thermal ink transfer process.
- C. Optical Fiber Connectors: EIA/TIA-455-21-A. Optical fiber connectors shall be duplex LC, epoxyless crimp style compatible with fiber optic cable to which it will be terminated. The connectors shall utilize a zirconia ceramic ferrule. The connectors shall provide a maximum attenuation of 0.3 dB @ 1300 nm with less than a 0.2 dB change after 500 mating cycles.
- D. 110 Connector Blocks: Provide insulation displacement connector (IDC) Type 110 for Category 5e and higher systems. Provide blocks for the number of horizontal and backbone cables terminated on the block plus 25 percent spare.
- E. UTP Copper Patch Panels: Provide in accordance with ANSI/TIA-568.1-D and ANSI/TIA-568.2-D. Panels shall be third party verified and shall comply with EIA/TIA Category 6 requirements. Panels shall be constructed of 0.09-inch minimum aluminum and shall be rack mounted and compatible an EIA compliant 19-inch equipment rack. Panel shall provide 48 non-keyed, 8-pin modular ports wired to T568B for patch panels within TSA Equipment Cabinets. Patch panels shall terminate the building cabling on Type 110 IDCs and shall utilize a printed circuit board interface. The rear of each panel shall have incoming cable strain-relief and routing guides. Panels shall have each port factory numbered and be equipped with laminated plastic nameplates above each port.
- F. Optical Fiber Patch Panels: Provide panel for maintenance and cross-connect of optical fiber cables. Panel shall be constructed of 18-gauge steel or 11-gauge aluminum minimum and shall be rack mounted and compatible with an EIA compliant 19-inch equipment rack. Each panel shall support a minimum of 24-strands configured as 12-strand adapters as duplex "LC" in accordance with ANSI/TIA/EIA-604-3A with zirconia ceramic alignment sleeves. Provide dust cover for unused adapters. The rear of each panel shall have a cable management tray a minimum of 8-inches deep with removable cover, incoming cable strain-relief and routing guides. Panels shall have each adapter factory numbered and be equipped with laminated plastic nameplates above each adapter.

2.06 EQUIPMENT CABINETS/RACKS

- A. Provide in accordance with EIA-310-D and UL 50.
- B. Freestanding Equipment Cabinet, 7-foot high freestanding modular type, 16-gauge steel or 11-gauge aluminum construction minimum, treated to resist

corrosion. Cabinet shall have removable and lockable side panels, front and rear doors, and have adjustable feet for leveling. Cabinet shall be vented in the roof and the rear. Cabinet shall have cable access in the roof and base and be compatible with standard EIA 19-inch rack mounted equipment. Provide cabinet with full height vertically mounted rack grounding busbar, roof mounted 550 CFM fan with filter and a vertical power strip with minimum twenty (20) 120-volt 15-amp receptacles and 10-foot cord set.

- C. Wall Mounted Equipment Cabinet, UL listed, modular type (height as noted on construction documents), minimum 16-gauge steel construction, treated to resist corrosion. Cabinet shall have lockable front door with tinted viewing window, louvered side panels, 250 CFM roof mounted fan, grounding lug, and top and bottom cable access. Cabinet shall include a backbox, approx. 5-inch deep, to terminate conduit entries. Cabinet shall be compatible with 19-inch panel mounting. All cabinets shall be keyed alike within Comm Room. A surge protected power strip with a minimum 6 duplex 20 amp receptacles shall be provided within the cabinet. Chatsworth CUBE-IT or approved equivalent.
- D. Horizontal Cable Management, 1RU or 2RU as noted, open ring-style or closed trough, single sided for standard 19-inch equipment rack, aluminum construction, and black. Provide 1U of horizontal cable management for every 1U of patch panels within equipment cabinets/racks.

2.07 BACKBOARDS

- A. Provide void-free, interior A/C grade plywood 3/4 inch thick and sized as noted on the drawings. Backboards shall be installed with the A-grade face of plywood facing into the telecommunications room and the fire stamp visible. Backboards shall be FRT rated and covered with two coats of gray or a lighter color, nonconductive, fire-retardant paint. Do not cover or paint over the fire stamp on the backboard.

2.08 GROUNDING AND BONDING PRODUCTS

- A. Comply with UL 467, ANSI/TIA-607-C, and NFPA 70. Components shall be identified/labeled as required by ANSI/TIA-606-C.

2.09 IDENTIFICATION

- A. Provide nameplates for equipment/telecommunications rooms doors, telecommunications cabinets and large telecommunications distribution junction boxes (6-inches and larger). Provide equipment nameplates in accordance with Section 16100 – ELECTRICAL WORK.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Telecommunications cabling and pathway systems, including the horizontal and backbone cable, pathway systems, telecommunications outlet/connector assemblies, and associated hardware shall be installed in accordance with ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, ANSI/TIA-568.3-D, ANSI/TIA-569-C, NFPA 70, and UL standards as applicable. Telecommunications infrastructure for TSA IT systems shall be provided in accordance with TSA Structured Cabling System Guidelines. Cabling shall be connected in a star topology network. Daisy chaining cables between outlets is not acceptable. Metal raceway bases, covers, and dividers shall be bonded and grounded in accordance with ANSI/TIA-607-C.
1. Cabling: Install UTP and optical fiber telecommunications cabling and pathway system as detailed in ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, and ANSI/TIA-568.3-D. Screw terminals shall not be used except where specifically indicated on plans. Use an approved insulation displacement connection (IDC) tool kit for copper cable terminations. Do not untwist UTP cables more than one half inch from the point of termination to maintain cable geometry. Provide service loop on each end of the cable, minimum 10-feet unless otherwise noted, at each backboard location and in the electrical/telecommunications rooms. Do not exceed manufacturers' cable pull tensions for copper and optical fiber cables. Provide a device to monitor cable pull tensions. Do not exceed 25 pounds pull tension for four pair copper cables. Do not chafe or damage outer jacket materials. Use only lubricants approved by cable manufacturer. Do not over cinch cables, or crush cables with staples. For UTP cable bend radii shall not be less than six times the cable diameter.
 - a. Optical Fiber Backbone Cable. Install backbone optical fiber in indicated pathways. Do not exceed manufacturer's recommended bending radii and pull tension. Prepare cable for pulling by cutting outer jacket 10 inches leaving strength members exposed for approximately 10 inches. Twist strength members together and attach to pulling eye. Vertical cable support intervals shall be in accordance with manufacturer's recommendations.
 - b. Horizontal Cabling: Install horizontal cabling and pathway as indicated on drawings between electrical/telecommunications closet and telecommunications outlet assemblies. Horizontal cabling shall be homerun between outlet connector and patch panel within designated telecommunications room. Splicing of horizontal distribution cabling is not allowed. All horizontal cabling shall be terminated on a outlets/connector at the outlet location on one end and on cabinet/rack mounted patch panels within a telecommunications room on the other end.

- B. Pathway Installations: Comply with ANSI/TIA-569-D and associated addenda. Conceal conduit within finished walls and ceilings, where possible. Keep conduit minimum 6 inches away from parallel runs of electrical power equipment, flues, steam, and hot water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit is visible after completion of project.
- C. Work Area Outlets:
 - 1. Terminations: Terminate UTP cable in accordance with ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, and wiring configuration as specified. Terminate fiber optic cables in accordance with ANSI/TIA-568.3-D.
 - 2. Faceplates: As a minimum, each jack shall be labeled as to its function and a unique number to identify cable link.
 - 3. Cables: Unshielded twisted pair shall have a minimum of 6 inches of slack cable loosely coiled into the telecommunications outlet boxes. Minimum manufacturer's bend radius for each type of cable shall not be exceeded.
 - 4. Pull Cords: Pull cords shall be installed in all conduits which do not initially have cable installed.
- D. Telecommunications Room Terminations: Install termination hardware required for copper and optical fiber system. An insulation displacement tool shall be used for terminating copper cable to insulation displacement connectors.
- E. Grounding and Bonding: In accordance with ANSI/TIA-607-C, and NFPA 70.

3.02 LABELING

- A. Labels: All labels shall be in accordance with labeling scheme indicated on drawings and also in accordance with ANSI/TIA-606-C and the latest version of the DOT-A Airports Building Design Standards. Handwritten labeling unacceptable. Stenciled lettering for voice and data cables shall be provided using either thermal ink transfer process or laser printer.
- B. Cable: All cables shall be labeled using color labels on both ends with identifiers as indicated on the drawings.
- C. Termination Hardware: All communication outlets and patch panel connections shall be labeled using color coded labels with identifiers as indicated on the drawings.
- D. Passive telecommunications infrastructure components and cabling shall be labeled and identified in accordance with labeling scheme indicated on drawings and also in accordance with ANSI/TIA-606-C and as required by the latest version of the DOT-A Airports Building Design Standards.
- E. TSA IT infrastructure shall be labeled and identified in accordance with labeling requirements identified in TSA Structured Cabling System Guidelines.

- F. DOT-A telecommunications distribution conduits and junction boxes in back of house (non-public) areas shall be painted orange to match Fuller O'Brien B-123 Burnt Orange in accordance with DOT-A Airports Building Design Standards. All telecommunications pathways (conduits, cable trays, etc.) shall be labeled at not more than 8-feet on center and at each side of every junction. Color coded labeling scheme shall be utilized in accordance with DOT-A Airports Building Design Standards.

3.03 TESTING

- A. Telecommunications Cabling Testing: Perform telecommunications cabling inspection, verification, and performance tests in accordance with ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, and ANSI/TIA-568.3-D.
- B. Inspection: Visually inspect cabling jacket materials for UL or third party certification markings. Visually inspect UTP and optical fiber jacket materials for UL or third party certification markings. Inspect cabling terminations at backboards and at outlets to confirm color code for tip and ring pin assignments, and inspect cabling connections to confirm compliance with ANSI/TIA-568.1-D, ANSI/TIA-568.2-D, and ANSI/TIA-568.3-D. Visually confirm marking of outlets, wallplates, outlet/connectors, and patch panels.
- C. Verification Tests:
 - 1. Telephone cabling shall be tested for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors, and between conductors and shield, if cable has overall shield. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connected.
 - 2. Perform optical fiber end to end attenuation tests using an optical time domain reflectometer (OTDR) and manufacturer's recommended test procedures. Perform tests in accordance with ANSI/TIA/EIA-526-7, Method B for single mode optical fiber and ANSI/TIA/EIA-526-14A, Method B for multi-mode optical fiber. Perform verification acceptance tests and factory reel tests. Maximum acceptable end-to-end limit for optical loss (fiber optic cabling) of 7.5dB for multi-mode fiber and 10.5dB for single-mode fiber.
- D. Performance Tests:
 - 1. Perform testing for each outlet.
 - 2. Perform Category-6 link tests in accordance with ANSI/TIA/EIA-568-C.1 and ANSI/TIA/EIA-568-C.2. Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay, and delay skew
 - 3. Optical fiber Links: Perform bi-directional optical fiber end to end attenuation tests and reel tests at jobsite.

- E. Final Verification Tests: Perform verification tests for UTP and optical fiber systems after the complete telecommunications cabling and workstation outlet/connectors are installed. These tests assume that dial tone service has been installed.
1. Connect to the network interface device at the demarcation point.
 2. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local and long distance telephone call.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Cost Allowance – State (DOT-A) Tel/Data Connections, Cost Allowance – Commercial Utility, Tel/CATV Service Charges, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for Cost Allowance – State (DOT-A) Tel/Data Connections, and Cost Allowance – Commercial Utility, Tel/CATV Service Charges required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16740.1	Building Telecommunications Systems	Lump Sum
16740.2	Cost Allowance – State (DOT-A) Tel/Data Connections	Allowance
16740.3	Cost Allowance – Commercial Utility Tel/CATV Service Charges	Allowance

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 PRICE.

END OF SECTION

SECTION 16750 – ACCESS CONTROL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Provide all Work as detailed in the Contract Documents as a turnkey installation including all material, labor, warranties, freight and permits. Only items and requirements specifically stated to be provided by others shall not be a requirement for this Section of the Work.
- B. The Work is an expansion/addition to an existing Physical Access Control System. It shall be the responsibility of the Security Contractor to provide their system based on the guidelines and requirements contained in these Contract Documents and translate them into a complete installation proposal containing all elements necessary for a complete, operational and functionally integrated System.
- C. The Work shall include installation and commissioning of the following:
 - 1. ACS Intelligent Field Panels, Input/Output and Reader Modules
 - 2. Power Supplies
 - 3. Card Readers
 - 4. Miscellaneous Detection and Audible/Visual Devices
 - 5. Interfaces to other Work.
 - a. Access Control / Fire Alarm System
 - b. Access Control / Motorized Door Operators
 - c. Access Control / Video Surveillance System
 - d. Access Control/ Intrusion Detection
 - e. Security System / Security LAN
 - f. Security system power supply supervision / Access Control
 - 6. Wire and cable as required, for installing all equipment as specified herein.
 - 7. Miscellaneous conduit and back boxes not shown on the Security Drawings but required for a complete installation.

1.03 REFERENCES

- A. State:
 - 1. The State's General Conditions shall be considered as forming an integral part of the Specification and shall be carefully examined before proposals for any Work are submitted. Unless this Section contains statements, which are more definitive or more restrictive than those contained in the State's General Conditions, this Specification shall not be interpreted as

waiving or overruling any requirements expressed in the General Conditions of the contract.

2. The Work is critical to the security of the State's facility. All plans, Specifications and other documentary material and information about the Work are considered Security Sensitive Information (SSI) under CFR49 Part 1520 and must remain secure and confidential at all times. Confidential information must not be deliberately or inadvertently disclosed to anyone other than the Security Contractor's personnel and subcontractors who require disclosure to perform their portion of the Work. The Security Contractor shall keep track of all confidential information at all times and shall ensure that all copies are accounted for at all times. The Security Contractor shall not permit any persons to have access to the confidential information of the Work unless and until the Security Contractor has assured itself of the trustworthiness of such persons.

B. Supplemental Conditions:

1. The Security Contractor represents that he/she is familiar with and has expertise in the Work of this nature and scope and has the appropriate licenses to perform the work.
2. The Security Contractor further agrees to provide the work described in the specifications but not shown on the drawings, and work shown on the drawings but not described in the specifications, as though expressly required by both.
3. The Security Contractor shall comply with all of the legal regulations, including safety regulations and regulations of municipal, city, local, and other government agencies having jurisdiction concerning the Work of the Security Contractor. The Security Contractor shall give all notices and comply with all laws, ordinances, codes, rules, and regulations bearing on the conduct of the Work. If the Security Contractor performs any Work, which is contrary to such laws, ordinances, codes, rules and regulations, they shall make all changes to comply therewith and bear all costs arising there from.
4. Because Drawings are, in general, diagrammatic, the Security Contractor shall coordinate all installations with the State or their authorized agent, based on the field conditions. The contractor represents that by submitting their proposal they are familiar with the field conditions at the facility and have based their firm price proposal on that knowledge.
5. All permits required for any part of the Security Contractor's Work shall be procured and paid for by the Security Contractor. The Security Contractor shall determine all permits required and transmit the required information to the Authority Having Jurisdiction. All persons working at the facility are required to be issued a security credential by the State. This credential requires finger printing and a background investigation be completed for each badge holder. All costs associated with obtaining and maintaining the issued security credentials are the responsibility of the contractor.
6. If the Security Contractor intends to utilize a subcontractor; the subcontractor shall comply with all the same rules, regulations, laws and codes, licenses, etc. as required by the Security Contractor and as specified herein. The State reserves the right to approve or disapprove any subcontractor proposed by Security Contractor.

C. Publications:

1. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.
2. Specific reference in Specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at date of Contract unless the Document is shown dated.
3. Comply with all local codes, and the requirements of the Authorities Having Jurisdiction.
4. Conflicts:
 - a. Between referenced requirements: Comply with the one (1) establishing the more stringent requirements.
 - b. Between referenced requirements and Contract documents. Comply with the one (1) establishing the more stringent requirements.
5. The Security System shall be installed in accordance with the most current version of and with all applicable revisions pertaining to all applicable national, state, and local codes and standards including, but not limited to the following:
 - a. Checkpoint Requirements and Planning Guide (CRPG)
 - b. 49CFR 1542 and all applicable and relevant Federal security regulations.
 - c. Americans with Disabilities Act (ADA).
 - d. Building Industry Consulting Services International (BICSI): "Electronic Safety and Security Design Reference Manual (ESSDRM)" and "Telecommunications Distribution Methods Manual" (TDMM).
 - e. Radio Technical Commission for Aeronautics (RTCA): "Standards for Airport Security Access Control Systems" (DO-230).
 - f. Building Officials & Code Administrators International, Inc. (BOCA) National Building Code.
 - g. National Fire Protection Association (NFPA), to include. Life Safety Code, (NFPA 101) and the National Electrical Code (NFPA 70).
6. Local, county, state and federal regulations and codes in effect as of date of contract shall be complied with.

1.04 DEFINITIONS

- A. The following shall serve as general definitions in addition to the definitions outlined in the State's General Conditions; the following definitions shall apply to this Section of the Work.
1. State: The State is the Hawaii Department of Transportation Airports Division (HDOT-A), and/or their designated representative.
 2. The Consulting Engineer is Faith Group, LLC.
 3. Security Contractor: The Security Contractor is the firm submitting a proposal to furnish and install the Work as defined herein.

4. Work: The term "Work" means all related labor, materials, equipment and services provided or to be provided by the Security Contractor to fulfill the specifications obligations.
5. Provide: Where the term "provide" is used throughout this Section of the Work, it means the Security Contractor is to "furnish and install."
6. Contract Documents: The Contract Documents shall consist of the following:
 - a. These Specifications in their entirety.
 - b. Drawings and plans herein referred to as Security Drawings.
 - c. Addenda, Bulletins, Drawings, and associated correspondence as may be authorized in writing and issued by the State, to interpret, clarify, or modify the Contract Documents.

B. Security System Acronyms:

1. Access Control System. (ACS)
2. Video Surveillance System. (VSS)
3. Intelligent Field Panel (IFP).
4. Door Interface Panel (DIP).
5. Request to Exit (REX).
6. Underwriters Laboratories (UL).
7. Uninterruptible Power Supply System (UPS).
8. Volts – Alternating Current (VAC).
9. Volts - Direct Current (VDC).
10. Security Screening Checkpoint (SSCP)

1.05 SUBMITTALS

A. Submittals provided by the contractor under this section are subject to the requirements of Specification Section 01330 – Submittals for this project. Where there is a conflict between that section and the requirements of this section, the more stringent will apply.

1. Phasing Plan: The Security Contractor shall submit to the State as part of their Submittals a Phasing Plan for evaluation and approval. The plan shall highlight the Security Contractor's methods for maintaining security at the site during construction of the new facility. The plan should discuss their experience in transitioning systems while maintaining operations. The plan shall also include discussions addressing the requirement for compatibility with the existing system and using as much of the existing infrastructure as possible in accordance with the State's desire to control costs. The plan must provide the lowest risk for disruption of normal operation to the State by maintaining continuity of security while controlling costs.

B. Pre-Fabrication:

1. Submit the Pre-Fabrication Data according to the Conditions of the Contract but in no case later than forty-five (45) days after the notice to proceed.
2. Pre-fabrication Submittals shall consist of Product Data, Shop Drawings, and a Detailed Schedules. Partial submittals will not be accepted without

- prior written approval from the Consulting Engineer or designated alternate.
3. No portion of the Work shall commence nor, shall any equipment be procured until the Consulting Engineer or designated alternate has approved the Pre-fabrication Submittals in writing. All Work shall be in accordance with the manufacturer's installation instructions.
 4. A letter of transmittal identifying the name of the Project, Security Contractor's name, date submitted for review, shall accompany pre-fabrication Submittals and a list of items transmitted.
- C. Product Data required as part of the Pre-fabrication Submittal shall include the following:
1. Submit manufacturer's data on System components including, but not limited to, electrical Specifications, mechanical Specifications, rough-in diagrams, and instructions for installation, operation, and maintenance.
 2. The Security Contractor shall submit catalog cut sheets that include Warranty information, manufacturer, trade name, and complete model number for each product specified. Literature sheets containing more than one (1) device or component model number shall be clearly marked to delineate items included in the Work. Model number shall be encircled and/or indicated with an arrow to indicate exact selection. Identify applicable Specification Section reference for each product. Product data sheets shall be delivered initially in electronic .PDF format with each product submitted as an individual file.
 3. Equipment schedules listing all system components, the manufacturer, model number and the quantity of each along with a general functional description for each system component.
 4. A complete list of cable and wiring types and sizes, as well as the manufacturer and model number for each.
 5. A complete list of finishes and graphics.
 6. List of the maintained parts inventory to provide service and maintenance of the systems following installation and commissioning.
- D. Shop Drawings shall include the following:
1. Floor plan drawings indicating device locations with device legends indicating manufacturers and model numbers for each device.
 2. System riser diagram with all devices, wire runs and wire designations.
 3. Schematic block diagrams for each system showing typical equipment interconnect data flow, etc.
 4. Wiring diagrams for each subsystem defining the interconnection of all inputs and outputs for all equipment.
 5. Wiring diagram for fail-safe release of electric locking mechanical devices.
 6. Fabrication Shop Drawings for all custom equipment mounting (if applicable).
 7. Plans and elevations of the security console(s) and equipment racks quantifying all equipment to be mounted therein and including notes detailing the fabrication of such. All materials, methods for construction and finishes shall be fully detailed.
 8. Elevations of security closet layouts showing panel locations, power supply locations, conduit, wire ways, wire molds, and all other equipment to be

mounted at that location.

9. Parts Lists: Provide complete parts lists and breakdowns that identify each component (to the lowest repairable unit) as well as ordering information. The characteristics of each component shall also be shown, where applicable, to aid in obtaining substitute parts.

E. Detailed Project Schedule shall include the following:

1. The Security Contractor will develop and submit a sufficiently detailed CPM (Critical Path Method) schedule prepared in MS Project that identifies the activities and deliverables that are included within the scope of their proposal. This schedule shall include and make visible as many of the following elements that apply to their proposal including but not limited to:
 - a. Key Milestones
 - b. Deliverable(s)
 - c. Activities
 - d. Procurement
 - e. Durations
 - f. Activities
 - g. Milestones
 - h. Lead Times
 - i. Dates
 - j. Forecast Start (Start)
 - k. Forecast Finish (Finish)
 - l. Dependencies
 - m. Predecessors
 - n. Successors
2. The proposal schedule submittal shall have the following fields exposed and be printed on paper of sufficient size so that the contents of these fields and the Gantt Chart are clearly legible:
 - a. Activity ID (ID)
 - b. Activity Name (Task Name)
 - c. Duration (in Days)
 - d. Start Date (Start)
 - e. Finish Date (Finish)
 - f. Predecessor
 - g. Successor
 - h. Gantt Chart

F. Procedure for Resubmitting:

1. Make corrections or changes in Product Data, Shop Drawings, and/or Samples as required by the Consulting Engineer or designated alternate and resubmit when stamped as requiring re-submittal.
2. Clearly identify changes made other than those specifically requested by the Consulting Engineer or designated alternate when resubmitting Shop Drawings. Changes shall be clouded or similarly highlighted as

coordinated with the State. Only changes that have been specifically requested by the Consulting Engineer or designated alternate or have been clouded by the Security Contractor will be reviewed on re-submittals.

3. Any drawing sheets added to the re-submittal shall be clearly identified and clouded and shall not change the sheet numbering scheme for previously issued Shop Drawings.
4. The Security Contractor shall be responsible for any delays caused by the re-submittal process.
5. If the State or their designated representative rejects the Security Contractor's Prefabrication Submittal (Rejected, Revise and Resubmit), the State will be compensated for their time spent on all subsequent reviews beyond the second review, whether partial or comprehensive. The amount of such compensation will be incorporated by Change Order and withheld from the Security Contractor's Application for Payment.

G. Field Mark-Up Document:

1. Field-Record Documentation shall include all information required in the Pre-fabrication Submittals but revised to reflect "as installed" conditions. The documents shall be updated daily to reflect the most recent installation activity. The documents shall be kept on-site and be made available for inspection by the Consulting Engineer or designated alternate.
2. Thirty (30) days prior to the Final Acceptance testing, submit one (1) copy of the Field Drawings to the Consulting Engineer or designated alternate. This copy shall be used during the Final Acceptance testing by the Consulting Engineer or designated alternate.
3. Update all documentation to reflect changes or modifications made during final acceptance testing as required and submit three (3) blue / black line sets as part of the Record Documents.

H. Record Drawings:

1. Record Documentation shall consist of "As-Built" Drawings and Operation and Maintenance Manuals. The Record Documentations shall be submitted to the Consulting Engineer or designated alternate within forty-five (45) days after final acceptance.
2. Produce all Record Drawings using the latest version of AutoCAD. Record Drawings shall, at a minimum, include the following:
 - a. Floor plan drawings indicating device locations, with device legends indicating manufacturers and model numbers for each device.
 - b. Floor plan drawings indicating wire routing. Wire routing shall be delineated in straight line runs and be tagged with cable identification and terminal strip numbers to coincide with the installation.
 - c. Mounting details for all equipment and hardware.
 - d. Functional block diagrams for each subsystem.
 - e. Wiring details showing rack elevations, equipment wiring and terminations, and inter-rack wiring.
 - f. Wiring diagrams for all custom circuitry including interfaces to various control output-controlled devices, i.e. overhead doors,

- automatic sliding doors, parking gate operators, fire alarm system interface, etc.
- g. Wiring diagrams for each data gathering panel (IFP). Wiring diagrams shall be identical to those laminated and located with each IFP.
 - h. Typical point-to-point wiring diagrams for each piece of equipment and groups of equipment within the system.
 - i. Layout details for each riser location, including security panels, power supplies, junction boxes, conduit, and any other security related equipment.
- I. Operation and Maintenance Manuals:
- 1. Intent: The intent of this Section is to require complete documentation of each System for the purpose of system operation and maintenance during and after the Warranty period. It is intended that the operation and maintenance manuals be exhaustive in the coverage of the system to the extent that they may be used as the sole guide to the troubleshooting, identification, and repair of defective parts.
 - 2. Scope: The Security Contractor shall comply with the terms of the contract but in no case provide the State with less than two (2) complete drawing books and maintenance and operation manuals on the completed system hardcopy and six (6) copies of the drawing books and maintenance and operations manuals in PDF format. These manuals shall include basic wiring diagrams, schematics, and functional details such that any component, wire, or piece of equipment in the system may be easily identified by going to the actual equipment and making reference to this manual. It is required that everything in the system be neatly labeled and easily identifiable. Every terminal, wire, component, or piece of equipment, relay, and other such items shall have a number or letter designation. All these identification characteristics shall be included in the maintenance and operation manuals.
 - 3. The maintenance manual requirement of this Section is in addition to Shop Drawing requirements. Maintenance manuals and drawing sets shall be compiled after system fabrication and testing and shall incorporate any changes made after Shop Drawing submittal. The maintenance manuals and drawing books shall be permanently bound in hard plastic covers.
 - 4. Maintenance Manuals, Manufacturer's Literature: Provide manufacturer's standard literature, covering all equipment included in the system. The maintenance manuals shall contain Specifications, adjustment procedures, circuit schematics, component location diagrams, and replacement parts identification. All references to equipment not supplied on this Project shall be crossed out.
 - 5. Provide Pulling/Terminating operation Record and CMS (Cable Management System): As-Built required cable data to be provided to the State as part of the O&M Manuals. An electronic record shall be in an Excel spreadsheet format and supported by Revit drawings. Security Contractor shall be responsible for any delays due to improper documentation or failing to submit within the prescribed time frame.
 - 6. Drawing Books: All Drawings developed specifically for this Project shall be reduced to 11" X 17", folded and bound with hard plastic covers. The 11" X 17" Drawings provided shall be easily readable after printing, even if

this requires breaking large drawings into several parts. Text shall be no smaller than 1/16-inch. The Drawing book documents shall be produced with AutoCAD and the electronic files shall be provided to the State at the completion of the project. Provide component identification and cross reference on the Drawings to allow the maintenance department to understand the function of each item (the block diagram), find the room where the device is mounted (Contract document plans), find its location in a rack (arrangement drawings), find how it is wired (wiring diagrams), and its detailed Specifications (vendor data sheets), and how to repair it (spare part lists). Include the following drawings as a minimum:

- a. Functional Block Diagram: Provide an overall block diagram showing the major interconnections between subsystems.
 - b. Arrangement Drawings: Provide drawings showing the physical arrangement of all major system components. This shall include:
 - c. Elevation drawings of all equipment racks showing the location of each component in the racks. Components in the racks shall be identified as in the functional block diagrams.
 - d. Wiring Diagrams: Provide wiring diagrams showing all field installed interconnecting wiring. Wire identification on the diagrams shall agree with the wire markers installed on the equipment.
7. Spare Parts Lists: Submit lists for manufacturer recommended field replaceable modules to maintain the complete system with a minimum of downtime. This list shall include part names, part numbers, and source for additional purchase. The part list shall be cross-referenced to the functional block diagrams and the product data.
 8. Special Tools List: Submit a list of special tools required to maintain the systems. Include on the list the name, part number, and source for all special tools. Special tools are defined as a tool that cannot be purchased at a normal retail hardware department.
 9. Special Test Equipment: Submit a list of special test equipment required to prove that all system components are functioning per the Specifications. Special test equipment is defined as a device that cannot be purchased at a normal retail outlet.
 10. Operation and Maintenance Manuals shall apply to all security related devices, equipment, and software modules.
 11. Operation and Maintenance Manuals shall also include, at a minimum, the following:
 - a. Explanations of subsystem interrelationships. Explanations shall include operations of each subsystem and operations unique to the interfaces between each of the subsystems and possible conflicts that may occur with the interfaces. Each explanation shall be identified, tagged, bound, and indexed into a single binder.
 - b. Power-up and power-down procedures for each subsystem.
 - c. Description of all diagnostic procedures.
 - d. A list of manufacturers, their local representatives and subcontractors that have performed Work on the Project. The list shall include contact names, phone numbers and addresses for each.
 - e. Installation and service manuals for each piece of equipment.

- f. Maintenance schedules for all installed components. Schedules shall include inspections and preventative maintenance schedules, and documentation of all repaired or replaced equipment.
12. Operation and Maintenance Manuals shall be formatted as follows:
- a. Bind each manual in a hard-back loose-leaf binder.
 - b. Identify each manual's contents on the cover.
 - c. Provide a table of contents and tabulated sheets for each manual. Place tab sheets at the beginning of each chapter or section and at the beginning of each appendix if applicable.
 - d. Any hardware manual demonstrating more than one model number of devices on any one page shall be clearly marked as to delineate which model has been implemented in the Work.
13. Operation and Maintenance Manuals shall include a separate section for each software program incorporated into the Project. The software section shall include, at a minimum, the following information:
- a. Definitions of all software related terms and functions.
 - b. Description of required sequences.
 - c. Directory of all disk files.
 - d. Description of all communications protocols, including data formats, command characters, and a sample of each type of data transfer.
 - e. Instructions for manufacturer supplied report generation with illustrations showing what reports should look like and screen by screen illustrations for each entry made.
 - f. Instructions for custom report generation.
 - g. Database format and data entry requirements.

J. Procedure for Resubmitting

- 1. Make corrections or changes in O & M and/or Record Drawings as required by the State and resubmit when the State's stamp requires re-submittal.
- 2. Clearly identify changes made other than those specifically requested by the State when resubmitting Record Drawings. Changes shall be clouded or similarly highlighted as coordinated with the State. Only changes that have been specifically requested by the State or have been clouded by the Security Contractor will be reviewed on re-submittals.
- 3. Any drawing sheets added to the re-submittal shall be clearly identified and clouded and shall not change the sheet numbering scheme for previously issued Record Drawings.
- 4. The Security Contractor shall be responsible for any delays caused by the re-submittal process.

5. If the State rejects the Security Contractor's Record Submittal (Rejected, Revise and Resubmit), the State will be compensated for their time on all subsequent reviews beyond the second time, whether partial or comprehensive. The amount of such compensation will be incorporated by Change Order and withheld from the Security Contractor's Application for Payment.

1.06 QUALITY ASSURANCE

A. Security Contractor Qualifications

1. Security Contractor shall be recognized by the manufacturer of the equipment being provided under this contract as a "top tier" dealer. Furthermore, the contractor shall have on their team for the duration of the project a certified network engineer to provide planning and configuration of all operating systems, database programs, network equipment and other data processing equipment.
2. Work specified herein shall be the responsibility of a single electronic security systems integration contractor.
3. The Security Contractor shall have local in-house Engineering and Project Management capabilities consistent with the requirements of the Work. The Security Contractor shall provide a full-time Project Manager who is to be present on site at all times that Work is actively in progress. This person shall be the same individual throughout the course of the Project and shall be the person responsible for direct supervision coordination and scheduling of all subcontract labor (as applicable). Should it be necessary to assign a new project manager during the project, the State reserves the right to approve the replacement Project Manager.
4. By submitting a Bid, the Security Contractor thereby certifies that it is qualified in all areas pertaining to, either directly or indirectly, the Work. In the event the Security Contractor becomes unable to complete the Work in accordance with the Contract Documents, or the satisfaction of the State or its representatives, due to a lack of understanding of equipment, systems or services required by the Contract Documents, it shall be the responsibility of the Security Contractor to retain the services of the applicable manufacturers' representatives to expeditiously complete the Work in accordance with the State's construction schedule with no additional cost to the State.
5. The Security Contractor shall maintain, or establish and maintain, a fully staffed office including a service center capable of providing comprehensive maintenance and service to the Security System for the Project. The Security Contractor shall staff the service center with factory trained technicians and adequately equip the office to provide emergency service within three (3) hours after being called, twenty-four (24) hours per day, whether the State elects to purchase a maintenance contract from the Security Contractor.
6. The Security Contractor shall provide factory-certified technicians to install, commission, and maintain the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.
7. The Security Contractor shall ensure compliance with, and have a thorough understanding of, all local codes and contract conditions pertaining to this Project.

1.07 PRODUCT STANDARDS:

- A. Provide at the time of installation the latest Commercial-Off-The-Shelf (COTS) version of all equipment and software. Discontinued or prototype equipment shall not be acceptable.
- B. Provide equipment suitable for the purpose for which it was manufactured. Field modifications made to adapt equipment for purposes other than what it was manufactured shall not be permitted.

1.08 CERTIFICATIONS

The Security Contractor warrants that he/she and his/her subcontractors are licensed by the State and as required by local ordinances prior to engaging in any construction or installation work.

1.09 DELIVERY, STORAGE AND HANDLING

- A. All risk of loss or damage to materials shall rest with the Security Contractor until delivery of equipment to an on-site designated delivery and storage location. Materials will be subject to inventory by the State upon delivery and anytime thereafter without warning or notification.
- B. The Security Contractor shall be responsible to provide and maintain his/her own storage facility. If this storage facility is required to be on-site it shall be the Security Contractor's responsibility to coordinate the size and spatial requirements with the State and/or their representatives. The Security Contractor shall assume full responsibility for their storage facility and all contents therein, unless otherwise indicated by the State.
- C. The Security Contractor shall examine the site and the Contract Documents and review with the State the designated areas of access, delivery, and storage for the Security Contractor's use. The Security Contractor agrees that such areas are satisfactory and sufficient for his/her needs in the prosecution of his Work in conformance with the terms of this Contract.

1.11 PROJECT SITE CONDITIONS

Existing Conditions: Existing Conditions: Hawaiian Airlines shall be engaged in the construction of a Security Screening Checkpoint (SSCP), which shall be coordinated / constructed by one or more General Contractors and / or Special Contract Groups. The Security Project Contractor shall be required to coordinate their scope of work with one or more Contractors for such things as locking hardware, power, and conduit requirements. The State currently operates network-based security systems using physically discrete hardware and shared backbone communications infrastructure. The contractor shall be responsible for integrating the work under this contract with the existing ACS, including any additional door interface licenses for the existing systems to accommodate the work described in this project. This shall in no way impact the requirement for installation of a complete and operational ACS since all work shall be considered as forming an integral part of those systems defined herein.

1.12 SEQUENCING & SCHEDULING

- A. The Security Contractor shall review the State's construction and completion schedules for the construction of the terminal building and shall coordinate execution of the scope of work as defined in this document and all other Security Contract Documents with all other contractors and service providers engaged by the State and their representatives for work related to this facility.
- B. The installation of the new ACS shall be done in a manner to avoid extended Security System outages. The contractor must schedule any required short duration outages with the State a minimum of five (5) days in advance to allow for alternative security arrangements to be made. Each scheduled system outage must include an estimate of the approximate down time for the system and a written plan for providing back-up security in the event the outage extends beyond the estimated service interruption.

1.13 WARRANTY

- A. Provide a one (1) year warranty on the Work. If, within one (1) year after the date of Final Acceptance of the Work or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the Work or equipment is found to be defective or not in accordance with the Contract Documents, the Security Contractor shall correct it promptly including all parts and labor after receipt of notice from the State to do so unless the State has previously given the Security Contractor a written acceptance of such condition. The State will give such notice promptly after discovery of the condition. Such notice shall be provided by State representatives, to be identified either verbally or in writing.
- B. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation, which the Security Contractor might have under the Contract Documents or any manufacturer's warranty. The establishment of the time period of one (1) year after the date of final acceptance of the Work or such longer period of time as may be prescribed by law or by the terms of any manufacturer's warranty or these contract documents relates only to the specific obligation of the Security Contractor to correct the Work or equipment, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Security Contractor's liability with respect to its obligations other than specifically to correct the Work or equipment.
- C. The one (1) year Warranty period shall begin upon final acceptance of the installed systems. For purposes of Warranty consideration, final acceptance shall be defined as the date on which the State formally acknowledges acceptance of the completed Work.
- D. Warranty Service: If defects in the materials and/or workmanship are identified during the Warranty period, the Security Contractor shall provide all labor, travel expenses and materials as may be required for prompt correction of the defect at no additional charge to the State.
- E. During the Warranty period, the Security Contractor shall, upon receipt of a

- request for service from the State, deploy service personnel to the State's premises and complete corrective action within twenty-four (24) hours of arriving on site.
- F. Repair or replacement service during the warranty period shall be performed in accordance with the following schedule:
 - 1. Seven (7) days, twenty-four (24) hour, three (3) hour on-site response time shall apply for major system failure. A major system failure is defined as a failure that causes multiple portions of a system to be unable to perform the task for which it was intended or creates a potential for an immediate security breach.
 - 2. Next business day response time shall apply for minor component and device failures.
 - 3. The State shall be the sole authority to define a failure as a major or minor system failure.
 - G. If the Security Contractor is unable to restore system operation during the warranty period within two (2) business days of a system failure, the State reserves the right to require the Security Contractor to provide on-site manufacturer's service technicians at no additional cost.
 - H. All Warranty service and repair work shall be performed by personnel, who have been trained, certified, and experienced in the operation and maintenance of the installed system(s).
 - I. Warranty service shall include the prompt replacement of all parts and/or components at no additional cost to the State and as required for restoring normal system operation. If system parts or components must be removed for repair, it shall be the responsibility of the Security Contractor to furnish and install temporary parts and/or components as required to restore normal system operation until the repaired parts or components can be repaired and re-installed.
 - J. It shall be the responsibility of the Security Contractor to maintain an inventory of spare parts or to arrange for manufacturer parts support as required to ensure correction of all critical component failures or malfunctions within twenty-four (24) hours of the State's request for service.
 - K. The Security Contractor's Warranty obligation shall include correction of any software/firmware defects, which may be identified during the Warranty period. Any failure of the software/firmware to perform as specified by the software/firmware manufacturer beyond the time of final acceptance shall be defined as a software/firmware error.
 - L. Immediately following the completion of a Warranty repair or service call, the Security Contractor's service personnel shall submit a written report to the State which details the service work performed, the cause of the trouble, and any outstanding work which is required to restore complete and normal operation.
 - M. The contractor shall provide for manufacturer direct technical support to the end user via telephone as well as any training required by the manufacturer to do so. This effort to self-support on the part of the Airport shall not relieve the contractor of any of their obligations under the terms of the warranty to provide service.

- N. As part of the warranty, the Security Contractor shall perform preventative maintenance during the warranty one (1) year period. The Security Contractor shall submit a list of manufacturers required items to be included in the preventative maintenance program. The list shall include maintenance to each item, the frequency of such maintenance, and the amount of time to be spent on each item for maintenance. As a minimum, preventative maintenance shall include, but not be limited to, the following.
1. Within five (5) days of the one-year anniversary of Final Acceptance the contractor shall perform Annual Preventative Maintenance as follows: Test all system sensors and devices provided under this contract for proper operation using procedures identical to those used for Final Acceptance Testing. Repair or adjust devices to restore system capabilities to those accepted at Final Acceptance Testing unless otherwise directed by the State. Prepare Annual Inspection Report detailing repairs and adjustments made during the Annual Preventative Maintenance visit.
 2. Within five (5) days of the six-month anniversary of Final Acceptance the contractor shall perform Semi-Annual Preventive Maintenance on components provided under this contract and as recommended by the manufacturer but in no case less than the following:
 - a. Inspect, test, clean, and adjust power supplies and battery back-up. Replace batteries as necessary.
 - b. Inspect and clean all IFPs.
 - c. Inspect, clean, and vacuum all equipment mounted in consoles and equipment racks including air filters.
 3. Within five (5) days after the initial 90 days from Final Acceptance and every 90 days thereafter the contractor shall perform on all components provided under this contract, Quarterly Preventive Maintenance as directed by the manufacturer, but in no case less than:
 - a. Inspect and clean the field panels. Perform hardware, firmware, software updates, as required to ensure optimum performance.
 - b. Test interfaces to external systems including but not limited to VSS and IDS for proper operation.
- O. Prior to undertaking any maintenance, the contractor shall notify the Airport of the intended date of such maintenance or upgrade in advance. This schedule and intended outcome of the maintenance visit including a list of items to be maintained shall be presented to the Airport within 24 hours prior to the scheduled visit.
- P. Provide written notice to the State documenting any work performed during the preventative maintenance visit within 24 hours of the completion of the maintenance visit.
- Q. The Security Contractor shall maintain an inventory of on-site spare parts and other items critical to system operation and as necessary to meet the emergency service requirements of this Project. Spare parts used in response to a Warranty service call must be replenished within five (5) days of their use. Spare parts

shall include, but not be limited to, the following:

1. ACS System:
 - a. IFP (including all boards and modules).
 - b. Card Readers/Keypads.
 - c. Magnetic Door Switches
 - d. Audio/Visual Devices.
 - e. Power Supplies.
 - R. Provide loaner equipment for any equipment not field repairable. Such loaner equipment shall be in working order and the functional and technical equivalent of the item replaced.
 - S. Provide loaner equipment that is fully compatible and fully functions with all associated equipment.
 - T. Loaner equipment for system components that must be shipped from the manufacture or distributor shall be on site and operational within twenty-four (24) hours of the component failure. Furnish lists of equipment that will require shipment from the manufacturer or distributor and lead times associated with that equipment.
 - U. The State reserves the right to expand or add to the system during the warranty period using firm(s) other than the Security Contractor for such expansion without affecting the Security Contractor's responsibilities on the components originally provided by them, provided that the expansion is done by a firm which is an authorized dealer or agent for the equipment or system being expanded.
- 1.14 COMMISSIONING
- A. All of the Security Contractor's Work shall be tested and inspected by all Authorities Having Jurisdiction including the State and Consulting Engineer or designated alternate and in accordance with all Specifications. The Security Contractor shall coordinate and cooperate fully and shall provide at no additional cost to the State, manpower, blueprints, facilities, scaffolds, etc. to reasonably assist the inspectors.
 - B. Commissioning shall occur in two phases. The first phase will be a functional and physical inspection of the installation. All faults found in this first phase will be corrected prior to the advancement to the second phase.
 - C. The second phase of commissioning shall be a reliability test. The entire system will be tested by the engineer with the contractor and TSA present. The contractor shall make available any personnel who can troubleshoot any errors found in the system to be resolved immediately.

PART 2 - PRODUCTS

2.01 ACCESS CONTROL SYSTEMS (ACS)

A. Architecture and Components

1. The ACS is to be an extension of the existing Software House C-Cure system present at the airport at the time of design. The contractor is responsible for verifying the exact make/model of the system present at the time of installation and provide an equivalent solution. The SSCP system shall operate in the same manner consistent with other secure portals. All ACS cabling shall be in conduit from the Door Interface Box to the Security Equipment Cabinet in the Communications rooms. ACS cabling from the DIB to the end devices must be concealed within the door frame, building structure or conduit.
2. Security Contractor is responsible for all additional reader or other licenses necessary to expand the existing ACS software to accommodate the work in this project.
3. The contractor is responsible for coordinating the ACS system requirements with Division 8 and Division 16 door hardware providers.
4. The ACS System shall make full use of the latest methods for distributed processing by employing multiple Intelligent Field Panel (IFP). Each IFP shall provide an intelligent interface between input/output devices and card readers and the ACS System file server. The IFP shall directly act upon point input/output data and process access control decisions from ACS devices in real-time based on locally stored programming that is continuously synchronized with the server. IFPs shall also collect point monitoring and access control messages from door interface panels and transmit the data to the ACS System file server for display and further action by system workstations. In the absence of communication with the server the IFP will continue to process data in real-time with all activity stored locally and automatically forwarded to the server upon restoration of communications
5. The ACS System shall extend the distributed processing architecture to the individual door using intelligent door input/output devices co-located with the IFP which shall provide for the direct connection of input/output devices in a manner which shall detect tampering. The intelligent door input/output devices shall communicate in real-time with the IFP. In the absence of communication with the IFP, it is desired that the door interface panel retain limited decision-making ability to provide access control at selected doors. When operating in this "degraded" mode the door interface panel may process access control decisions based on the last 100 cards granted valid access through the portal or grant access based on a "facility code" or other such similar method approved by the State.
6. The Door Interface Boxes (DIB) located at each access-controlled portal are intended to not contain any active devices. Instead, they are intended to provide a passive barrier terminal strip to isolate field wiring from door device wiring as a means facilitate troubleshooting. Each DIB must be provided with a tamper switch that is continuously monitored by the ACS for intrusion. Each DIB must have a key lock and all DIB enclosures must be keyed alike.
7. ACS System workstations shall communicate with the system file server

and workstations to indicate in real-time any event or malfunction.

B. ACS Functions

1. The ACS shall provide for continuous real-time monitoring of tamper and duress devices via fully supervised inputs to IFP.
2. The ACS System shall provide for monitoring of the open / closed status (door propping / intrusion alarms) of card reader-controlled doors through electrically supervised normally closed magnetic door position switches provided as part of the System. In addition, the ACS System shall monitor the card reader for invalid card and PIN use. The ACS System shall annunciate each condition individually.
3. The ACS shall provide for shunting / disarming of door position switch alarm monitoring for a predefined period of time upon the use of a valid request to exit device or a card reader provided as part of the card reader-controlled door. This process shall be dynamically adjustable by an authorized cardholder using the card reader keypad and shall allow the door to be opened without generating a forced / intrusion alarm for the time period defined. The ACS System shall generate a held open / door prop alarm if the door is still open once the predefined entry / exit time period has elapsed.

C. Communications

1. The field panels shall communicate over a LAN provided by the security system Security Contractor as part of this contract. This LAN shall be dedicated to security system components and be an extension of the existing security LAN.
2. All system DIB shall communicate with the card reader or I/O modules over dedicated copper communications circuit. Provide all equipment necessary to facilitate communications, e.g., signal distributors, media converters, etc. All communications shall be fully supervised. DIB equipment cabling installed by the Security Contractor must be in conduit.

D. Intelligent Field Panels (IFPs)

1. The IFP shall incorporate Flash ROM to allow for efficient firmware update downloads from the server. Updating the firmware shall not disrupt the operation of the IFP.
2. The IFP shall have memory and logic circuits as required to ensure continued operation of connected devices without degradation in system security if communications with the ACS System file server is interrupted. All system IFP shall store a minimum of one thousand (1,000) card transactions and up to sixty-four (64) events per alarm input and transmit that data to the ACS System file server as soon as communication is restored.
3. The IFP or server shall provide for automatic disconnection from the communication circuit upon a communication error within the IFPs to prevent communication with another IFP in the circuit from being disrupted. All panels that are not able to communicate with the server must be reported as a communication failure alarm to the ACS workstations.
4. Provide Software House GCM IFPs.

E. The Intelligent Door Input/Output Devices

1. The intelligent door input/output devices shall provide the following:
 - a. Inputs from a keypad/card reader/biometric access control device.
 - b. Supervised alarm inputs to monitor the status of alarm circuits such as a door contact and report the status information to the IFP.
 - c. Relay outputs for controlling devices by remote command from the ACS System workstation or automatically through time programming or on alarm point activation. Control relay output contacts shall be Form C and rated for 2 A @ 24 VDC.
 - d. Four state (door secure, door unsecure, cut wire, and shorted wire) supervision of all wiring / circuits between the intelligent door input/output devices and monitored alarm input devices.
 - e. Activation of a door control relay output and shunting of the intrusion alarm upon verification of a card authorization or request to exit.
 - f. Adjustable lock activation time through ACS System Software from 5 to 30 seconds on an individual card or reader basis. The door shall automatically relock after the door is opened.
 - g. An intrusion alarm output shall be provided to activate an audible/visual indicator if the card reader-controlled door is opened without an authorized card use or request to exit.
 - h. A door prop alarm output if the card reader-controlled door is held open past an adjustable time period after an authorized card use or request to exit. The door prop time delay shall be adjustable through ACS System Software from 5 to 60 seconds on an individual card reader basis.
 - i. A wiring chart delineating wire termination point. The chart shall be produced by the Security Contractor, laminated and housed in a clear plastic sleeve affixed to the inside of the enclosure cover.
 - j. A tamper switch and input to sense the removal or opening of the intelligent door input/output devices enclosure cover and other tamper switches installed on card readers and junction boxes.
 - k. An input to individually monitor the bond or latch sensor of a magnetic lock separately from door position switches.
2. Provide conduit from intelligent door input/output devices to all peripheral devices. Flexible conduit of any length is permitted when concealed in walls. When flexible conduit is not concealed within walls, lengths shall not exceed one (1) foot.
3. Provide Software House ACM reader modules.

F. Power Supply

1. The IFP Power Supply shall be dedicated to IFPs and shall not provide power for locks or any other low voltage device.
2. The Lock Power Supply shall be dedicated to electronic door locking devices and other auxiliary devices.
3. Each power supply shall be housed in a locking steel enclosure designed for surface mounting. The housing shall include a tamper switch to sense the removal or opening of the enclosure cover. All power supplies shall be

keyed alike and shall be on the same key as all other System cabinets. Provide any conduit required from the IFP Power Supply to the associated IFP, junction boxes or wire ways.

4. Minimum Specifications:

- | | |
|--------------------|---|
| a. Type | UL Listed Class II power limited |
| b. Input | 120V AC, 60 Hz |
| c. Output | Regulated UL Class II Power Limited filtered DC with individual over current protected output per connected device. Total power output rated at 150% of connected load. |
| d. Alarm outputs | Individual low battery, power fail and tamper switches monitored by ACS. |
| e. Battery backup | Four (4) hours of rechargeable backup for the connected load |
| f. Battery support | Battery charger to maintain battery |
| g. Battery | Sealed gel type |
| h. Enclosure Type | Key lockable, door tamper switch and weatherproof when installed on the exterior. |

G. Card Readers

1. The Card Reader shall be able to utilize the existing security identification credential cards issued by the Owner for the facility.
2. A multi-colored LED on the face of the Card Reader and an audible tone shall indicate authorized and unauthorized reader uses.
3. The reader's flash firmware can be easily updated to support changing standards without removing the readers from the wall.
4. The reader on selected doors as indicated on the drawings shall incorporate an integral numeric touchpad for PIN and dynamic configuration of shunt times on selected doors. The multi-colored LED shall provide a unique indication that the extended shunt time mode has been activated.
5. Card reader shall include an integrated tamper switch which shall detect when the card reader is removed from the mounting. The tamper switch shall be monitored by an ACS tamper circuit.
6. Provide HID RK-40 card readers with keypads and R-40 readers without keypads or approved equal.

H. Door Position Switch

1. Provide normally closed magnetic concealed door position switches and surface mount door position switches to monitor the open/closed status of doors as specified herein and as indicated on the drawings.
2. Switch shall be UL 634 Listed BMAS-Level 2
3. Provide device as applicable for door and door frame material (i.e. wood, metal, etc.)
4. Provide armored cable from the switch location to the associated junction

5. Concealed in door frame with integral terminals.
 6. Surface mounted using one-way screws.
- I. Local Audio / Visual Device
1. White with blue strobe. No fire markings
 2. Adjustable sound level
 3. Isolated sounder/strobe input terminals
 4. Field selectable audio tone to differentiate from fire alarm
- J. Request-to-Exit (REX) Pushbutton
1. When not integral to the door hardware, provide request-to-exit (REX) pushbuttons with two electrical circuits for unlocking card reader-controlled doors. One circuit shall be wired directly to the locking device to provide failsafe unlocking of the door. The other circuit shall be wired to the REX input of the associated DIB. Activation of the REX pushbutton shall release the lock and shall shunt the intrusion alarm output. The REX pushbutton shall contain an adjustable time delay for the door unlocking time. All REX pushbuttons shall be lighted and meet life safety codes.
 2. Minimum Specifications:
 - a. Pushbutton diameter: 2.5 inches or as required by code
 - b. Pushbutton color: Red
 - c. Time-delay: Adjustable from 1 to 10 seconds
 - d. Trim plate finish: Brushed stainless steel
 - e. Rated for outdoor use when installed outdoors
 - f. Continuously illuminated with positive visual feedback of successful activation.
- K. Duress Pushbutton
1. Provide personnel duress alarms with normally closed alarm output contacts. Devices shall have mechanical latching feature that requires a keyed reset.
 2. Buttons shall require positive mechanism engagement using recessed actuators or requiring dual button activation. The duress button shall not be subject to activation through accidental bumping.
 3. Locate duress buttons below counter tops or an accessible location concealed from public view. Verify the exact location with the Architect.
 4. The button shall have an indicator light to confirm the activation of the device. The activation of any duress button shall illuminate the light to alert others of a duress situation.
- L. Electric Locking Mechanisms
1. Coordinate with the Division 8 supplier to interface with locking system provided on the door. All electronic access control functions must be fully integrated with the portal. All door hardware shall include integral electrified locking and request to exit circuitry. Door frames shall include accommodations for integral magnetic contact and cross hinge wiring.

2. The Security Contractor shall be responsible for interfacing the lock power supply to the power transfer hinge and locking mechanism. Provide all cabling and electrical connectors as required. The contractor shall wire the interface between internal REX contacts and the DIB.
3. Provide power supplies for fail-secure operation of all electric locking mechanisms. Locking devices shall unlock automatically in the direction of egress under the following conditions:
 - a. Any building fire alarm
 - b. Failure of the power supply

M. Tamper Switches

1. Provide normally closed tamper switches to monitor the secure status of all IFPs, power supplies, card readers and power distribution units, junction boxes and fiber optic equipment enclosures.
2. Minimum Specifications:
 - a. Type UL Listed Mechanical Plunger
 - b. Configuration Normally closed when the cabinet door is closed
 - c. Mounting Fastened within box with no access to mounting
3. Equipment Rack
 - a. Utilize space in racks provided by Communication Security Contractor. Coordinate equipment location with other trades.

2.02 LOCAL AREA NETWORK

- A. The Security Contractor shall provide a solution for network connectivity that will supplement the existing security LAN. In general, the system must meet the requirements of the technologies provided by the contractor. The minimum equipment provided must comply with the requirements contained in this section.
- B. Equipment provided shall have Power over Ethernet (POE) capabilities. The provided equipment shall be suitable to support the bandwidth requirements of the attached security equipment and be configured appropriately to provide maximum security from non-security attached devices and external sources.
- C. Provide switches with a minimum of twenty-four (24) 10/100/1000 ports on each unit as well as the necessary fiber optic uplinks. If the number of ports initially occupied by attached security project equipment exceeds 80% of the available ports, an additional switch with identical port count will be provided in all cases.
- D. The switches provided shall use a Gigabit Fiber Optic backbone using field installed modules.

2.03 UNINTERRUPTIBLE POWER SUPPLY SYSTEM (UPS)

- A. System Architecture and Components
 1. Coordinate with electrical contractor for provisioning of ACS power from central UPS. Individual rack UPS are not desired. Monitor the central UPS

for failures via ACS intelligent field panel input.

2.04 WIRE AND CABLE

A. General

1. All ACS wire and cable shall be installed in conduit from end-to-end.
2. Provide wire and cable as required to install the System as indicated on the drawings and specified herein.
3. All wire and cable shall be Underwriter's Laboratories (UL) listed, and shall meet all national, state, and local code requirements for its application.
4. All wire and cable shall meet individual system or subsystem manufacturer specifications.
5. All wire and cable shall be plenum type cable, except that which shall be installed in conduit.
6. All insulated wire and cable shall conform to the minimum requirements of Insulated Cable Engineer Association (ICEA) Standards.
7. Wire and cable shall comply with the applicable requirements of the National Electrical Code (NEC), latest edition, regarding cable construction and usage.
8. The conductors of wires shall be copper and have conductivity in accordance with the standardization rules of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). The conductor and each strand shall be round and free of kinks and defects.
9. All cable carrying data or voice transmissions shall be shielded. All other cable shall be shielded where necessary for interference-free signals.
10. Insulation shall be rated for a minimum of 300 V.
11. Color coding shall be accomplished by using solidly colored insulation. Grounding conductors, where insulated, shall be colored solid green or identified with green color as required by the National Electric Code (NEC).

B. Wire Types and Sizes

1. 120-volt Power Wiring: Minimum 12 AWG copper with THHN/THWN insulation.
2. Composite multi-jacketed cables are permitted for use on ACS doors.
3. Low Voltage Power Cable: Wire size shall be a minimum of 18 AWG, twisted, stranded, insulated, and jacketed.
4. Control Point Cable (Non-Power): Wire size shall be a minimum of 20 AWG, twisted, stranded, insulated, and jacketed.
5. Alarm Point Cable (Non-Power): Wire size shall be a minimum of 20 AWG, twisted, stranded, insulated, and jacketed.
6. Control Point Cable (Low Voltage Power): Wire size shall be a minimum of 18 AWG, stranded, insulated, and jacketed.
7. Ethernet cable: Shall be a Category 6a cable. Wire size shall be a minimum of 24 AWG bare copper, twisted, unshielded and jacketed and shall be used for cable runs not to exceed 250 feet.
8. All fiber optic cable shall be suitable for the location in which it is to be installed. Cable installed in an exterior environment shall be filled with a water excluding gel. Cable type shall be compatible with existing fiber optic infrastructure.

2.05 INTERFACES

A. ACS / Fire Alarm

1. Automatic Unlock of Electric Locking Mechanisms
 - a. Electric locking mechanisms controlled by the security system shall be automatically unlocked upon a fire alarm condition as required by applicable codes and the local Authority Having Jurisdiction (AHJ).
 - b. The Fire Alarm Security Contractor must provide a normally closed auxiliary dry output contacts such that upon a fire alarm condition, the contacts shall open, and the security system shall unlock the electric locking mechanisms. The contacts shall remain open until the fire alarm system is manually reset.
 - c. Any delayed egress panic bars shall have the delay automatically drop to 0 seconds during a fire alarm event.

B. ACS/VSS

1. The ACS shall communicate with the VSS system specified in Section 16780 of this project to provide for tagging selected video associated with and ACS alarm event such that pre-event and post-event video from the area of the alarm event is available for instant review from the ACS workstation without switching away from the ACS application.
2. The ACS shall communicate with the VSS system to cause the VSS system to switch live images from a camera focused on the area of an ACS alarm event to display on a larger format display for closer examination. In the case of multiple alarms events, this cameras call-up shall be sequenced through the larger format display until acknowledged by the ACS.

C. ACS / Motorized Door

1. Provide an interface between the ACS and the Motorized Door(s) where shown on the Security Drawings. The interface shall provide for enabling the local "Open" button.
2. The doors shall be equipped to support dynamically extending the shunting of the door open detect switch to permit opening the door for extended periods without causing a door held open alarm.
3. The ACS shall signal the door to close upon sounding of the shunt pre-expiration sounder indicating the extended shunt is about to expire. The ACS shall not interfere with any door safety device, close, or stop buttons.

2.06 CONDUIT BOXES & RACEWAYS

- A. This Section is intended to provide guidance but not supersede any requirement contained in the electrical sections specifying raceways, fittings, boxes, enclosures, and cabinets for electrical wiring. All ACS wiring must be in conduit from end-to-end. Cable runs from multiple doors may be consolidated into a single run when the conduit is appropriately sized by the Security Contractor:
 1. Rigid Metal Conduit.
 2. Electrical Metallic Tubing (EMT).

3. Liquid tight Flexible Conduit.
 4. Boxes, enclosures, and cabinets include the following:
 5. Device Boxes.
 6. Outlet Boxes.
 7. Pull and Junction Boxes.
 8. Cabinets and Hinged Cover Enclosures.
 9. Conduit Bodies.
 10. Rigid Non-Metallic Conduit.
- B. Install all conduits necessary for a complete installation, but not provided for in the Electrical Drawings. Conduit and boxes in finished areas shall be concealed in chases, furring, concrete slabs and/or above suspended ceilings. No exposed conduit shall be installed within public areas.
- C. Conduit shall be carefully installed, properly and adequately supported as required to comply with the requirements outlined herein and as required by the NEC to provide a neat, workmanlike installation. Horizontal conduit runs shall be supported by clamps, pipe straps, special brackets, or heavy iron tie, tied to the black iron structural members supporting the ceiling. Fastening of conduit to masonry walls, floor or partitions require malleable pipe clips with screws and suitable expansion sleeves.
- D. All conduits shall be cut accurately to measurements established at the building and shall be installed without springing or forcing.
- E. All required inserts shall be drilled-in and all openings required through concrete or masonry shall be saw cut or core drilled with tools specifically designed for this purpose.
- F. Swab out and remove all burrs from conduit before any wires are pulled.
- G. Layout and install conduit run as to avoid proximity to hot pipes. In no case shall a conduit be run parallel within one (1) foot of such pipes. Where crossings are unavoidable and then the conduit shall be kept at least six (6) inches from the covering of the pipe and cross it at no less than a ninety (90) degree angle.
- H. Provide fire stops where conduits penetrate fire rated walls and/or floors.
- I. All conduit installation, whether run exposed or concealed, shall be approved by the Consulting Engineer or designated alternate prior to installation.
- J. Seismically brace all conduits required to be seismically braced per National and Local Building Codes

PART 3 - EXECUTION

3.01 INSTALLATION MANAGMENT

A. Project Manager's Duties and Responsibilities

1. The Security Contractor shall provide to the State, as a part of the prefabrication submittal, the name of the Project Manager that will provide all duties and responsibilities as specified herein, during the term of the project.
 - a. The State reserves the right to approve or disapprove the individual that shall be designated as the Project Manager.
 - b. If at any point during the term of the project, and for any reason, the Project Manager is replaced, it shall be the responsibility of the Security Contractor to submit such information onto the State expeditiously for approval prior to any position replacement.
2. The Project Manager shall maintain the ability of making all managerial decisions on behalf of the Security Contractor on a day-to-day basis and shall retain the authority of accepting notices of deduction, inspection reports, payment schedules and any other project related correspondence on behalf of the State.
3. The Project Manager shall schedule and attend weekly project management meetings, during which time all system related issues are discussed, scheduled, confirmed and/or resolved.
 - a. The project management meetings shall continue weekly until such time that the Security Contractor and State schedule otherwise. The scheduling of the project management meetings shall be approved by the State prior to commencement.
4. The Project Manager shall be available during normal business hours (8:00 a.m. to 5:00 p.m.) within two (2) hours by phone during the term of the project.
 - a. After normal business hours, they shall be available within four (4) hours by phone during the term of the project.
 - b. If the Project Manager is not available within the allotted time frame, the Security Contractor may designate another employee to temporarily act as the Project Manager in all correspondence with the State.
 - c. The Security Contractor shall ensure that any individual temporarily assuming the duties of the Project Manager is at equal or higher level in the Security Contractor's managerial chain of command.
5. Upon notification by the State, of any project related installation issue, or issue that may contradict the system specifications as stated herein, the Project Manager shall respond to such issue, verbally and/or in writing within an eight (8) hour period.
 - a. Responses to such issues as stated above shall include a clear

- understanding of the issue, along with a tentative plan of action, reflecting milestones and/or deadlines to resolve the issue.
- b. Where appropriate, based on the overall importance of the project issue, the Project Manager shall follow-up their initial response with a written response to the issue within twenty-four (24) hours of identification of the issue.

3.02 CONNECTION TO EXISTING SYSTEMS

- A. The systems described in this section are extensions of the existing ACS systems installed at the Airport. They are not intended to operate as a stand-alone system. Tie-in to the existing system shall be done by the existing authorized service provider. An allowance in Proposal Schedule shall account for this work.
- B. The tie-in to the existing system shall be done in a manner that ensures that there will be no system outages on the existing system. The Security Contractor on this project shall be required to coordinate with the existing authorized service provider as part of their work on this project for such things including but not limited to device naming conventions and IP address.
- C. The Security Contractor shall provide all information including but not limited to floor plans for Graphical User Interface development and alarm point/camera call-up views to the existing service provider in an expeditious manner so that they can program the existing system.

3.03 EXAMINATION

Site Verification of Conditions

- 1. Continuously verify that the site conditions are in agreement with the Contract Documents and the design package. Submit a report to the State documenting changes to the site or conditions that affect the performance of the system to be installed. For those changes or conditions, which affect system installation or performance, provide (with the report) specification sheets, or written functional requirements to support the findings, and a cost estimate to correct the deficiency. No deficiency shall be corrected without written permission from the State.
- 2. Specific mounting locations, exact wire and cable runs, and conduit routing have not been specified or delineated on the Security Device Drawings. Coordinate all aspects of the Work with the Consulting Engineer or designated alternate.

3.04 PREPARATION

Protection: The Security Contractor shall provide protection necessary to safeguard his/her own Work from damage by his/her own operations and others. Unless the Security Contractor proves to the State's satisfaction that their Work has been damaged by others, the Security Contractor shall, at his/her own cost and expense, promptly repair, adjust and clean all defective installations as shown on the punch list prepared by the State.

3.05 INSTALLATION

- A. Should any questions of union jurisdiction arise, the Security Contractor shall immediately take steps to settle such disputes and shall use such labor as may be determined to have jurisdiction, at no additional cost to the State. Should he/she fail to take expeditious action, he/she shall be responsible for any time lost because of delays arising from such a dispute.
- B. Provide code compliant fire proofing techniques for all penetrations of fire rated partitions and slabs, where the penetrations are made by or used for installation of the Security System.
- C. Coordinate the routing of wire and cable requiring isolation from power, radio frequency (RF), electromagnetic interference (EMI), telephone, etc. with the Consulting Engineer or designated alternate.
- D. Run all wire and cable continuous from device location to the final point of termination. No mid-run cable splices shall be allowed.
- E. Furnish and install all cable such that ample slack is supplied at the device terminating end of the cable to compensate for any final field modifications in location. The approximately three (3) feet extra cable shall be bundled and neatly wrapped to permit future use.
- F. Wire and cable within IFPs, power distribution cabinets and other security enclosures shall be neatly installed, completely terminated, pulled tight with slack removed and routed in such a way as to allow direct, unimpeded access to the equipment within the enclosure. All wire and cable shall be bundled and tied.
- G. Provide grommets and strain relief material where necessary to avoid abrasion of wire and excess tension on Wire and Cable.
- H. Make connections with solder-less devices, mechanically and electrically secured in accordance with the manufacturers' recommendations. Wire nuts shall not be an acceptable means of connecting wire and cable.
- I. All exterior devices shall be sealed and protected against all weather conditions including heat, cold, moisture, dust, and sand.
- J. Neatly bundle and wrap all horizontally run (above accessible ceilings and not within conduit) wire and cable at three-meter intervals. Provide supports as required.
- K. All system wiring within vertical riser shafts (as required) shall be bundled, wrapped, and tied to the structure at three-meter intervals in order to isolate it from other wire and cable within the shaft. Additionally, all wire and cable within the shaft shall be supported at least every two floors using Slack Grips (Split Mesh Lace Closing) or approved equal. Provide all personnel and equipment necessary to install and support the cable.

3.06 Coordination

- A. Coordinate locations of all devices with the State and Consulting Engineer or designated alternate prior to installation.

- B. Coordinate and verify the location of each piece of rack-mounted equipment with the Consulting Engineer or designated alternate prior to installation.
- C. Coordinate custom ACS report requirements with the State. Submit report formats to the Consulting Engineer or designated alternate prior to installation for review and acceptance.
- D. Coordinate all initial database partitioning and setup with the Consulting Engineer or designated alternate prior to installation prior to initial programming and data entry.
- E. Coordinate finishes and colors of all equipment with the State and Consulting Engineer or designated alternate prior to installation. Submit all finish and graphics for all equipment in public areas to the State and Consulting Engineer or designated alternate prior to installation for approval prior to installation.
- F. Verify acceptance of each type of specified request-to-exit hardware for each application with local life safety code officials.
- G. Verify fail-safe and fail-secure lock requirements with the local Life Safety Code Officials.
- H. Security Contractor or equipment manufacturer logos or names shall not be visible on equipment in public areas.
- I. Provide tamper proof fasteners for all equipment in public areas. Fastener finish shall match equipment finish.
- J. Equipment: Provide equipment as indicated on the Drawings and specified herein. Additional specific installation requirements are as follows:
 - 1. Card Readers: Wire card reader LEDs to indicate valid and invalid card reads, and door locked and unlocked conditions as well as extended shunt time mode for passenger processing.
- K. System Programming and Data Entry
 - 1. Coordinate with the existing authorized system provider on all system programming and setup of the ACS System including, but not limited to the following:
 - a. Interactive Graphical Maps and Icons: Update all graphical maps and symbols to reflect the modifications made to the building as part of this project. Import all floorplan information provided by the Architect and produce a complete set of interactive graphical maps depicting all ACS and VSS points in the system.
 - b. ACS System Card Reader Information: Coordinate all card reader values and text, including descriptors, alarm messages, VSS Camera call up, map call up and identification with the State and Consulting Engineer or designated representative.
 - c. Input and Output Points: Coordinate all input and output priorities and text, including descriptors, alarm messages, VSS Camera call up, and map call up and identification with the State and Engineer

or designated alternate.
d. Initial VSS Camera call up and alarm information for interface with the VSS System.

2. Coordinate with the existing system provider on all data needed to make the Security System operational. Deliver the data to the existing authorized system provider on data entry forms, Security Contractor's field surveys and all other pertinent information in the Security Contractor's possession required for complete installation of the database. Identify and request from the existing authorized system provider any additional data needed to make the Security System fully operational and integrated.

L. Labeling

1. Label all controls as necessary to agree with their function.
2. Mark all Wire and Cable in common at both ends using a permanent method such as self-laminating cable marking tape. The tags shall be attached to the wire and able nylon cable ties in an accessible location so that they can easily be read. Tags shall be installed when wire and cables are installed. Labeling shall agree with Record Documentation.
3. Place wire identification numbers at each end of the conductor involved by using sleeve type, heat shrinkable markers. The markers shall be installed to be readable from left to right or top to bottom.
4. Mark all connectors with common designations for mating connectors. The connector designations shall be indicated on the Record Drawings.
5. Coil all spare conductors in the device back-box, panel wire way, or top of panel where wire way is not provided. These conductors shall be neatly bundled and tagged.

3.07 CONSTRUCTION

A. Interface with Other Work

1. Electric Locking Mechanisms
 - a. Wire electric locking mechanisms as required by the manufacturer.
 - b. Wire fail-safe electric locking mechanisms in accordance with local codes.
 - c. Wire fail-secure electric locking mechanisms and power supplies such that a fire alarm condition or building power failure shall not affect operation of the lock.
2. Delayed Egress Locking Devices
 - a. Interface with delayed egress locking devices as required by the manufacturer.
 - b. Wire delayed egress locking devices for fail-safe operation in accordance with local codes.
 - c. Interface with a normally closed alarm contacts that shall open upon activation of the unlock timer.
 - d. Interface with sounder bypass control contacts. Wire ACS System control output contacts to bypass sounder by system workstation.

- e. Interface with lock control contacts activated by system workstation and / or time schedule. Wire ACS System control output contacts to lock / unlock devices by time schedule and / or system workstation.

3. Fire Alarm Interface

- a. Connect (hard wire) fail-safe electric and time delay locking mechanical to the building fire alarm system for fail-safe release upon any fire alarm.
- b. Interface with the existing low voltage normally closed dry contact from the fire alarm system provided by the fire alarm Security Contractor in the at the existing fire control panel location. The contact shall open on any fire alarm condition.
- c. Provide all additional UL listed fail-safe relays and power supplies necessary to interface to this contact and unlock all fail-safe doors.
- d. Connect fail-safe relays and power supplies to standard building power. Connection of fail-safe devices to emergency or UPS power shall not be acceptable.
- e. Reference the Security Device Drawings for fire alarm interface requirements.

4. Power Requirements

- a. 120VAC AC power dedicated to security and on generator backup shall be provided by the electrical Contractor in coordination with the Security Contractor for the Security System
- b. Connect to the AC power and provide UL listed power supplies and transformers to distribute low voltage power to the system components as required.
- c. Provide hinged cover terminal cabinets with tamper switches for all power supplies, transformers, and power distribution terminal strips. Provide all conduit and wiring from the AC power facilities to the terminal cabinets.

5. Labeled Doors and Frames: In no instance shall any UL labeled door or frame be drilled, cut, penetrated, or modified in any way that voids the rating of the door. The Security Contractor shall be responsible for replacing any labeled door or frame that is modified and voids the rating.

3.08 REPAIR/RESTORATION

- A. The Security Contractor, upon receiving notice from State that the Security Contractor has furnished inferior, improper or unsound Work or materials (including equipment) (whether worked or unworked), or Work or materials at variance with that which is specified, will, within twenty-four (24) hours, proceed to remove such Work or materials and make good all other Work or materials damaged thereby, and, at the option of the State, the Security Contractor shall immediately replace such Work or materials with Work or materials as specified. The removal, replacement and repair shall be performed at such times and with manpower sufficient, in the judgment of the State, so as not to avoid disturbance to occupants, or other ongoing work.

- B. If the Security Contractor does not remove such unsound Work within a reasonable time, the State may remove it and may store the material at the expense of the Security Contractor. If the Security Contractor does not pay the expenses of such removal within ten (10) days' time thereafter, the State may, upon ten (10) days' written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Security Contractor and all expenses of the sale.
- C. The State shall always have the authority, until Final Completion and acceptance of the Work, to inspect and reject Work and materials which in its judgment are not in conformity with the Drawings and Specifications, and its decision in regard to character and value of Work shall be final and conclusive on both contracting parties. If the State permits said Work or materials to remain, the State shall be allowed the difference in value or shall at its election have the right to have said Work or materials repaired or replaced, as well as the damage caused thereby, at the expense of the Security Contractor, at any time within one year after the completion of the entire project, or within such longer period as may be covered by any guaranty; and neither payments made to the Security Contractor, nor any other acts of the State, shall be construed as evidence of acceptance, waiver or estoppels.
- D. Any expense incurred by the State in connection with the foregoing, shall be borne by the Security Contractor, and the State may withhold money due to the Security Contractor or recover money already paid to the Security Contractor, to the extent of such expense.

3.09 SYSTEM ACCEPTANCE

- A. Prior to any final acceptance testing, the Security Contractor shall submit two sets of preliminary (draft) Record Documents to the State. The preliminary Record Documents are to be used by the State to conduct the system final test.
- B. Submit a paragraph-by-paragraph completion matrix indicating completion or delinquency for each item included in the Specification and all subsequent addenda and bulletins as part of the Work. Indicate completion of the requirement by the word "Completed" following each paragraph number. Indicate delinquency for the requirement by the words "To Be Completed" following the applicable paragraph number. Should work on any item be under way, but not yet fully complete, indicate the extent (or lack thereof) of completion to date, and the proposed date of completion.
- C. Conduct a complete test of the entire Security System and provide the State and Consulting Engineer or designated alternate with a written report on the results of that test. During this test, place the integrated Security System in service, and calibrate and test all equipment.
- D. The Security Contractor shall submit documentation indicating completion of the testing to the State and Consulting Engineer or designated alternate before conducting System Acceptance testing. All items are required to be complete before a final inspection of the security system. If for some reason the Security Contractor is unable to fully comply with any of the listed conditions, a written statement describing the exception is to be submitted with the checklist for

review. The checklist shall accompany the written certification to the State and Consulting Engineer or designated alternate that the installed complete Security System has been calibrated, tested, and is fully functional as specified herein.

- E. Following completion of the initial testing and correction of any noted deficiencies, the State and Consulting Engineer or designated alternate shall conduct Final Acceptance testing.
- F. After completion of Final Acceptance testing and any deficiencies noted and repaired the State shall conduct a fifteen -day (15) burn-in test. The intent of the burn-in test shall be to prove the Security System by placing it in real operating conditions. During this period the Security System shall be fully functional and programmed such that all points, interfaces, controls, reports, messages, prompts, etc. can be exercised and validated. Record and correct any system anomaly, deficiency, or failure noted during this period. This will be reported to the Security Consultant for evaluation. Severe failures may cause the testing period to begin again and run in its entirety until successfully completed. The issuing of the Final Acceptance Certificate is based on the successful completion of the burn-in testing.
- G. To sufficiently demonstrate the Security System's functionality, the State may have the Security Contractor intentionally introduce faults into the system to demonstrate its resiliency. These tests shall not be allowed to adversely affect the long-term operation of the system, but rather demonstrate the ability of the system to operate in a fault condition.
- H. The State retains the right to suspend and/or terminate testing at any time when the system fails to perform as specified. If it becomes necessary to suspend the test, all of the State's fees and expenses related to the suspended test will be deducted from the Security Contractor's retainage. Furthermore, in the event it becomes necessary to suspend the test, the Security Contractor shall work diligently to complete/repair all outstanding items to the condition called for in the Specification and as indicated on the Security Drawings. The Security Contractor shall supply the State with a detailed completion schedule outlining phase-by-phase completion dates and a tentative date for a subsequent punch list retest. During the final acceptance test, no adjustments, repairs, or modifications to the system will be conducted without the permission of the State.

3.10 CLEANING

- A. Prior to the final acceptance test, coordinate with the State and Consulting Engineer for security related construction clean-up and patch work requirements. Security equipment closets and similar areas should be free of accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, remove all waste materials, rubbish, the Security Contractor's and its subcontractors' tools, construction equipment, machinery, and all surplus materials.
- B. The Security Contractor shall utilize good housekeeping practice with respect to his/her Work including cleanup of all dirt and debris created by the Security Contractor during his installation operations daily.
- C. The Security Contractor shall at his own expense collect and dispose of packing

and debris in an environmentally responsible manner at the end of each working shift. This shall include recycling packaging materials and excess copper wire.

- D. The Security Contractor shall be on call during the Warranty to answer any questions the State might have. Maintain time sheets verifying the total hours of training provided. The State reserves the right to use any excess training hours, not used by the time of system completion, for future training as requested by the State until the total number of training hours has been completed.

PART 4 MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Connection to Existing Access Control System, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for Connection to Existing Access Control Systems required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16750.1	Access Control System	Lump Sum
16750.2	Access Control System - Existing TSA Checkpoint Work (Phase 2)	Lump Sum
16750.3	Connections of Access Control System to Existing Access Control System	Allowance

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 PRICE.

END OF SECTION

SECTION 16770 – PUBLIC ADDRESS SYSTEM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

The requirements in Section 16771 – Public Address Visual Paging System shall also apply to this section.

The airport operational information contained within the FIDS database will be integrated and used by the PA System when performing automated, announcements.

1.02 SUMMARY

- A. This section includes administrative and procedural requirements for coordinating and installation of the public address systems.

1. The Contractor shall be certain that all existing public address systems outside of the Project Limits remain operational at all times. Any damages caused by the Contractor to the existing public address systems outside of the Project Limits shall be repaired by the Contractor at no cost to the State.

1.03 SCOPE OF WORK

- A. Work covered by these specifications and related documents consists of providing all shop drawings, paging microphone stations, preamplifiers, announcement control system hardware and software, parametric equalizers, power amplifiers, loudspeakers, interconnecting wiring, documentation, technical supervision, labor, transportation, permits, user training, and testing, as required, to upgrade, install, and maintain a Public Address (PA) System at the Kahului Airport (OGG), in strict accordance with the Contract Documents, and subject to the terms and conditions of the contract.
- B. All descriptions included herein are general and it shall be understood that all optional equipment, accessories, fasteners, anchorage devices, protective finishes, trip pieces and the like for complete installations be provided as specified. The Contractor shall submit a bid that is completely workable without the necessity to add additional items after submission of the bid.
- C. The intent of the PA System is to serve the new South TSA SSCP extension with an ADA compliant PA System as well as to connect to the existing SITA PA

System. Connection to the existing SITA PA System requires the necessary inclusion of SITA recommended components as specified in order to provide compatibility with the existing PA (and video information) system.

- D. Provide distribution points in State (DOT-A) Comm Rooms on the ground and concourse levels with FO backbone interface tie back to existing SITA network infrastructure at existing Comm Room "A-2" in the existing terminal building. This audio subsystem must be able to operate independently in a local mode in the event of loss of system server(s).
- E. The Work in general consists of, but is not limited to, the following items to the extent that they are required to comply with ADA regulations:
 - 1. All labor, equipment, hardware, and software required for the integration, installation, wiring, adjustment, and testing for a complete and working PA System.
 - a. Where existing equipment is to be reused and integrated into the PA System by the Contractor as indicated in the plans, the Contractor shall verify that the existing equipment is operating properly prior to commencement of work.
 - b. Coordinate all electronic switching, data storage and control, server, and monitoring equipment hardware and software required for the PA System coverage in the new South TSA SSCP extension.
 - 2. All loudspeakers in the TSA queueing/screening areas and adjacent circulation areas on the ground and concourse levels.
 - 3. All telecommunications, networking hardware, and interconnecting cables, equipment, connectors, and receptacles between existing and new PA System equipment, and equipment power wiring from the A.C. power receptacles provided.
 - 4. All cables shall be neatly wrapped and bundled using approved cable straps and be clearly identified using permanent labels which are manufactured for that purpose. Telecommunications or network cables shall be documented and labeled in accordance with TIA 606-D.
 - 5. All externally powered equipment shall include a chassis grounding wire when operating directly from A.C. power, shall be fused, and shall be the latest standard product of a manufacturer who is regularly engaged in the manufacture of such equipment. All equipment shall be installed so as to insure the safety of the operators.
 - 6. All electronic circuitry shall be of solid state design. Equipment operating at audio signal levels below -20 dBm shall be interconnected with shielded, twisted pair, color coded, and stranded conductor cables. All interconnections between equipment items shall be made through the use of approved mating connectors.
 - 7. "Scatter Wired" panels will not be acceptable. All markings, including markings on knobs, shall be deeply etched and filled or engraved to reveal a contrast in color. Silk screening or other temporary marking methods will not

be acceptable. All rotary knobs shall be secured with socket headed set screws in metal inserts.

1.04 REFERENCES

A. The Electronic Industries Association (EIA) publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1. RS-160 Sound Systems
2. RS-174 Audio Transformers for Electronic Equipment
3. RS-219 Audio Facilities for Radio Broadcasting Systems
4. RS-297-A Cable Connectors for Audio Facilities for Radio Broadcasting
5. RS-310-C Racks, Panels and Associated Equipment
6. RS-426-A Loudspeakers, Power Rating, Full Range
7. RS-433 Standard for Magnetic Tape Records: Compact Cassette (EIA RS-399-A) with Four-Track Mono/Stereo Compatible Records at 1.875 IN/S
8. RS-470 Telephone Instruments with Loop Signaling for Voiceband Applications
9. RS-490 Standard Test Methods of Measurement for Audio Amplifiers
10. SE-101-A Amplifiers for Sound Equipment
11. SE-103 Speakers for Sound Equipment
12. SE-105 Microphones for Sound Equipment

B. Additional publications and standards listed below form a part of this specification to the extent referenced.

1. 28 CFR Part 36 ADA Standards for Accessible Design
2. TIA 568.1-E Commercial Building Telecommunications Cabling Standard
3. TIA 568.2-D Balanced Twisted Pair Telecommunications Cabling and Components Standard.
4. TIA 568.3-E Optical Fiber Cabling and Components Standard.
5. TIA 569-E Telecommunications Pathways and Spaces.
6. TIA 606-D Administrative Standard for Telecommunications Infrastructure.
7. IEEE 802 Series Local Area Network (LAN) Standards
8. ANSI S-83-596 Fiber Optic Premises Distribution Cable

1.05 OVERALL SYSTEM PERFORMANCE REQUIREMENTS

A. Interface the new PA system with the existing SITA head-end via network connections as shown in the drawings.

- B. Environmental: System components shall operate as specified under the following environmental conditions:
1. Dry Bulb Temperature: 65 deg. to 85 deg. F normally; 90 deg. F intermittently.
 2. Relative Humidity: 25 to 60 percent normally; 10 to 90% intermittently.
 3. Ventilation Air: No forced ventilation is to be provided within equipment enclosures by DOT-A.
 4. A.C. Power Voltage Fluctuation: Normally plus/minus 10% of 118 VAC. Voltage transients during power outages and switchover to backup power may also occur intermittently.
 5. A.C. Power Frequency Fluctuation: Normally plus/minus 3% of 60 Hz.
 6. Electromagnetic and Electrostatic Fields: As applicable for the facility location, within one mile of radio and radar transmitters, and in close proximity to electrical and mechanical equipment, including high intensity discharge lamps.
- C. System Life: The service life of the PA System shall be a minimum of fifteen (15) years. The Contractor shall indicate the periodic maintenance required in the Handbooks of Operating Instructions in order to provide the fifteen (15) year service life.
- D. System Reliability: The system shall be capable of being operated 24 hours a day and seven (7) days per week, with a Mean-Time Between-Failure (MTBF) greater than six (6) calendar months. All data file servers and system control units shall be connected to Uninterruptible Power Supplies, and all system control units and hard drives shall be configured for automatic backup via hot swap with fault notification.
- E. System Automation: The PA System shall be automatic, and not require continuous operator attention for adjusting microphone gain controls, listening level, or page zone assignments. The system shall also monitor and report the status of each page zone amplification chain on a daily basis and alert the operator at Central Communications and PA System maintenance personnel when system faults are detected and indicate the probable location(s) of the detected fault. Automatic adjustment of system volumes to preset daytime and nighttime levels at each zone is required of the system. The system will automatically indicate to the user when access to the paging system is possible for announcements, and shall prioritize all announcements, fixed messages, and assembled messages in accordance with the assigned priority level on a First-In, First-Out basis. Timeouts of paging station microphones will also be automatically performed in accordance with maximum preset durations of inactive and active microphone usage periods. The system will also provide password accessible emergency override capabilities from any microphone paging station which is programmed by the System Control Console located at Central Communications. Automatic muting of a switching unit and pages originating from that unit will also occur upon activation of a local fire alarm switch closure. Automatic answering capability and paging access via standard,

touch-tone telephone instruments and PBX trunk lines shall also be provided to any zone or zone group of the PA System.

- F. System Accessibility: Primary user access to the PA System shall be via keypad and network microphone stations located throughout the airport complex. Capability for user selection of paging zone groups based on employee user groups shall be provided at the microphone stations. Secondary user access to the PA System shall be provided via hand-held, plug-in, microphones at the keypad and network microphone stations, as well as via ten (10) PBX trunk lines using standard, touch-tone telephone instruments.
- G. ADA Compliant Paging Features: Each networked microphone paging station shall be capable of automatically initiating actual human voice paging announcements. Announcements shall be selectable by type and shall be automatically assembled using prerecorded human voice and stored text plus the applicable operational information contained in the flight information database.
1. These announcements shall include:
 - a. Flight Arrival.
 - b. Baggage Availability.
 - c. Aircraft Boarding.
 - d. Final Call.
 - e. Delayed Flight Arrival.
 - f. Delayed Flight Departure.
 - g. Departure Gate Change.
 - h. Arrival Gate Change.
 - i. Departure Canceled Flight.
 - j. Arrival Canceled Flight.
 - k. Immigration Check-In Procedures.
 - l. Customs Processing Procedures.
 - m. General airport-wide announcements.
 1. Voice and text message libraries shall be included for English, Japanese, Korean, and Chinese languages.
 2. Network Plus (or text-entry) microphone stations shall be capable of producing any and all types of synthesized voice paging announcements of the announcements whenever the announcements contain names, places, objects, or times which are not normally stored in the flight information or PA System message libraries. These announcements shall be assembled at the Network Plus microphone stations using announcement text assembly and entry devices. Examples of these announcements include report of item left at security checkpoint, message for an individual to report to a gate, security check point, ticket lobby, or hold room counter, or shall message for an individual to claim lost baggage. All announcements shall be stored and organized for automatic or selective repeat execution without reentry of the announcement text.

3. The speech-to-text engine shall be of the highest quality available at the time of factory acceptance testing. Voice and text engines shall be provided for English, Japanese, Korean, and Chinese languages.
 4. All PA System announcements which are directed toward airport or airlines operations personnel rather than the general or traveling public shall be preceded with a software selectable chime or other signaling preamble prior to commencement of the announcement.
- H. System Monitoring, Supervision, and Control: Monitoring, supervision, and control of the entire PA System shall be possible from a System Control Console located at Central Communications or from any of the existing sound system equipment rooms. Automatic monitoring, supervision, and control tasks shall be delegated to a total of five (5) programmable redundant CPU Announcement Control Systems located at the various terminals of the airport complex. The entire PA System shall be controllable and software programmable by trained airport administrative personnel, such that changes to microphone station setup, announcement class priority, user group access, groupings of loudspeaker zones into zone groups, visual information system controls, PBX trunk line access, and microphone station ON/OFF status and setup may be made without hardware modifications. In addition, intermittent or continuous audio monitoring of any loudspeaker zone of the PA System shall be possible at Central Communications. An Executive Microphone Station shall also be provided at Central Communications for paging any combination or all speaker zones of the entire PA System. Access priority for that as well as all paging stations in the system shall be established by employee user group as defined by the administrator. Emergency level access shall be available at any system paging station with the login at that station of an emergency level user password and pin number. The control of music channel assignments, as well as daytime and nighttime PA System output levels shall also be possible from the System Control Console.
- I. System Logging: The Announcement Control System shall log announcements and messages played through the system. This information shall include user logged in, paging station location, time, length of message, message number (if not a live page), zone maps played to, and buss utilized. This activity information must have the ability to be sorted for discovery and managerial purposes and shall be stored in the system archive for a minimum of thirty (30) days.
- J. Page Zone Groupings and Assignments: All PA System loudspeakers shall be hardwired to one of many speaker zones, each of which shall be powered by a separate power amplifier. Page area selection shall be possible from each microphone paging station, in accordance with programmed zone groupings at the switching system to route the page announcement to the correct speaker zone or the group of speaker zones assigned to that selected page area. All microphone stations shall be connected via the common Ethernet Network (provided under this contract) and loudspeaker zone feed lines shall be hardwired to the power amplifiers. Each of these five (5) Announcement Control Systems shall route an announcement or message request from any connected microphone station to any and all combinations of separately powered speaker

zones which are also connected to that Announcement Control System, or to speaker zone groups connected to any or all of the other announcement control systems, all under preprogrammed operating system control. If a user selected speaker zone is being paged by others (or busy), or if all signal channels of the Announcement Control System are processing ongoing pages, the system shall automatically record and store the announcement. Upon release of resources (speaker zone groups) the recorded announcement shall immediately play into the desired speaker zone group in accordance with the assigned priority level. If all eight (8) channels (per announcement control system) of digital recorders are busy, the system shall indicate the "busy" status at the waiting microphone station. Upon availability of a page channel or the previously active speaker zone, a "ready" status indicator shall be provided at the waiting microphone station, and the announcement shall be processed and routed to the selected page zone group. Creation of loudspeaker zone groups and user shall be programmed by the Contractor in accordance with drawings and instructions from the Engineer.

- K. Background Music: The PA System shall have the capability of distributing one of three background music sources to each of the terminals of the airport complex. Under programmed control by the Executive Unit, any music source may be distributed to one or any combination of speaker zones of the PA System. All three background music source channels shall include an AGC amplifier to maintain the long-term average music level of each channel at a constant value. Background music levels at each speaker zone shall be adjustable separately from message announcement levels.
- L. Modularity and Future Expansion Capabilities: The PA Announcement Control Systems shall have the capability of accommodating a 50 percent increase in the number of microphone paging stations and speaker zones by the addition of plug-in electronic modules, and without requiring a rewiring or replacement of the basic system delivered under this Contract.
- M. Fail Safe Provisions: A.C. power outages, breaks in shields or signal wires, and wire breaks/shorts shall not result in component failures. All components shall be protected from failure due to operator misadjustment of component controls.
- N. System Security: Access to PA System data files, configuration modifications, automatic paging functions, and network connected devices shall be controlled using a hierarchical access system which is supervised, logged, and recorded by the PA System. Activation of microphone stations, access to the PA System network, and access to PA System modification, control, supervision, and testing functions shall be via Individual Password and PIN Number which allow each user a defined degree of access to PA System functions. All access to the PA System shall be recorded and stored for a minimum of thirty (30) days, with date, time, identification of user, system access device, and system parameter changes recorded. An unlimited number of access levels shall be provided throughout the entire PA System. In addition, modification of PA System data, parameters, and functions will be controlled by additional pass code screening within each access level.

- O. Inter Changeability of Components: All components and plug-in modules supplied for the PA System shall be of identical type and manufacturer for the functional use intended, unless specified as unique delivery components. These components include microphone paging stations, visual display devices, Announcement Control System plug-in modules, connectors, central processing unit (CPU) and memory hard drive cards, equalizers, power amplifiers, speakers, and impedance matching/isolation transformers.
- P. Freedom from Parasitic Oscillation, Electromagnetic and Electrostatic Pickup, Hum, Buzzes, Rattles, Objectionable Distortions and Other Objectionable Noises: All PA System components shall not produce parasitic oscillation, electromagnetic and electrostatic interference, hum, buzzes, rattles, or objectionable distortion.
- Q. Dynamic Range: The PA System shall have a minimum usable linear dynamic range of 40 dB without adjustment of equipment gain controls. System Signal-to-Noise Ratio shall be greater than 80 dB.
- R. Impedances: Balanced impedances shall be used throughout the PA System for microphone and line level conductors. Balanced impedances between equipment shall be maintained as necessary to insure that degradation of system frequency response, signal-to-noise ratios, and dynamic range do not occur. Balanced line impedances of 600 ohms shall be used when interconnecting Announcement Control System zone outputs to power amplifier inputs with lines of run lengths in excess of 50 FT.
- S. Frequency Response: System frequency response, from live microphone output to power amplifier input, shall be flat (within 1 dB) from 20 Hz to 20,000 Hz for all combinations of page zones.
- T. Total Harmonic Distortion: Less than 0.1% distortion at all line level outputs shall be introduced by the PA System at +24 dBm line levels, from 20 Hz to 20,000 Hz.
- U. Equivalent Input Noise: Equivalent Input Noise Level at all microphone inputs shall not exceed -125 dBV.
- V. House Curves: The final House Curves for the TSA Queuing and screening areas shall be flat (within 3 dB) between 150 Hz and 8,000 Hz and shall exhibit a 6 dB/Octave roll-off below 150 Hz and a 3 dB/Octave roll-off above 8,000 Hz, both within the frequency range of 40 to 16,000 Hz.
- W. Conservative Operation: No integrated circuits, transistors, capacitors, resistors, or transformers anywhere in the system shall be operated in excess of eighty percent of their maximum ratings specified by the manufacturer for the class of operation involved.

- X. System Maintainability: All equipment provided under the Project shall be capable of meeting maintainability requirements as follows:
1. Provide for the capability of removal of component items within each piece of equipment with minimal requirement for removal of other items to gain access to a specified item.
 2. Reduce the need for special tools, test equipment, and extender boards, to a minimum.
 3. Be designed to utilize available and proven general purpose tools and test equipment to a maximum.
 4. Be self-sufficient to the extent that performance can be verified, failures detected and located, and calibration performed with a minimum of externally applied tools and test equipment.
 5. Incorporate features which shall reduce the following maintenance practices to a minimum of time: preventive maintenance; repair of failures; and verification of system performance.
 6. Provide test extender cards, standard connectors, and cables to assist in maintenance operations and access to all circuits (electrical and mechanical) requiring maintenance.
 7. Provide self-test calibration and diagnostic measurements which localize probable system faults to a specific equipment or cable in the amplification and distribution chain of each paging zone.
 8. Provide automatic PA System failure messages via email to as many as four designated addresses when faults or problems are detected in the PA System. Also provide for high-speed internet access to the PA System for remote system monitoring and troubleshooting by manufacturer or authorized maintenance personnel, and for downloading or uploading PA System software and data by manufacturer or authorized maintenance personnel.

1.06 SUBMITTALS

- A. Submit manufacturer's product data, installation instructions, project specific shop drawings, operation and maintenance manual as indicated within SECTION 01300 – SUBMITTALS.
- B. List of Materials: The material list of items supplied under this contract shall include catalog numbers, catalog cuts and diagrams, specifications data, and other descriptive data as may be required.
1. Submittals for all electronic equipment, and architecturally exposed microphone stations, cables, connectors, and equipment mounting hardware shall be provided.
 2. Approval of material will be based upon manufacturer's published data and ratings and will be tentative subject to submission of complete shop drawings.
 3. Where performance ratings are not supplied by the manufacturer, tentative approval of material may be provided, subject to final acceptance testing and completed PA System performance requirements.

- C. Shop Drawings: Complete shop drawings and other such descriptive data as may be required to demonstrate compliance with the contract documents shall be submitted prior to installation.
1. Shop drawings shall include an overall system block diagram, indicating the relationship of all PA System equipment on a one diagram and showing power and controls, impedances, interconnections, and mounting details for co-located equipment, microphones, loudspeakers, and exposed surface mounted receptacles and switches.
 2. All shop drawings shall be submitted comprehensively to demonstrate that these items of equipment have been properly integrated and will function properly. If departures from the shop drawing are deemed necessary by the Contractor, details of such departures, including changes in related portions and reasons therefore, shall be submitted. Approved departures shall be made at no additional cost to the State.
- D. Field Posted As-Built Drawings: Complete and submit wiring diagrams and operating and maintenance documentation as indicated within SECTION 01300 - SUBMITTALS.
1. Field posted as-built drawings shall include documentation and diagrams of the interconnection of all new equipment included under this contract with existing equipment not included in this contract, as well as a list, indicating quantities, of equipment supplied but not installed.
 2. Field posted as-built drawings shall also include annotated plans delineating speaker zone boundaries and identification symbols, and table delineating pre-programmed groupings of speaker zones into microphone page zones.

1.07 QUALITY ASSURANCE

- A. The Contractor and the primary equipment manufacturer shall meet the following technical requirements:
1. Be an established installer of sound systems as evidenced by the fact that they have installed at least two (2) ADA compliant sound systems of similar size, configuration and complexity to that proposed for the project.
 2. Have a minimum of five (5) years' experience in the installation and servicing of sound systems of similar size and complexity.
 3. Have an established and current service department in State of Hawaii, with the capability of providing parts and support and shall have locally available service personnel.
 4. Personnel assigned to the Project shall be experienced electronic technicians with a minimum of two (2) years or 60 credit hours of formal academic training in analog and digital electronics theory plus two (2) years of work experience in repair and maintenance of sound systems.
 5. Personnel assigned to the Project shall be available to respond to repair service calls within one (1) working day of receipt of malfunction report from the State and/or DOT-A.

6. Additionally, the Contractor shall have an office in State of Hawaii and staffed with factory-trained personnel fully capable of installing, testing, operating, and maintaining the PA System, as well as providing the DOT-A training and emergency repair.

1.08 WARRANTIES

- A. Comply with SECTION 01300 – SUBMITTALS.
- B. The Contractor shall warrant the completed PA System components supplied and/or installed under this Contract to be free of defects in materials and workmanship for a period of one year. The Contractor's warranty shall not include repairs resulting from vandalism, theft, negligent use, or misuse of equipment.
- C. The Contractor shall also provide maintenance and repair service, including the replacement of parts, without charge to the State within the warranty period.
 1. The Contractor shall warrant that any repair and replacement of parts or assemblies necessary to keep the equipment in proper operating condition, will be performed commencing within one (1) working day by qualified electronics repair/maintenance personnel following notification to the Contractor that the equipment is in need of repair. The Contractor shall retain those personnel on the job until all necessary repair tasks are completed and the PA System is operational in its entirety. The Contractor shall advise the State, in writing, when it is determined that the PA System outages are not related to this contract, and the reasons for the determinations.
 2. In the event the Contractor fails to respond satisfactorily to the notification for repair, the State shall have the right to employ, immediately after the 24-hour period, labor and equipment for each repair task and charge the Contractor for the cost thereof. The repairs shall be completed by the parties starting the repair tasks. In the event the Contractor performs the repair tasks after the 24-hour period, all charges incurred by the State and resulting from the failure of the Contractor to respond during the 24-hour period shall be charged to the Contractor.
- D. The maintenance and repair work for the equipment installed under this contract shall not be sublet to a company which was not involved in the original equipment installation. All repair work performed shall be in accordance with original equipment manufacturers' standards and specifications, and substitutions of replacement parts which are not explicitly approved by the manufacturer will not be allowed.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. General: All products must be compatible with the existing SITA PA system currently installed at OGG. Products will need to be reviewed/approved by SITA for installation within and connection to their existing PA system at OGG.
- B. Modular Power Amplifier: Each speaker zone shall be provided with a separate power amplifier of minimum RMS power output rating of 300 watts. Power amplification requirements for each speaker zone shall be provided by combining identical modular power amplifier units as required to meet the load requirements. All power amplifiers shall be configured for balanced input impedance, rated at less than 0.5 percent total harmonic distortion at rated output for the applicable frequency response band, have a minimum signal-to-noise ratio of 80 dB at rated output, have a minimum input sensitivity of 0.8 VRMS to achieve rated output, and shall be 19-inch rack mountable. Power output ratings shall be based upon continuous sine wave output into a matched, resistive load, and amplifiers shall be configured for balanced and regulated 70-volt output. Frequency response of amplifiers at rated power shall be 35 to 20,000 Hz, flat within 1 dB. Common mode rejection shall be at least 85 dB at 60 Hz, and cross-talk ratio shall be at least 70 dB at 1,000 Hz. Power ON/OFF and output level controls, and ON/OFF indicator shall be provided. Primary Amplifier: Crown 8-channel 300N or approved equivalent, Secondary Amplifier: Crown 2-channel or 4-channel 300N or approved equivalent.
- C. PA Signal Processor: Configurable I/Os with 4 I/O card slots, open architecture, and configurable signal processing featuring CobraNet audio with primary/secondary ports for fault tolerance. Low latency, fault tolerant digital audio-bus of 256-channels using standard CAT-5E cabling between devices. Rack mountable within standard 19-inch equipment rack. Soundweb London BLU-800 or approved equivalent.
- D. Amplifier Switcher: Allows for automatic switchover between primary and secondary amplifier for added reliability. 16-primary amp inputs and 16 secondary (back-up) amp inputs, and 16 outputs. Rack mountable within standard 19-inch equipment rack. Ethernet connector for communication with paging system controller. Switching capacity of 2 Amps continuous for up to 1000W per channel audio signal. Crown CT16S or approved equivalent.
- E. Ceiling Mounted Loudspeaker: PA System flush mounted ceiling loudspeakers shall have full range type, 93 dB (SPL at 1-meter with 1 watt pink noise input) sensitivity with four (0.75W, 1.5W, 3W and 6W) transformer taps in 70V operation, 60 Hz to 18,000 Hz frequency response, 130 degree dispersion angle; and with nominal 4-inch overall diameter. JBL 8124 or approved equivalent.
- F. Pendant Loudspeaker: PA System pendant loudspeakers shall have full range type, with 2.25-inch low frequency reproducer, 87 dB (SPL at 1-meter with 1 watt

pink noise input) sensitivity with 8W and 16W transformer taps in 70V operation, 95 Hz to 16,000 Hz frequency response, 130 degree dispersion angle; and with nominal 5.9-inch overall diameter. Bose Freespace FS2P or approved equivalent.

- G. Line Level Conductors: Microphone and line level conductors shall be minimum No. 22 AWG, stranded, tinned copper, polypropylene or polyethylene insulated, twisted pair, 100 percent shield coverage of individual twisted pairs with common stranded tinned copper drain wire, and with vinyl or PVC jacket. Twisted pairs shall be individually shielded.
- H. Replacement Speaker Sense Line Conductors: Conductors used to sense zone output levels at the speaker at the far end of the speaker feed system shall be No. 20 AWG, stranded, tinned copper, polypropylene or polyethylene insulated, twisted pair, 100 percent shield coverage of individual twisted pairs with common stranded tinned copper drain wire, and with vinyl or PVC jacket.
- I. Spare Modules: Provide a sufficient inventory of spare modules on site to properly maintain and repair the PA System, and in particular, the Announcement Control System and modular power amplifiers, so that prolonged system outages will not result from the lack of replacement parts. A minimum of two spare modules for each of the field replaceable plug-in types shall be provided. Provide one spare Announcement Control System micro-processor motherboard. The Contractor shall also maintain a sufficient inventory of spare parts at his place of business to properly maintain and repair the PA System.

2.02 FIELD POSTED AS-BUILT DRAWINGS

- A. The Contractor shall also furnish six (6) copies of a PA System Maintenance Manual which includes the following items:
 - 1. An as-built system block diagram for the PA System, giving essentials of the installation and their functional relations.
 - 2. A wiring diagram showing the location and number of all power amplifiers, loudspeakers, and microphone stations covered by each PA Announcement Control System. The location and routing of all loudspeaker feed system loops and loudspeaker sense wiring, as well as system monitor point wiring, shall be included in the wiring diagrams.
 - 3. Complete field posted as-built drawings, interconnection wiring lists and plans with terminal and cable identification. The locations of all test and monitoring points, modules, and system component groups shall be included in these plans to simplify maintenance.
 - 4. Complete table of installed system calibration levels at all monitor and speaker sense points.
 - 5. Recommended daily and routine monitoring and maintenance procedures for verifying PA System operation and for detecting problems and faults within two minutes of their occurrence so as to reconstruct probable cause of problem or fault.

6. Complete fault diagnostic instructions and procedures using the operating system status messages and monitor point calibration levels, so as to isolate problems to a single module or circuit.
7. Original Equipment Manufacturers' Warranties on all materials supplied.

PART 3 – EXECUTION

3.01 PREPARATION

- A. The Contractor shall be responsible for verifying the completeness, correctness, and the overall suitability of the equipment to meet the overall PA System performance requirements of this specification. In the event the Contractor discovers any errors or discrepancies, the Contractor shall immediately notify the State for further direction.
- B. The Contractor shall coordinate the Work with all other trades with which this work overlaps or is dependent upon, verify all dimensions before proceeding, obtain measurements at the Project Site for all work required to be accurately fitted to other construction, coordinate selection of architecturally finishes, materials, and installation methods with the State.

3.02 PRE-INSTALLATION TEST

- A. Tests to verify the proper operation of existing equipment to be reused shall be performed by the Contractor in the presence of the State and the Engineer prior to installation. The Contractor shall arrange for the time of these tests, provide the State and the Engineer with two-day notice, and supply test equipment and operating personnel as required.
- B. If the status of the existing sound system equipment is not determined prior to commencement of installation by tests in the presence of the Engineer, the Contractor will have waived any future claims regarding the suitability of existing equipment which are to be incorporated into this work, and replacement of the existing equipment shall be at the Contractor's expense.
- C. Where the Contractor has determined that existing equipment requires replacement, the State and the Engineer shall be notified of the deficiencies. Performance tests of the equipment shall be conducted by the Contractor in the presence of the State and the Engineer.

3.03 FACTORY ACCEPTANCE TESTING AND DEMONSTRATION

- A. Prior to delivery and installation of the PA System's equipment, factory acceptance testing and demonstration of a mockup system shall be performed at the factory or other mutually agreed upon location. The intent of the factory acceptance testing and demonstration is to confirm that the hardware and

software to be installed is capable of complying with the requirements of this specification, and that no serious deficiencies are present in the hardware and software to be supplied prior to installation.

- B. As a minimum, the equipment and software required to implement the deliverables shall be tested and demonstrated as indicated within this specification section in the presence of the State prior to delivery and installation.
- C. When the system provided will be an extension of an existing system and the new equipment will be of the same manufacturer as the existing equipment, documentation from the equipment manufacturer certifying that the equipment provided will be compatible with the existing system components will be accepted in lieu of a pre-construction demonstration.

3.04 INSTALLATION

- A. All equipment shall be firmly held in place. Fastenings and supports shall be adequate to support their loads with a safety factor of at least three (3). All switches, connectors, jacks, receptacles, cables, and cable terminations shall be clearly, logically, and permanently marked and documented.
- B. All display and data entry devices shall be securely mounted to deter theft. Use of security screws and/or locking devices shall be used for devices not located in secure equipment rooms.
- C. The Contractor shall perform all wiring, installations, and interconnections in accordance with standard broadcast practices, EIA and IEEE standards, manufacturer's recommendations, and the National Electric Code. The Contractor must take such precautions as are necessary to protect and guard against electrostatic and electromagnetic pickup, and to provide safety for the operators.
- D. Microphone lines (levels below -20 dBm), line level circuits (up to +30 dBm), and speaker circuits (above +30 dBm) shall be run in separate conduits. Speaker sense conductors may be run in common conduits with speaker conductors if shielded, twisted pair, conductors are used for the sense lines. All lines shall be electrically insulated from the conduit and from each other over the entire conduit length. Microphone and line level circuit conductors in conduits shall not be spliced unless prior approval is obtained from the Engineer. The Contractor shall indicate all locations for proposed splices of microphone and line level conductors in the shop drawings. All joints and connections shall be made with approved mechanical connectors or terminal blocks. Stranded wire ends shall not be tinned with solder when installed in compression type screw terminals.
- E. Announcement Control System and power amplifier equipment shall be installed in 19-inch racks in the spaces as shown in the plans. System Control Computer Console and desk top Network Paging Station shall be installed in the vicinity of the existing paging microphone in Central Communications. The Multi-Play

Compact Disc Player shall be installed on a new shelf provided by the Contractor above the desk top microphone. The Contractor shall install quick disconnect cable connectors between equipment as necessary to facilitate equipment removal and installation.

- F. All loudspeakers shall be wired in phase and in parallel when connected to a common loop feed circuit. Branch circuits shall not be allowed in any speaker zone. Loudspeaker cables installed in non-metallic conduits shall be shielded. Zones of loudspeakers shall be individually wired as indicated in the plans. Each zone of loudspeakers shall be powered by separate power amplifiers and shall be monitored for proper operation of the entire speaker distribution line out to the furthest loudspeaker from the amplifier.
- G. Assignments of microphone stations to loudspeaker zones shall be performed by the Announcement Control System as indicated in the drawings, or as amended by the Engineer prior to completion of PA System installation. Background music assignments to each loudspeaker zone shall also be programmed by the Announcement Control System. Levels of background music shall be initially adjusted to be 15 dBA below the average paging levels in each loudspeaker zone.
- H. Programmed attenuator and power amplifier adjustments shall be performed by the Contractor to set speaker zone levels for the daytime and nighttime levels. The Contractor shall initially adjust daytime average page levels to be approximately 20 dB above background ambient noise within the speaker zone under condition of normal occupancy. Programmed nighttime average page (and music) levels shall be initially set to approximately 10 dB below daytime levels in each page zone. The daytime period shall be defined as from 6:00 AM to 12:00 Midnight. The Engineer shall be notified if any of these initial settings produce unacceptably high or low page or music levels.
- I. The Contractor shall provide PA System connection blocks for the one commercial music and ten telephone trunk line circuits which are external to the PA System. The Contractor will restore all connections to these circuits which were removed during his PA System installation work.
- J. Final Adjustments: The Contractor is responsible for performing all final adjustment and system software parameter changes to meet the requirements of this specification. All adjustments and final parameter settings shall be recorded by the Contractor in the final system As-Built drawings and documentation. All final adjustments shall be performed prior to Acceptance Testing by the State.

3.05 ON-SITE TESTING AND DEMONSTRATION

- A. All tests and demonstrations shall be performed by the Contractor. The Contractor shall furnish all equipment necessary to perform these tests and perform all work required to modify the performances of the PA System required

by the specifications. Electronic Industry Association standards RS-219 and RS-160 shall be followed in performing these tests.

- B. Loudspeaker Feed Line Impedance: The Contractor shall measure the impedance of each loudspeaker line entering the equipment racks, without power amplifier connected, but with all loudspeakers and transformer taps connected. The absolute value shall be measured at 400 Hz and recorded. Any deviations which indicate possible speaker line abnormalities shall be checked by the Contractor prior to connection of the power amplifiers.
- C. Loudspeaker Phasing: Checks of loudspeaker phasing for distributed loudspeakers in each speaker zone shall be performed by using a phase and polarity testing device such as that manufactured by GoldLine (model APTf2) or Neutrik. Verify positive polarity from each speaker in each zone. Correct wiring as necessary to achieve in phase polarity of every speaker in the system.
- D. Freedom from Parasitic Oscillation, Interference, and Radio Frequency Pickup: The Contractor shall check to ensure that all microphone stations, telephone answering stations, and speaker zones are free from spurious oscillation and radio frequency pickup, both in the absence of any audio input signal and also when the system is driven to full output at 200 Hz. The Contractor shall employ an oscilloscope having at least a 5 MHz bandwidth for these checks.
- E. Freedom from Buzzes, Rattles and Objectionable Distortion: The Contractor shall apply a high-quality music signal to each speaker, adjusting the system for frequent peaks (A-weight, SLOW) of 90 dB sound pressure level, and listen carefully for buzzes, rattles and objectionable distortion. The Contractor shall correct any causes of these defects, unless the cause is clearly outside his system equipment and installation, in which case the cause shall be brought to the attention of the State and the State's agent.
- F. Hum and Noise Level: The equivalent input hum and noise level shall be measured for each microphone and music channel. Microphone and line level inputs shall be terminated with shielded resistors of 150 and 600 ohms, respectively, for these measurements.
- G. Demonstration of PA System Paging and Visual Display Capabilities: The Contractor or their agent shall demonstrate the operation of each major component and feature, and of the complete installation, using each microphone furnished, all required microphone and telephone stations, all music sources, and all other PA System equipment and capabilities. Demonstration shall include programming and modifications of system zone and source assignments, paging via a standard telephone, EMERGENCY ALL PAGE to all zones of the airport complex from Central Communications, EMERGENCY TERMINAL AREA PAGE to all zones of a terminal area switching unit, selective zone pages from Central Communications, paging during "Busy" periods, automatic timeout of microphone stations due to long page or quiet periods, automatic daytime/nighttime level attenuation changes, system aural monitoring, system failure sensing and reporting, and system boot and start-up procedures. ADA compliant

announcements from standard network keypad and network plus microphone stations and their resulting visual displays shall be demonstrated.

- H. Listening Tests: These tests may include subjective tests by observers at various positions, listening under various operating conditions. Speech intelligibility surveys may be part of this testing procedure.
- I. Equipment Tests: Tests may be performed on any item of equipment or group of items to determine whether it meets the pertinent specifications. Any measurements deemed necessary by the State or the State's agent may be made for frequency response, distortion, noise or other characteristics, with the support and cooperation of the Contractor.
- J. Adjustments: In case the need for further adjustments becomes evident during the demonstration and testing, the Contractor's work shall be continued until the installation operates properly.

3.06 TRAINING

- A. There is no new user interfacing equipment in the system upgrade, only amplifiers, loudspeakers, and noise sensors to add new listening zones to the existing system. As the system is already in place with the users trained on the system, there is a minimal training requirement other than identifying the new zones which are addressable by the existing system. Training is limited to 4, ½ hour sessions to user groups up to 10 people at a time, as needed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Public Address System Integration with existing Public Address System, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for added Public Address System Integration with existing Public Address System required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16770.1	Public Address System	Lump Sum
16770.2	Public Address System - Existing TSA Checkpoint Work (Phase 2)	Lump Sum
16770.3	Public Address System Integration with Existing Public Address System	Allowance

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 PRICE.

END OF SECTION

SECTION 16771 - PUBLIC ADDRESS VISUAL PAGING SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

The requirements in Section 16770 – Public Address System shall also apply to this section.

The airport operational information contained within the FIDS data base will be integrated and used by the PA System when performing automated, announcements.

1.02 APPLICABLE PUBLICATIONS

The Electronic Industries Alliance (EIA) publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

EIA-160	Sound Systems
EIA-174	Audio Transformers for Electronic Equipment
EIA-219	Audio Facilities for Radio Broadcasting Systems
EIA-297-A	Cable Connectors for Audio Facilities for Radio Broadcasting
EIA-310-D	Cabinets, Racks, Panels and Associated Equipment
EIA-426-B	Loudspeakers, Optimum Amplifier Power
EIA-560	Method for Measurement for Compact Disc Players
EIA-470-B	Telephone Instruments with Loop Signaling for Voiceband Applications
EIA-490	Standard Test Methods of Measurement for Audio Amplifiers
SE-101-A	Amplifiers for Sound Equipment
SE-103	Speakers for Sound Equipment
SE-105	Microphones for Sound Equipment

Additional publications and standards listed below form a part of this specification to the extent referenced.

28 CFR Part 36	ADA Standards for Accessible Design
ANSI 568-B	Commercial Building Telecommunications Cabling Standard (General Requirements, Balanced Twisted Pair, and Optical Fiber)
IEEE 802 Series	Local Area Network (LAN) Standards

1.03 SCOPE OF WORK

A. General

Work covered by these specifications and related documents consists of providing all shop drawings, , Public Address (PA) System hardware and software related to the visual paging system, visual displays, interconnecting wiring, documentation, technical supervision, labor, transportation, permits, user training, and testing, as required, to install, and maintain a Public Address System at the new South TSA SSCP extension in the Kahului Airport (OGG), in strict accordance with these specifications and the contract drawings, and subject to the terms and conditions of the Contract.

B. Work Items

The work in general consists of, but is not limited to, the following items to the extent that they are required to comply with ADAAG Chapter 7: Communication Elements and Features:

1. All visual displays, and monitoring equipment hardware and software required for the visual paging function of the Public Address System in the renovated area. The Public Address System in the renovated area shall be an extension of the existing Public Address System at OGG.
2. All telecommunications, network, and interconnecting cables, equipment, connectors, and receptacles for the new visual paging equipment, and equipment power wiring from the A.C. power receptacles.
3. All labor, hardware, and software required for the integration, installation, wiring, adjustment, and testing of the visual paging portion of the Airport Public Address System. Where existing equipment is to be integrated into the Airport Public Address System by the Contractor as indicated in the plans, the Contractor shall verify that the existing equipment is operating properly prior to commencement of work on this project.
4. Complete As-Built documentation, wiring diagrams, and operating instructions on the visual paging portion of the Public Address System installed under this contract. As-Built documentation to include documentation and diagrams of the interconnection of new equipment included under this contract with existing equipment not included in this contract, as well as a list, indicating quantities, of equipment supplied but not installed.
5. Minimum one (1) year warranty on the new Public Address System hardware and software components supplied and/or installed under this Contract, including all maintenance services, replacement parts, and repair services required during the one (1) year warranty period. The Contractor shall not

be responsible for acts of vandalism, theft, or loss of PA System equipment attributable to others.

6. Notwithstanding the detailed information contained in this performance specification, it is the responsibility of the Contractor to supply a properly working Public Address System, and to warrant it for a period of one year. The Contractor is responsible for verifying the completeness of the functional equipment list and overall suitability of the equipment to meet the performance requirements of this specification. Any additional equipment, labor and testing needed in order to meet the system performance requirements stated shall be supplied by the Contractor without claim for additional payment.

1.04 SOUND SYSTEM CONTRACTOR QUALIFICATIONS

A. Qualifications

In order to be considered qualified, the primary PA equipment manufacturer shall meet the following technical requirements:

1. Be an established installer of sound systems as evidenced by the fact that he has installed at least two ADA compliant sound systems of similar configuration and complexity to that proposed for the project.
2. Have a minimum of five years experience in the installation and servicing of sound systems of similar size and complexity.
3. Have or shall establish a Service Department in Hawaii, with the capability of providing parts support.
4. Have locally available service personnel.
 - a. Personnel assigned to this job shall be experienced electronic technicians with a minimum of two (2) years or 60 credit hours of formal academic training in analog and digital electronics theory plus two (2) years of work experience in repair and maintenance of sound systems.
 - b. Personnel assigned to this job shall be available to respond to repair service calls within 1 hour after notification of a trouble report from the State of Hawaii.
5. The following suppliers are qualified. All other suppliers shall be qualified through the Substitution Request process.
 - a. SITA.

B. Business Office and Licenses

Additionally, the Contractor shall have or establish an office in the Maui County, State of Hawaii, staffed with factory-trained personnel fully capable of installing, testing, operating, and maintaining the PA System, as well as providing owner training and emergency repair service. The Contractor shall possess a General Excise Tax License and a business license for the State of Hawaii.

1.05 OVERALL SYSTEM PERFORMANCE REQUIREMENTS

A. Environmental

System components shall operate as specified under the following environmental conditions:

1. Dry Bulb Temperature: 65 deg. to 85 deg. F normally; 95 deg. F intermittently.
2. Relative Humidity: 25 to 60 percent normally; 10 to 90% intermittently.
3. Ventilation Air: No forced ventilation is to be provided within equipment enclosures by the State.
4. A.C. Power Voltage Fluctuation: Normally plus/minus 10% of 118 VAC. Voltage transients during power outages and switchover to backup power may also occur intermittently.
5. A.C. Power Frequency Fluctuation: Normally plus/minus 3% of 60 Hz.
6. Electromagnetic and Electrostatic Fields: As applicable for the facility location, within one mile of radio and radar transmitters, and in close proximity to electrical and mechanical equipment, including high intensity discharge lamps.

B. Paging Features compliant with ADAAG Chapter 7: Communication Elements and Features

Each microphone paging station shall be capable of automatically initiating actual human voice paging announcements with simultaneous and synchronized visual text display of the announcements in matching zones. Announcements shall be selectable by type, and shall be automatically assembled using prerecorded human voice and stored text plus the applicable operational information contained in the FIDS data base. There should not be audible clues which allow the listener to determine that the announcements were assembled using prerecorded voice passages or takes. These announcements include: Flight Arrival; Baggage Availability; Aircraft Boarding; Final Call; Delayed Flight Arrival; Delayed Flight Departure; Departure Gate Change; Arrival Gate Change; Departure Canceled Flight; Arrival Canceled Flight; Immigration Check-In Procedures; and Customs Processing Procedures. Voice and text message libraries shall be included for English, Hawaiian, Japanese, Korean, and Chinese languages.

Network Plus (or equivalent text-entry) microphone stations shall be capable of producing any and all types of synthesized voice paging announcements with simultaneous and synchronized visual display of the announcements whenever the announcements contain names, places, objects, or times which are not normally stored in the flight information or public address system message libraries. These announcements shall be assembled at the Network Plus microphone stations using announcement text assembly and entry devices. Examples of these announcements include: Report of item left at security checkpoint; message for an individual to report to a gate, security check point,

ticket lobby, or hold room counter; or message for an individual to claim lost baggage. All announcements shall be stored and organized for automatic or selective repeat execution without reentry of the announcement text. The speech-to-text engine shall be of the highest quality available at the time of the factory acceptance testing. Voice and text engines shall be provided for English, Hawaiian, Japanese, Korean, and Chinese languages.

Visual displays which are used for displaying announcement text in real time shall meet ADA requirements for minimum "X" character height of 3 inches; 3:5 to 1:1 width-to-height ratio; 1:5 to 1:10 stroke-width-to-height ratio; non-glare finish; and maximum contrast (light characters on dark background) requirements. Visual displays which are used for displaying announcement text in real time shall be synchronized line for line with the voice audio announcements from the speaker system.

Visual displays which are used for displaying announcement text in real time shall display a flashing preamble of minimum 3 seconds duration prior to commencement of the announcement. Use of this feature shall be administrator selectable at the time of installation.

All PA System announcements which are directed toward airport employees or airlines' employees and operations personnel rather than the general or traveling public shall be preceded with a software selectable chime or other signaling preamble prior to commencement of the announcement.

Visual displays which are used as message storage boards (bulletin boards) shall store announcements and continuously display those announcements in vertical scrolling display format on a first-in, first-out basis. The types of messages stored and the duration of the storage period for each message shall be software selectable. Minimum character height for these message storage board displays shall be 1 inch.

C. Page Zone Groupings and Assignments

Visual display assignments to the various speaker zones shall be programmed by the Contractor and coordinated with the PA system speaker zone assignments.

D. Fail Safe Provisions

A.C. power outages, breaks in shields or signal wires, and wire breaks/shorts shall not result in component failures. All components shall be protected from failure due to operator misadjustment of component controls.

E. System Security

Access to PA System data files, configuration modifications, automatic paging functions, and network connected devices shall be controlled using a hierarchical access system which is supervised, logged, and recorded by the PA System.

F. Interchangeability of Components

All components and plug-in modules supplied for the Public Address System shall be of identical type and manufacturer for the functional use intended, unless specified as unique delivery components. These components include visual display devices, Public Address Subsystem plug-in modules, and connectors,

G. Conservative Operation

No integrated circuits, transistors, capacitors, resistors, or transformers anywhere in the system shall be operated in excess of eighty percent of their maximum ratings specified by the manufacturer for the class of operation involved.

H. System Maintainability

All equipment provided under the Contract shall be capable of meeting maintainability requirements as follows:

1. Provide for the capability for removal of component items within each piece of equipment with minimal requirement for removal of other items to gain access to a specified item.
2. Reduce the need for special tools, test equipment, and extender boards, to a minimum.
3. Be designed to utilize available and proven general purpose tools and test equipment to maximum.
4. Be self sufficient to the extent that performance can be verified, failures detected and located, and calibration performed with a minimum of externally applied tools and test equipment.
5. Incorporate features which shall reduce the following maintenance practices to a minimum of time: preventive maintenance; repair of failures; and verification of system performance.
6. Provide test extender cards, standard connectors, and cables to assist in maintenance operations and access to all circuits (electrical and mechanical) requiring maintenance.
7. Provide automatic PA System failure messages via email to as many as four designated addresses when faults or problems are detected in the PA System. Also provide for high speed Internet access to the PA System for remote system monitoring and troubleshooting by manufacturer or authorized maintenance personnel, and for downloading or uploading PA System software and data by manufacturer or authorized maintenance personnel.

1.06 GENERAL INTENT

The intent of these specifications is to specify high grade standard equipment and it is not the intent of these specifications to exclude or limit the products of any responsible manufacturer, if such products are equal or better in every respect as specified herein. Whenever an article or any class of material is specified by the trade name or by the name of any particular patentee, manufacturer, or dealer, it shall be taken as intending to mean and specify the article or material described or any other serviceable item, for the purpose of which it or they are intended.

Item Descriptions: All descriptions included herein are general and it shall be understood that all optional equipment, accessories, fasteners, anchorage devices, protective finishes, trip pieces and the like for complete installations be provided as specified. The Contractor shall submit a bid that is completely workable without the necessity to add additional items after submission of the bid.

All externally powered equipment shall include a chassis grounding wire when operating directly from A.C. power, shall be fused, and shall be the latest standard product of a manufacturer who is regularly engaged in the manufacture of such equipment. All equipment shall be installed so as to insure the safety of the operators.

All electronic circuitry shall be of solid state design. Equipment operating at audio signal levels below -20 dBm shall be interconnected with shielded, twisted pair, color coded, and stranded conductor cables. All interconnections between equipment items shall be made through the use of approved mating connectors.

"Scatter Wired" panels will not be acceptable. All markings, including markings on knobs, shall be deeply etched and filled or engraved to reveal a contrast in color. Silk screening or other temporary marking methods will not be acceptable. All rotary knobs shall be secured with socket headed set screws in metal inserts. All cables shall be neatly wrapped and bundled using approved cable straps, and be clearly identified using permanent labels which are manufactured for that purpose. Telecommunications or network cables shall be documented and labeled in accordance with EIA 606-A.

1.07 SUBMITTALS

A. List of Materials

The Material List of items supplied under this contract shall include: catalog numbers, cuts and diagrams, specifications data, and other descriptive data as may be required. Submittals for all electronic equipment, and architecturally exposed microphone stations, visual displays, cables, connectors, and equipment mounting hardware shall be provided. Approval of material will be based upon manufacturer's published data and ratings, and will be tentative

subject to submission of complete shop drawings. Where performance ratings are not supplied by the manufacturer, tentative approval of material may be provided subject to final acceptance testing and completed Public Address System performance in accordance with this specification.

B. Shop Drawings

Complete shop drawings and other such descriptive data as may be required to demonstrate compliance with the contract documents shall be submitted prior to installation. Shop drawings shall include an overall system block diagram, indicating the relationship of all Public Address System equipment on one diagram and showing power and controls, impedances, interconnections, and mounting details for co-located equipment, visual paging displays and exposed surface mounted receptacles and switches. All shop drawings shall be submitted at one time to demonstrate that these items of equipment have been properly integrated and will function properly. If departures from the shop drawing are deemed necessary by the Contractor, details of such departures, including changes in related portions and reasons therefore, shall be submitted. Approved departures shall be made at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Visual Information System For ADA Compliant Announcements

The Public Address System shall be provided with hardware and software for creating, storing, and distributing visual messages for display in text form onto display devices simultaneously with prerecorded or assembled voice pages or with synthetic voice pages generated by text-to-speech software. Announcements originating from speaking into the push-to-talk and gooseneck microphones, and from the telephone interface stations may be disregarded by the Visual Information System. For prerecorded or assembled voice pages and for synthetic voice pages generated by text-to-speech software, the Visual Information System shall be synchronized line for line with the audio announcements emanating from the PA System speakers in that zone, and shall provide the text replica of the audio announcements on a word-for-word basis. Capability for visual display of typed-in text messages, while disabling the text-to-speech software and using the push-to-talk or gooseneck microphones for paging compliant with ADAAG 708: Two-Way Communication Systems shall also be provided at all Network Plus microphone stations equipped with keyboard terminals. The Visual Information System shall also provide for picture-in-picture capabilities at gate, holding room, and baggage claim area displays, and time sharing of the display devices with flight information, advertising, and visual messages. The Visual Information System shall also be capable of storing text messages on a first-in-first-out basis for display on scrolling (or Bulletin Board) display units. The types of messages to be stored and their individual storage

times shall be software selectable. All visual messages shall be automatically routed to the display devices which are located within the speaker zones which also reproduce the same announcements in audio form. Visual displays at gate, holding room, and baggage claim areas shall display current airline flight information and status applicable to their respective locations when not being engaged in paging announcements. Standard logos, symbols, and seals used by airlines, Hawaii State Department of Transportation, Department of Homeland Security, etc. shall be used when displaying flight or instructional information. Visual announcements in English, Hawaiian, Japanese, Korean, and Chinese languages are to be included.

B. LCD Visual Display Devices

Provide 50" diagonal LCD, flat screen, 4K displays with required a.c. power conditioning unit, network interface and display driver electronics, anti-glare screen, and mounting hardware for use as multipurpose displays. Displays shall commercial grade specifically designated for use as digital signage. The following minimum capabilities are required: 170 degree horizontal and vertical viewing angle; 16:9 screen aspect ratio; 450 cd/m² brightness; 600:1 contrast ratio; 23 ms response time; 16 million display colors; 1920x1080 native resolution; and VGA, SVGA, XGA, SXGA, and UHD TV display resolutions and formats. Each display shall include remote control functions for: Power ON/OFF; OSM (On Screen Manager); color, tint, sharpness, contrast, and brightness; picture size and position; and input signal select. Each display shall also be able to transmit display status information such as: Power supply status; display status; and accumulated ON time. Display devices shall also meet requirements of Flight Information Display System (FIDS) if used in multipurpose applications. The ON/OFF times of the displays located at Gate Holding Rooms and Baggage Claim areas shall be software programmable. Displays in these service areas shall be automatically turned ON within 1.5 hours (or as selected by the Engineer) of the next scheduled operation at the respective service area, and remain ON until 1 hour (or as selected by the Engineer) past the last scheduled flight operation time, and then be automatically turned OFF if future scheduled operations are not anticipated at the respective service area within the next 1.5 hours (or as selected by the Engineer). Displays located at Security Check Points, and shown as "S" displays in the plans, shall display Security Check Point Instructions to Travelers, except when "ducked" during real time visual page announcements. Samsung QMB Series or approved equivalent.

C. System Automation, Integration, Control, Testing, and Monitoring Capabilities

The audio and visual information systems shall be integrated with each other and with the Flight Information Display System (FIDS), and shall be interconnected via private network communication cables. Operational flight information in the PA System database shall be automatically updated from the FIDS server. The PA System database shall be accessed when assembling and producing ADA compliant paging announcements from the standard network keypad and Network Plus microphone stations. Normal operations of audio paging and ADA compliant visual paging shall not require continuous response from the FIDS

server to operate. In addition, typed-in messages from the Network Plus microphone stations with keyboard terminals shall be processed through the text-to-speech engine, and synchronized line for line during announcements on the display devices and speakers. All typed-in messages involving paging for named individuals shall include fill-in blank areas for the individuals' names. The system will also include a provision for storing and displaying the typed-in names of the individuals on software assignable displays with picture-in-picture capabilities. Audio announcements routed to certain software selectable speaker zones shall be stored and displayed on software assignable scrolling (Type "Vs" or Bulletin Board) displays.

2.02 AS-BUILT DOCUMENTATION

A. PA System Maintenance Manuals

The Contractor shall also furnish 6 copies of a PA System Maintenance Manual which includes the following items:

1. An as-built system block diagram for the Public Address System, giving essentials of the installation and their functional relations.
2. A wiring diagram showing the location and number of all visual display devices. The location and routing of all system monitor point wiring shall be included in the wiring diagrams.
3. Complete, as-built, interconnection wiring lists and plans with terminal and cable identification. The locations of all test and monitoring points, modules, and system component groups shall be included in these plans to simplify maintenance.
4. Recommended daily and routine monitoring and maintenance procedures for verifying PA System operation and for detecting problems and faults within two minutes of their occurrence so as to reconstruct probable cause of problem or fault.
5. Complete fault diagnostic instructions and procedures using the operating system status messages and monitor point calibration levels, so as to isolate problems to a single module or circuit.
6. Original Equipment Manufacturers' Warranties on all materials supplied.

PART 3 - EXECUTION

3.01 PREPARATION

The Contractor shall be responsible for verifying the completeness, correctness, and the overall suitability of the equipment to meet the overall Public Address System performance requirements of this specification. In the event he discovers any errors or discrepancies, the Contractor shall immediately notify the Engineer.

The Contractor shall coordinate this work with all other trades with which this work overlaps or is dependent upon, verify all dimensions before proceeding, obtain measurements at the site for all work required to be accurately fitted to other construction, and coordinate selection of architecturally sensitive finishes, materials, and installation methods with the Engineer.

3.02 PRE-INSTALLATION TESTS

Tests to verify the proper operation of existing equipment to be reused shall be performed by the Contractor in the presence of the Engineer prior to installation. The Contractor shall arrange for the time of these tests, provide the Engineer with two-day notice, and supply test equipment and operating personnel as required.

If the status of the existing sound system equipment is not determined prior to commencement of installation by tests in the presence of the Engineer, the Contractor will have waived any future claims regarding the suitability of existing equipment which are to be incorporated into this work, and replacement of the existing equipment shall be at the Contractor's expense.

Where the Contractor has determined that existing equipment (indicated as Allowance Items in the Proposal Schedule) requires replacement, the Engineer shall be notified of the deficiencies. Performance tests of the equipment shall be conducted by the Contractor in the presence of the Engineer if required by the Engineer. All existing equipment to be replaced by the Contractor shall require the approval of the Engineer prior to their replacement as Allowance Items.

3.03 FACTORY ACCEPTANCE TESTING AND DEMONSTRATION

Prior to delivery and installation of the PA System equipment at Kahului Airport, factory acceptance testing and demonstration of a mockup system shall be performed at the factory or other mutually agreed upon location. The intent of the factory acceptance testing and demonstration is to confirm that the hardware and software to be installed is capable of complying with the requirements of this specification, and that no serious deficiencies are present in the hardware and software to be supplied prior to installation.

As a minimum, the equipment and software required to implement the deliverables identified in Paragraphs 1.05.D, 1.05.E, 1.05.F, 1.05.G, 1.05.H, 1.05.I, 1.05.J, 1.05.K, 1.05.L, 1.05.M, and 2.01.A through 2.01.C shall be tested and demonstrated in the presence of the Engineer prior to delivery and installation.

When the system provided will be an extension of an existing system and the new equipment will be of the same manufacturer as the existing equipment, documentation from the equipment manufacturer certifying that the equipment provided will be compatible with the existing system components will be accepted in lieu of a pre-construction demonstration.

3.04 INSTALLATION

All equipment shall be firmly held in place. Fastenings and supports shall be adequate to support their loads with a safety factor of at least 3. All switches, connectors, jacks, receptacles, cables, and cable terminations shall be clearly, logically, and permanently marked and documented. PA System equipment and cables installed shall be clearly marked and identified as "PA System" equipment in all equipment closets and rooms.

All display and data entry devices shall be securely mounted to deter theft. Use of security screws and/or locking devices shall be used for devices not located in secure equipment rooms.

The Contractor shall perform all wiring, installations, and interconnections in accordance with standard broadcast practices, EIA and IEEE standards, manufacturer's recommendations, and the National Electric Code. The Contractor must take such precautions as are necessary to protect and guard against electrostatic and electromagnetic pickup, and to provide safety for the operators.

The Contractor shall sequence his work such that outages of the audio sections of the PA System do not occur during aircraft boarding operations at the gates and holding rooms. In all other areas, outages of the audio sections of the PA System shall be limited to the period from 10:00 pm to 5:00 am. If such outages are unavoidable, the Contractor shall provide acceptable portable PA Systems for use during these outages.

Final Adjustments: The Contractor is responsible for performing all final adjustment and system software parameter changes to meet the requirements of this specification. All adjustments and final parameter settings shall be recorded by the Contractor in the final system As-Built drawings and documentation. All final adjustments shall be performed prior to Acceptance Testing by the Owner.

3.05 ON-SITE TESTING AND DEMONSTRATION

All tests and demonstrations shall be performed by the Contractor. The Contractor shall furnish all equipment necessary to perform these tests and perform all work required to modify the performances of the Public Address System required by the specifications. Electronic Industry Association standards RS-219 and RS-160 shall be followed in performing these tests.

Equipment Tests: Tests shall be performed on any item of equipment or group of items to determine whether it meets the pertinent specifications. Any measurements deemed necessary by the Engineer shall be made for frequency response, distortion, noise or other characteristics, with the support and cooperation of the Contractor.

Adjustments: In case the need for further adjustments becomes evident during the demonstration and testing, the Contractor's work shall be continued until the installation operates properly.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Public Address Visual Paging System Integration with Existing System will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for Public Address Visual Paging System Integration with Existing System required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16771.1	Public Address Visual Paging System	Lump Sum
16771.2	Public Address Visual Paging System Integration with Existing System	Allowance

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 PRICE.

END OF SECTION

SECTION 16780 – VIDEO SURVEILLANCE SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes expansion of the existing Genetec video management system.
- B. Section includes integration with the existing C-Cure Access Control System.
- C. Section includes programming of existing Video Management System Software (VMS) and network video storage, to be completed by the Contractor.
- D. Section includes one (1) new VMS workstation at TSA checkpoint.
- E. Physical Hosts (Servers) and Internet Protocol (IP) network hardware (switches) shall be furnished by Telecom Contractor. Switches shall be programmed and tested by the Telecom Contractor. Incumbent Security and Telecom maintenance contractor shall provide final network connection and configuration for use with the VMS.

1.03 REFERENCES

- A. State:
 - 1. The State's General Conditions shall be considered as forming an integral part of the Specification and shall be carefully examined before proposals for any Work are submitted. Unless this Section contains statements, which are more definitive or more restrictive than those contained in the State's General Conditions, this Specification shall not be interpreted as waiving or overruling any requirements expressed in the General Conditions of the contract.
 - 2. The Work is critical to the security of the State's facility. All plans, Specifications and other documentary material and information about the Work are considered Security Sensitive Information (SSI) under CFR49 Part 1520 and must remain secure and confidential at all times. Confidential information must not be deliberately or inadvertently disclosed to anyone other than the Contractor's personnel and subcontractors who require disclosure to perform their portion of the Work. The Contractor shall keep track of all confidential information at all times and shall ensure that all copies are accounted for at all times. The Contractor shall not permit any persons to have access to the confidential information of the

Work unless and until the Contractor has assured itself of the trustworthiness of such persons.

B. Supplemental Conditions:

1. The Contractor represents that he/she is familiar with and has expertise in the Work of this nature and scope and has the appropriate licenses to perform the work.
2. The Contractor further agrees to provide the work described in the specifications but not shown on the drawings, and work shown on the drawings but not described in the specifications, as though expressly required by both.
3. The Contractor shall comply with all the legal regulations, including OSHA safety regulations and regulations of municipal, city, local, and other government agencies having jurisdiction concerning the Work of the Contractor. The Contractor shall give all notices and comply with all laws, ordinances, codes, rules, and regulations bearing on the conduct of the Work. If the Contractor performs any Work, which is contrary to such laws, ordinances, codes, rules, and regulations, they shall make all changes to comply therewith and bear all costs arising there from.
4. Because Drawings are, in general, diagrammatic, the Contractor shall coordinate all installations with the State or their authorized agent, based on the field conditions. The contractor represents that by submitting their proposal they are familiar with the field conditions at the facility and have based their firm price proposal on that knowledge.
5. All permits required for any part of the Contractor's Work shall be procured and paid for by the Contractor. The Contractor shall determine all permits required and transmit the required information to the Authority Having Jurisdiction. All persons working at the facility are required to be issued a security credential by the State. This credential requires finger printing and a background investigation be completed for each badge holder. All costs associated with obtaining and maintaining the issued security credentials are the responsibility of the contractor.
6. If the Contractor intends to utilize a subcontractor, the subcontractor shall comply with all the same rules, regulations, laws and codes, licenses, etc. as required by the Contractor and as specified herein. The State reserves the right to approve or disapprove any subcontractor proposed by Contractor.

C. Publications:

1. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.
2. Specific reference in Specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at date of Contract unless the Document is shown dated.
3. Comply with all local codes, and the requirements of the Authorities Having Jurisdiction.
4. Conflicts:

- a. Between referenced requirements: Comply with the one (1) establishing the more stringent requirements.
 - b. Between referenced requirements and Contract documents. Comply with the one (1) establishing the more stringent requirements.
5. The Security System shall be installed in accordance with the most current version of and with all applicable revisions pertaining to all applicable national, state, and local codes and standards including, but not limited to the following:
- a. Checkpoint Requirements and Planning Guide (CRPG)
 - b. 49CFR 1542 and all applicable and relevant Federal security regulations.
 - c. ASIS Protection of Assets Manual
 - d. Americans with Disabilities Act (ADA).
 - e. Building Industry Consulting Services International (BICSI): “Electronic Safety and Security Design Reference Manual (ESSDRM)” and “Telecommunications Distribution Methods Manual” (TDMM).
 - f. Building Officials & Code Administrators International, Inc. (BOCA) National Building Code.
 - g. National Fire Protection Association (NFPA), to include. Life Safety Code, (NFPA 101) and the National Electrical Code (NFPA 70).
6. Local, county, state and federal regulations and codes in effect as of date of contract shall be complied with.

1.04 DEFINITIONS

- A. The following shall serve as general definitions in addition to the definitions outlined in the State’s General Conditions; the following definitions shall apply to this Section of the Work.
- 1. State: The State is the Hawaii Department of Transportation Airports Division (HDOT-A), and/or their designated representative.
 - 2. The Consulting Engineer is Faith Group, LLC.
 - 3. Contractor: The Contractor is the firm submitting a proposal to furnish and install the Work as defined herein.
 - 4. Work: The term “Work” means all related labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the proposals obligations.
 - 5. Provide: Where the term “provide” is used throughout this Section of the Work, it shall mean the Contractor is to “furnish and install.”
 - 6. Contract Documents: The Contract Documents shall consist of the following:
 - a. These Specifications in their entirety.
 - b. Drawings and plans herein referred to as Security Drawings.
 - c. Addenda, Bulletins, Drawings, and associated correspondence as may be authorized in writing and issued by the State, to interpret, clarify, or modify the Contract Documents.

B. Security System Acronyms:

1. Access Control System (ACS).
2. Security Screening Checkpoint (SSCP)
3. Video Surveillance System (VSS)
4. Power Over Ethernet (POE)
5. Underwriters Laboratories (UL).
6. Uninterruptible Power Supply System (UPS).
7. Volts – Alternating Current (VAC).
8. Volts - Direct Current (VDC).

1.05 SUBMITTALS

A. Submittals provided by the contractor under this section are subject to the requirements of Specification Section 01330 – Submittals for this project. Where there is a conflict between that section and the requirements of this section, the more stringent will apply.

1. Phasing Plan: The Contractor shall submit to the State as part of their Submittals a Phasing Plan for evaluation. The plan shall highlight the Contractor's methods for maintaining security at the site during construction of the new facility. The plan should demonstrate their experience in transitioning systems while maintaining operations. The plan shall also include discussions addressing the requirement for compatibility with the existing system and using as much of the existing infrastructure as possible in accordance with the State's desire to control costs. The plan must provide the lowest risk for disruption of normal operation to the State by maintaining continuity of security while controlling costs.

B. Pre-Fabrication:

1. Submit the Pre-Fabrication Data according to the Conditions of the Contract but in no case later than forty-five (45) days after the notice to proceed.
2. Pre-fabrication Submittals shall consist of Product Data, Shop Drawings, and a Detailed Schedules. Partial submittals will not be accepted without prior written approval from the Consulting Engineer or designated alternate.
3. No portion of the Work shall commence, nor shall any equipment be procured until the Consulting Engineer or designated alternate has approved the Pre-fabrication Submittals in writing. All Work shall be in accordance with the manufacturer's installation instructions.
4. A letter of transmittal identifying the name of the Project, Contractor's name, date submitted for review, shall accompany pre-fabrication Submittals and a list of items transmitted.

C. Product Data required as part of the Pre-fabrication Submittal shall include the following:

1. Submit manufacturer's data on System components including, but not limited to, electrical Specifications, mechanical Specifications, rough-in

2. diagrams, and instructions for installation, operation, and maintenance.
2. The Contractor shall submit catalogue cut sheets that include Warranty information, manufacturer, trade name, and complete model number for each product specified. Literature sheets containing more than one (1) device or component model number shall be clearly marked to delineate items included in the Work. Model number shall be encircled and/or indicated with an arrow to indicate exact selection. Identify applicable Specification Section reference for each product. Product data sheets shall be delivered initially in electronic .PDF format with each product submitted as an individual file.
3. Equipment schedules listing all system components, the manufacturer, model number and the quantity of each along with a general functional description for each system component.
4. A complete list of cable and wiring types and sizes, as well as the manufacturer and model number for each.
5. A complete list of finishes and graphics.
6. List of the maintained parts inventory to provide service and maintenance of the systems following installation and commissioning.

D. Shop Drawings shall include the following:

1. Floor plan drawings indicating device locations with device legends indicating manufacturers and model numbers for each device.
2. System riser diagram with all devices, wire runs and wire designations.
3. Schematic block diagrams for each system showing typical equipment interconnect data flow, etc.
4. Wiring diagrams for each subsystem defining the interconnection of all inputs and outputs for all equipment.
5. Wiring diagram for fail-safe release of electric locking mechanical devices.
6. Fabrication Shop Drawings for all custom equipment mounting (if applicable).
7. Plans and elevations of the security console(s) and equipment racks quantifying all equipment to be mounted therein and including notes detailing the fabrication of such. All materials, methods for construction and finishes shall be fully detailed.
8. Elevations of security closet layouts showing panel locations, power supply locations, conduit, wire ways, wire molds, and all other equipment to be mounted at that location.
9. Parts Lists: Provide complete parts lists and breakdowns that identify each component (to the lowest repairable unit) as well as ordering information. The characteristics of each component shall also be shown, where applicable, to aid in obtaining substitute parts.

E. Detailed Project Schedule shall include the following:

1. The Contractor will develop and submit a sufficiently detailed CPM (Critical Path Method) schedule prepared in MS Project that identifies the activities and deliverables that are included within the scope of their proposal. This schedule shall include and make visible as many of the following elements that apply to their proposal including but not limited to:
 - a. Key Milestones

- b. Deliverable(s)
- c. Activities
- d. Procurement
- e. Durations
- f. Activities
- g. Milestones
- h. Lead Times
- i. Dates
- j. Forecast Start (Start)
- k. Forecast Finish (Finish)
- l. Dependencies
- m. Predecessors
- n. Successors

2. The proposal schedule submittal shall have the following fields exposed and be printed on paper of sufficient size so that the contents of these fields and the Gantt Chart are clearly legible:

- a. Activity ID (ID)
- b. Activity Name (Task Name)
- c. Duration (in Days)
- d. Start Date (Start)
- e. Finish Date (Finish)
- f. Predecessor
- g. Successor
- h. Gantt Chart

F. Procedure for Resubmitting:

1. Make corrections or changes in Product Data, Shop Drawings, and/or Samples as required by the Consulting Engineer or designated alternate and resubmit when stamped as requiring re-submittal.
2. Clearly identify changes made other than those specifically requested by the Consulting Engineer or designated alternate when resubmitting Shop Drawings. Changes shall be clouded or similarly highlighted as coordinated with the State. Only changes that have been specifically requested by the Consulting Engineer or designated alternate or have been clouded by the Contractor will be reviewed on re-submittals.
3. Any drawing sheets added to the re-submittal shall be clearly identified and clouded and shall not change the sheet numbering scheme for previously issued Shop Drawings.
4. The Contractor shall be responsible for any delays caused by the re-submittal process.
5. If the State or their designated representative rejects the Contractor's Prefabrication Submittal (Rejected, Revise and Resubmit), the State will be compensated for their time spent on all subsequent reviews beyond the second review, whether partial or comprehensive. The amount of such compensation will be incorporated by Change Order and withheld from the Contractor's Application for Payment.

G. Field Mark-Up Document:

1. Field-Record Documentation shall include all information required in the Pre-fabrication Submittals but revised to reflect "as installed" conditions. The documents shall be updated daily to reflect the most recent installation activity. The documents shall be kept on-site and be made available for inspection by the Consulting Engineer or designated alternate.
2. Thirty (30) days prior to the Final Acceptance testing, submit one (1) copy of the Field Drawings to the Consulting Engineer or designated alternate. This copy shall be used during the Final Acceptance testing by the Consulting Engineer or designated alternate.
3. Update all documentation to reflect changes or modifications made during final acceptance testing as required and submit three (3) blue / black line sets as part of the Record Documents.

H. Record Drawings:

1. Record Documentation shall consist of "As-Built" Drawings and Operation and Maintenance Manuals. The Record Documentations shall be submitted to the Consulting Engineer or designated alternate within forty-five (45) days after final acceptance.
2. Produce all Record Drawings using the latest version of AutoCAD. Record Drawings shall, at a minimum, include the following:
 - a. Floor plan drawings indicating device locations, with device legends indicating manufacturers and model numbers for each device.
 - b. Floor plan drawings indicating wire routing. Wire routing shall be delineated in straight line runs and be tagged with cable identification and terminal strip numbers to coincide with the installation.
 - c. Mounting details for all equipment and hardware.
 - d. Functional block diagrams for each subsystem.
 - e. Wiring details showing rack elevations, equipment wiring and terminations, and inter-rack wiring.
 - f. Wiring diagrams for all custom circuitry including interfaces to various control output-controlled devices, i.e. overhead doors, automatic sliding doors, parking gate operators, fire alarm system interface, etc.
 - g. Wiring diagrams for each data gathering panel (IFP). Wiring diagrams shall be identical to those laminated and located with each IFP.
 - h. Typical point-to-point wiring diagrams for each piece of equipment and groups of equipment within the system.
 - i. Layout details for each riser location, including security panels, power supplies, junction boxes, conduit, and any other security related equipment.

I. Operation and Maintenance Manuals:

1. Intent: The intent of this Section is to require complete documentation of each System for the purpose of system operation and maintenance during

and after the Warranty period. It is intended that the operation and maintenance manuals be exhaustive in the coverage of the system to the extent that they may be used as the sole guide to the troubleshooting, identification, and repair of defective parts.

2. Scope: The Contractor shall comply with the terms of the contract but in no case provide the State with less than two (2) complete drawing books and maintenance and operation manuals on the completed system hardcopy and six (6) copies of the drawing books and maintenance and operations manuals in PDF format. These manuals shall include basic wiring diagrams, schematics, and functional details such that any component, wire, or piece of equipment in the system may be easily identified by going to the actual equipment and referring to this manual. It is required that everything in the system be neatly labeled and easily identifiable. Every terminal, wire, component, or piece of equipment, relay, and other such items shall have a number or letter designation. All of these identification characteristics shall be included in the maintenance and operation manuals.
3. The maintenance manual requirement of this Section is in addition to Shop Drawing requirements. Maintenance manuals and drawing sets shall be compiled after system fabrication and testing and shall incorporate any changes made after Shop Drawing submittal. The maintenance manuals and drawing books shall be permanently bound in hard plastic covers.
4. Maintenance Manuals, Manufacturer's Literature: Provide manufacturer's standard literature, covering all equipment included in the system. The maintenance manuals shall contain Specifications, adjustment procedures, circuit schematics, component location diagrams, and replacement parts identification. All references to equipment not supplied on this Project shall be crossed out.
5. Provide Pulling/Terminating operation Record and CMS (Cable Management System): As-Built required cable data to be provided to the State as part of the O&M Manuals. An electronic record shall be in an Excel spreadsheet format and supported by floorplan drawings. Contractor shall be responsible for any delays due to improper documentation or failing to submit within the prescribed time frame.
6. Drawing Books: All Drawings developed specifically for this Project shall be reduced to 11" X 17", folded and bound with hard plastic covers. The 11" X 17" Drawings provided shall be easily readable after printing, even if this requires breaking large drawings into several parts. Text shall be no smaller than 1/16-inch. The Drawing book documents shall be produced with AutoCAD and the electronic files shall be provided to the State at the completion of the project. Provide component identification and cross reference on the Drawings to allow the maintenance department to understand the function of each item (the block diagram), find the room where the device is mounted (Contract document plans), find its location in a rack (arrangement drawings), find how it is wired (wiring diagrams), and its detailed Specifications (vendor data sheets), and how to repair it (spare part lists). Include the following drawings as a minimum:
 - a. Functional Block Diagram: Provide an overall block diagram showing the major interconnections between subsystems.
 - b. Arrangement Drawings: Provide drawings showing the physical arrangement of all major system components. This shall include:

- c. Elevation drawings of all equipment racks showing the location of each component in the racks. Components in the racks shall be identified as in the functional block diagrams.
 - d. Wiring Diagrams: Provide wiring diagrams showing all field installed interconnecting wiring. Wire identification on the diagrams shall agree with the wire markers installed on the equipment.
7. Spare Parts Lists: Submit cost lists for manufacturer recommended field replaceable modules to maintain the complete system with a minimum of downtime. This list shall include part names, part numbers, and source for additional purchase. The part list shall be cross-referenced to the functional block diagrams and the product data.
 8. Special Tools List: Submit a list of special tools required to maintain the systems. Include on the list the name, part number, and source for all special tools. Special tools are defined as a tool that cannot be purchased at a normal retail hardware department.
 9. Special Test Equipment: Submit a list of special test equipment required to prove that all system components are functioning per the Specifications. Special test equipment is defined as a device that cannot be purchased at a normal retail outlet.
 10. Operation and Maintenance Manuals shall apply to all security related devices, equipment, and software modules.
 11. Operation and Maintenance Manuals shall also include, at a minimum, the following:
 - a. Explanations of subsystem interrelationships. Explanations shall include operations of each subsystem and operations unique to the interfaces between each of the subsystems and possible conflicts that may occur with the interfaces. Each explanation shall be identified, tagged, bound, and indexed into a single binder.
 - b. Power-up and power-down procedures for each subsystem.
 - c. Description of all diagnostic procedures.
 - d. A list of manufacturers, their local representatives and subcontractors that have performed Work on the Project. The list shall include contact names, phone numbers and addresses for each.
 - e. Installation and service manuals for each piece of equipment.
 - f. Maintenance schedules for all installed components. Schedules shall include inspections and preventative maintenance schedules, and documentation of all repaired or replaced equipment.
 12. Operation and Maintenance Manuals shall be formatted as follows:
 - a. Bind each manual in a hard-back loose-leaf binder.
 - b. Identify each manual's contents on the cover.
 - c. Provide a table of contents and tabulated sheets for each manual. Place tab sheets at the beginning of each chapter or section and at the beginning of each appendix if applicable.
 - d. Any hardware manual demonstrating more than one model number of devices on any one page shall be clearly marked as to delineate which model has been implemented in the Work.

13. Operation and Maintenance Manuals shall include a separate section for each software program incorporated into the Project. The software section shall include, at a minimum, the following information:
 - a. Definitions of all software related terms and functions.
 - b. Description of required sequences.
 - c. Directory of all disk files.
 - d. Description of all communications protocols, including data formats, command characters, and a sample of each type of data transfer.
 - e. Instructions for manufacturer supplied report generation with illustrations showing what reports should look like and screen by screen illustrations for each entry made.
 - f. Instructions for custom report generation.
 - g. Database format and data entry requirements.

J. Procedure for Resubmitting

1. Make corrections or changes in O & M and/or Record Drawings as required by the State and resubmit when the State's stamp requires re-submittal.
2. Clearly identify changes made other than those specifically requested by the State when resubmitting Record Drawings. Changes shall be clouded or similarly highlighted as coordinated with the State. Only changes that have been specifically requested by the State or have been clouded by the Contractor will be reviewed on re-submittals.
3. Any drawing sheets added to the re-submittal shall be clearly identified and clouded and shall not change the sheet numbering scheme for previously issued Record Drawings.
4. The Contractor shall be responsible for any delays caused by the re-submittal process.
5. If the State rejects the Contractor's Record Submittal (Rejected, Revise and Resubmit), the State will be compensated for their time on all subsequent reviews beyond the second time, whether partial or comprehensive. The amount of such compensation will be incorporated by Change Order and withheld from the Contractor's Application for Payment.

1.06 QUALITY ASSURANCE

A. Contractor Qualifications

1. Contractor shall be recognized by the manufacturer of the equipment being provided under this contract as a "top tier" dealer having maintained this manufacturer certification for not less than one (1) year and having installed a minimum of one (1) other system of the type being provided under this contract. Furthermore, the contractor shall have on their team for the duration of the project a certified network engineer to provide planning and configuration of all operating systems, database programs, network equipment and other data processing equipment.
2. Work specified herein shall be the responsibility of a single electronic security systems integration contractor.

3. The Contractor shall have local in-house Engineering and Project Management capabilities consistent with the requirements of the Work. The Contractor shall provide a full-time Project Manager who is to be present on site at all times that Work is actively in progress. This person shall be the same individual throughout the course of the Project and shall be the person responsible for direct supervision coordination and scheduling of all subcontract labor (as applicable). Should it be necessary to assign a new project manager during the project, the State reserves the right to approve the replacement Project Manager.
4. By submitting a Bid, the Contractor thereby certifies that it is qualified in all areas pertaining to, either directly or indirectly, the Work. In the event the Contractor becomes unable to complete the Work in accordance with the Contract Documents, or the satisfaction of the State or its representatives, due to a lack of understanding of equipment, systems or services required by the Contract Documents, it shall be the responsibility of the Contractor to retain the services of the applicable manufacturers' representatives to expeditiously complete the Work in accordance with the State's construction schedule with no additional cost to the State.
5. The Contractor shall maintain, or establish and maintain, a fully staffed office including a service center capable of providing comprehensive maintenance and service to the Security System for the Project. The Contractor shall staff the service center with factory trained technicians and adequately equip the office to provide emergency service within two (2) hours after being called, twenty-four (24) hours per day, whether the State elects to purchase a maintenance contract from the Contractor.
6. The Contractor shall provide factory-certified technicians to install, commission, and maintain the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.
7. The Contractor shall ensure compliance with, and have a thorough understanding of, all local codes and contract conditions pertaining to this Project.

1.07 PRODUCT STANDARDS:

- A. Provide at the time of installation the latest Commercial-Off-The-Shelf (COTS) version of all equipment and software. Discontinued or prototype equipment shall not be acceptable.
- B. Provide equipment suitable for the purpose for which it was manufactured. Field modifications made to adapt equipment for purposes other than what it was manufactured shall not be permitted.

1.08 CERTIFICATIONS

The Contractor warrants that he/she and his/her subcontractors are licensed by the State and as required by local ordinances prior to engaging in any construction or installation work.

1.09 DELIVERY, STORAGE AND HANDLING

- A. All risk of loss or damage to materials shall rest with the Contractor until delivery of equipment to an on-site designated delivery and storage location. Materials will be subject to inventory by the State upon delivery and anytime thereafter without warning or notification.
- B. The Contractor shall be responsible to provide and maintain his/her own storage facility. If this storage facility is required to be on-site it shall be the Contractor's responsibility to coordinate the size and spatial requirements with the State and/or their representatives. The Contractor shall assume full responsibility for their storage facility and all contents therein, unless otherwise indicated by the State.
- C. The Contractor shall examine the site and the Contract Documents and review with the State the designated areas of access, delivery, and storage for the Contractor's use. The Contractor agrees that such areas are satisfactory and sufficient for his/her needs in the prosecution of his Work in conformance with the terms of this Contract.

1.11 PROJECT SITE CONDITIONS

Existing Conditions: DOT-A shall be engaged in the construction of a Security Screening Checkpoint (SSCP), which shall be coordinated / constructed by one or more General Contractors and / or Special Contract Groups. The Security Project Contractor shall be required to coordinate their scope of work with one or more Contractors for such things as locking hardware, power, and conduit requirements. The State currently operates network-based security systems using physically discrete hardware and shared backbone communications infrastructure. The contractor shall be responsible for integrating the work under this contract with the existing VSS, including any additional camera licenses for the existing systems to accommodate the work described in this project. This shall in no way impact the requirement for installation of a complete and operational VSS since all work shall be considered as forming an integral part of those systems defined herein.

1.12 SEQUENCING & SCHEDULING

- A. The Contractor shall review the State's construction and completion schedules for the construction of the terminal building and shall coordinate execution of the scope of work as defined in this document and all other Security Contract Documents with all other contractors and service providers engaged by the State and their representatives for work related to this facility.

1.13 WARRANTY

- A. Provide a one (1) year warranty on the Work. If, within one (1) year after the date of Final Acceptance of the Work or by the terms of any applicable special warranty required by the Contract Documents or provided by a manufacturer, any of the Work or equipment is found to be defective or not in accordance with the

Contract Documents, the Contractor shall correct it promptly including all parts and labor after receipt of notice from the State to do so unless the State has previously given the Contractor a written acceptance of such condition. The State will give such notice promptly after discovery of the condition. Such notice shall be provided by State representatives, to be identified either verbally or in writing.

- B. Nothing contained in the Contract Documents shall be construed to establish a shorter period of limitation with respect to any other obligation, which the Contractor might have under the Contract Documents or any manufacturer's warranty. The establishment of the time period of one year after the date of final acceptance of the Work or such longer period of time as may be prescribed by law or by the terms of any manufacturer's warranty or these contract documents relates only to the specific obligation of the Contractor to correct the Work or equipment, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligations other than specifically to correct the Work or equipment.
- C. The one (1) year Warranty period shall begin upon final acceptance of the installed systems. For purposes of Warranty consideration, final acceptance shall be defined as the date on which the State formally acknowledges acceptance of the completed Work.
- D. Warranty Service: If defects in the materials and/or workmanship are identified during the Warranty period, the Contractor shall provide all labor, travel expenses and materials as may be required for prompt correction of the defect at no additional charge to the State.
- E. During the Warranty period, the Contractor shall, upon receipt of a request for service from the State, deploy service personnel to the State's premises and complete corrective action within twenty-four (24) hours of arriving on site.
- F. Repair or replacement service during the warranty period shall be performed in accordance with the following schedule:
 - 1. Seven (7) days, twenty-four (24) hour, eight (8) hour on-site response time shall apply for major system failure. A major system failure is defined as a failure that causes multiple portions of a system to be unable to perform the task for which it was intended or creates a potential for an immediate security breach.
 - 2. Next business day response time shall apply for minor component and device failures.
 - 3. The State shall be the sole authority to define a failure as a major or minor system failure.
- G. If the Contractor is unable to restore system operation during the warranty period within two (2) business days of a system failure, the State reserves the right to require the Contractor to provide on-site manufacturer's service technicians at no additional cost.
- H. All Warranty service and repair work shall be performed by personnel, who have

been trained, certified, and experienced in the operation and maintenance of the installed system(s).

- I. Warranty service shall include the prompt replacement of all parts and/or components at no additional cost to the State and as required for restoring normal system operation. If system parts or components must be removed for repair, it shall be the responsibility of the Contractor to furnish and install temporary parts and/or components as required to restore normal system operation until the repaired parts or components can be repaired and re-installed.
- J. It shall be the responsibility of the Contractor to maintain an inventory of spare parts or to arrange for manufacturer parts support as required to ensure correction of all critical component failures or malfunctions within twenty-four (24) hours of the State's request for service.
- K. The Contractor's Warranty obligation shall include correction of any software/firmware defects, which may be identified during the Warranty period. Any failure of the software/firmware to perform as specified by the software/firmware manufacturer beyond the time of final acceptance shall be defined as a software/firmware error.
- L. Immediately following the completion of a Warranty repair or service call, the Contractor's service personnel shall submit a written report to the State which details the service work performed, the cause of the trouble, and any outstanding work which is required to restore complete and normal operation.
- M. The contractor shall provide for manufacturer direct technical support to the end user via telephone as well as any training required by the manufacturer to do so. This effort to self-support on the part of the Airport shall not relieve the contractor of any of their obligations under the terms of the warranty to provide service.
- N. As part of the warranty, the Contractor shall perform preventative maintenance during the warranty one (1) year period. The Contractor shall submit a list of manufacturers required items to be included in the preventative maintenance program. The list shall include maintenance to each item, the frequency of such maintenance, and the amount of time to be spent on each item for maintenance. As a minimum, preventative maintenance shall include, but not be limited to, the following.
 1. Within five (5) days of the one-year anniversary of Final Acceptance the contractor shall perform Annual Preventative Maintenance as follows:
Test all system devices provided under this contract for proper operation using procedures identical to those used for Final Acceptance Testing.
Repair or adjust devices to restore system capabilities to those accepted at Final Acceptance Testing unless otherwise directed by the State.
Prepare Annual Inspection Report detailing repairs and adjustments made during the Annual Preventative Maintenance visit.
 2. Within five (5) days of the six-month anniversary of Final Acceptance the contractor shall perform Semi-Annual Preventive Maintenance on components provided under this contract and as recommended by the manufacturer but in no case less than the following:
 - a. Inspect, test, clean, and adjust power supplies and battery back-up.

- Replace batteries as necessary.
 - b. Inspect, clean, and vacuum all equipment mounted in consoles and equipment racks including air filters.
 - c. Test and adjust all camera pan, tilt, zoom, and preset functions. Inspect video quality and adjust VSS processing and recording equipment.
- 3. Within five (5) days after the initial 90 days from Final Acceptance and every 90 days thereafter the contractor shall perform on all components provided under this contract, Quarterly Preventive Maintenance as directed by the manufacturer, but in no case less than:
 - a. Perform hardware, firmware, software updates, as required to ensure optimum performance.
 - b. Clean all camera housing view panels and domes.
 - c. Visually observe all cameras and monitor displays and adjust as needed for optimal performance.
 - d. Inspect recorded video to ensure storage requirements for devices provided under this contract are met. In addition, review the image quality of overnight recordings and make camera adjustments to optimize the overall quality.
- O. Prior to undertaking any maintenance, the contractor shall notify the Airport of the intended date of such maintenance or upgrade in advance. This schedule and intended outcome of the maintenance visit including a list of items to be maintained shall be presented to the Airport within 24 hours prior to the scheduled visit.
- P. Provide written notice to the State documenting any work performed during the preventative maintenance visit within 24 hours of the completion of the maintenance visit.
- Q. Include a manufacturer's software maintenance agreement as part of the Warranty. This agreement shall include all software updates, revisions, service assistance and training for any changes in operation of the security system application required by the update. This software maintenance agreement shall also include all operating system and database programs provided under this contract.
- R. The Contractor shall maintain an inventory of spare parts and other items critical to system operation and as necessary to meet the emergency service requirements of this Project within the local service center. Spare parts shall include, but not be limited to one (1) of each type of the following:
 - 1. Video Surveillance System:
 - a. Fixed Cameras, illuminators, and Lenses.
 - b. Pan/Tilt/Zoom Dome Cameras.
 - c. Workstation Monitors and Peripherals
 - d. Fiber Optic Media Adapters.
 - e. Recording Storage Hard Drive.
 - f. Power Supplies.

- S. Provide loaner equipment for any equipment that is not field repairable. Such loaner equipment shall be in working order and the functional and technical equivalent of the item replaced.
- T. Provide loaner equipment that is fully compatible and fully functions with all associated equipment.
- U. Loaner equipment for system components that must be shipped from the manufacture or distributor shall be on site and operational within twenty-four (24) hours of the component failure. Furnish lists of equipment that will require shipment from the manufacturer or distributor and lead times associated with that equipment.
- V. The State reserves the right to expand or add to the system during the warranty period using firm(s) other than the Contractor for such expansion without affecting the Contractor's responsibilities on the components originally provided by them, provided that the expansion is done by a firm which is an authorized dealer or agent for the equipment or system being expanded.

1.14 COMMISSIONING

- A. All the Contractor's Work shall be tested and inspected by all Authorities Having Jurisdiction including the State and Consulting Engineer or designated alternate and in accordance with all Specifications. The Contractor shall coordinate and cooperate fully and shall provide at no additional cost to the State, manpower, blueprints, facilities, scaffolds, etc. to reasonably assist the inspectors.
- B. Commissioning shall occur in two phases. The first phase will be a functional and physical inspection of the installation. All faults found in this first phase will be corrected prior to the advancement to the second phase.
- C. The second phase of commissioning shall be a reliability test. The entire system will be tested by the engineer with the contractor and TSA present. The contractor shall make available any personnel who can troubleshoot any errors found in the system to be resolved immediately.

PART 2 - PRODUCTS

2.01 IP NETWORK BASED DIGITAL VIDEO SURVEILLANCE SYSTEM

- A. The contractor shall provide VSS equipment where shown on the drawings that is compatible with the existing State Genetec VSS. Contractor is responsible for confirming current version of VSS software in use by the State at this location at the time of construction and provide compatible cameras.
- B. Provide cameras from Axis or approved equal.
- C. Control of PTZ camera by TSA will be given priority over PTZ control by other staff. Cameras observing ACS control points must be viewable by the State Operations/Security staff.

- D. This Section includes all labor and materials including, but not limited to IP/Ethernet, cameras, housings, mounting hardware and power supplies required to form a fully functional network-based video surveillance system. Provide all software licenses required for the specified cameras and added workstations. The contractor shall provide cameras as shown on the drawings including, cables, conduit, lightning protection, and mounting bracket fabrication.
- E. The VSS system is intended to be a network-based system.
1. IP based cameras shall be fully supported by the video recording system including all PTZ functions and provide live viewing at a minimum of 1080p resolution at 30 frames-per-second.
 2. The cameras shall be configured for continuous recording capabilities for all the cameras shown on the drawings. As a minimum the cameras shall be available for review at full resolution and fifteen (15) frames per second for no less than thirty (30) days recording on motion only.
 3. All cameras designated to view alarm information received by the access control system shall be displayed at no less than full motion from ten (10) seconds prior to the initiation of the alarm event until two (2) minutes after the initiation of the alarm event on a designated alarm screen or window.
 4. All Genetec security camera licenses purchased under this contract shall be valid for three (3) years.
- F. The VSS system shall be highly integrated with the access control system (ACS) specified in Section 16750 of this project. Alarm events on the ACS from doors or other sources shall result in available live video images of the event being displayed on designated existing workstations with instant replay capabilities. Stored video images associated with the ACS alarm event shall be linked with the event on the screen. Alarm images shall consist of ten (10) seconds of pre-alarm video and two (2) minutes of post alarm video.
- G. Transportation of digital (IP) signals for viewing and management shall be via the Security Network which is to be expanded to the project area by the security system contractor as part of this contract. Coordinate IP addressing, Ethernet switch port assignments, fiber optic cable use and bandwidth utilization with other devices on the security network.
- H. The integration of the VSS system with the Access Control System is part of this contract. All costs associated with the integration of this system with the VSS system shall be included in the contract. The VSS system shall immediately respond to alarm events associated with the ACS by calling designated camera views near the site of the alarm to designated alarm displays in the communications center control room. If the designated view is from a PTZ style camera, the VSS system shall be capable of selecting a programmed preset position at the direction of the ACS to allow the PTZ to rotate and zoom in on the area of the alarm event. If the area is capable of being viewed from several cameras, the closest view will be called up to the designated alarm display with additional images being called up on alternate alarm displays. This integration shall be accomplished through a serial or network data exchange; contact closure interfaces to the ACS shall be prohibited.
- I. All System configurations, changes, setups and operation shall be available to the System administrator for access and use. System configurations, changes,

setups and operation shall be password protected.

- J. The system shall support the use of IP mega-pixel cameras and cameras with 360-degree fields of view displayed without distortion on a single monitor. The selected field of view from may be virtually panned and zoomed to provide the desired field of view. The system shall display up to four (4) independent views from the same camera and can manipulate PTZ of each view individually.
- K. Cameras
 - 1. Configure fixed and pan/tilt/zoom (PTZ) VSS cameras such that all ACS alarm points, and card reader-controlled doors located within the available field of view of the nearest camera are programmed for automatic viewing and real time recording.
 - 2. Type 1: Fixed position Day/Night VSS cameras:
 - a. 2304x1728 Resolution @30 Frames Per Second
 - b. Integrated IR Illumination
 - c. 110dB Wide Dynamic Range.
 - d. 3mm – 6mm variable focus integrated lens.
 - e. Integrated audio input
 - f. Basis of Design: Axis M4216-LV
 - 3. Type 2: Panoramic 360-degree cameras:
 - a. 2880x2880 Resolution
 - b. Integrated panoramic lens
 - c. De-warped in VSS system not in camera
 - d. Basis of Design: Axis M4308-PLE
 - 4. Type 3: PTZ cameras:
 - a. 4.25mm – 170mm lens
 - b. 1080p resolution
 - c. 360-degree endless rotation
 - d. Basis of Design: Axis Q6075
- L. VSS Camera Power Supply
 - 1. When cameras cannot be powered via Power-Over-Ethernet the following Minimum Specifications apply:
 - a. Provide high-power injector located in the communications room
 - b. Camera power supplies shall be UL listed units supplying the proper voltage required by the attached camera and housing and include Transient Voltage Surge Suppression
 - c. Low voltage outputs shall have automatically resetting over current protection devices and each output shall be electrically isolated from other outputs on the supply.
- M. VSS Camera Housings and Mounts
 - 1. Provide VSS camera housings and mounts as indicated on the Drawings.

2. Wiring to all cameras shall pass from the back box through the mount and into the housing. Exposed wiring of any kind shall not be acceptable.
3. Provide sun shields for camera housings in outdoor locations exposed directly to sunlight.
4. Provide weather and dust proof camera housings with thermostatically controlled blowers in outdoor locations.
5. Provide transient voltage surge protection for power, control, and video cables for all exterior cameras.

2.02 WORKSTATION HARDWARE

- A. Provide nationally branded and supported workstations with the following capabilities:
 1. 4th Generation Intel Core i7-4790 3.6 GHz or better
 2. 16 GB high speed RAM or better
 3. 64-bit operating system Windows 10 Professional
 4. 500Gb Solid State drive for OS and applications
 5. GB Ethernet network interface card
 6. 2 x NVIDIA GeForce GTX 1070 6 GB video card or better
 7. Keyboard and Mouse
 8. 2x 27" desktop mounted monitors with the following characteristics
 - a. In-Plane Switching panel type
 - b. 3H Anti-Glare hard-coated panel
 - c. 3840 x 2160 resolution
 - d. LED Light Source

2.03 LOCAL AREA NETWORK

- A. The contractor shall provide a solution for network connectivity that will supplement the existing Cisco security LAN. In general, the system must meet the requirements of the technologies provided by the contractor. The minimum equipment provided must comply with the requirements contained in this section.
- B. Equipment provided shall have Power over Ethernet (POE) capabilities on all ports. The provided equipment shall be suitable to support the bandwidth requirements of the attached security equipment and be configured appropriately to provide maximum security from non-security attached devices and external sources.
- C. Provide switches with a minimum of forty-eight (48) 10/100/1000 ports on each unit, two of which must support a fiber optic uplink. If the number of ports initially occupied by attached security project equipment exceeds 80% of the available ports, an additional switch with equal port count will be provided by the Contractor in all cases.
- D. The switches provided shall use a Gigabit Fiber Optic backbone using field installed modules and include dual power supplies and cooling fans.

2.04 WIRE AND CABLE

A. General

1. Provide wire and cable as required to install the System as indicated on the drawings and specified herein.
2. All wire and cable shall be Underwriter's Laboratories (UL) listed, and shall meet all national, state and local code requirements for its application.
3. All wire and cable shall meet individual system or subsystem manufacturer specifications.
4. All wire and cable shall be plenum type cable, except that which shall be installed in conduit.
5. All insulated wire and cable shall conform to the minimum requirements of Insulated Cable Engineer Association (ICEA) Standards.
6. Wire and cable shall comply with the applicable requirements of the National Electrical Code (NEC), latest edition, regarding cable construction and usage.
7. The conductors of wires shall be copper and have conductivity in accordance with the standardization rules of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). The conductor and each strand shall be round and free of kinks and defects.
8. All cable carrying data or voice transmissions shall be shielded. All other cable shall be shielded where necessary for interference-free signals.
9. Insulation shall be rated for a minimum of 300 V.
10. Color coding shall be accomplished by using solidly colored insulation. Grounding conductors, where insulated, shall be colored solid green or identified with green color as required by the National Electric Code (NEC).

B. Wire Types and Sizes

1. 120-volt Power Wiring: Minimum 12 AWG copper with THHN/THWN insulation.
2. Low Voltage Power Cable: Wire size shall be a minimum of 18 AWG, twisted, stranded, insulated, and jacketed.
3. Control Point Cable (Non-Power): Wire size shall be a minimum of 20 AWG, twisted, stranded, insulated, and jacketed.
4. Alarm Point Cable (Non-Power): Wire size shall be a minimum of 20 AWG, twisted, stranded, insulated, and jacketed.
5. Control Point Cable (Low Voltage Power): Wire size shall be a minimum of 18 AWG, stranded, insulated, and jacketed.
6. Ethernet cable: Shall be a Category 6a cable in accordance with Section 16740 – BUILDING TELECOMMUNICATION SYSTEMS. Wire size shall be a minimum of 24 AWG bare copper, twisted, unshielded and jacketed and shall be used for cable runs not to exceed 250 feet. Coordinate cable color with communications contractor.
7. All fiber optic cable shall be suitable for the location in which it is to be installed. Cable installed in an exterior environment shall be filled with a water excluding gel. Cable type shall be compatible with existing fiber optic infrastructure.

2.05 INTERFACES

A. ACS/VSS

1. The ACS shall communicate with the VSS system to provide for tagging selected video associated with and ACS alarm event such that pre-event and post-event video from the area of the alarm event is available for instant review from the ACS workstation without switching away from the ACS application.
2. The ACS shall communicate with the VSS system to cause the VSS system to switch live images from a camera focused on the area of an ACS alarm event to display on a larger format display for closer examination. In the case of multiple alarms events, this cameras call-up shall be sequenced through the larger format display until acknowledged by the ACS.

2.06 CONDUIT BOXES & RACEWAYS

- A. This Section is intended to provide guidance but not supersede any requirement contained in the electrical sections specifying raceways, fittings, boxes, enclosures, and cabinets for electrical wiring:
1. Rigid Metal Conduit.
 2. Electrical Metallic Tubing (EMT).
 3. Liquid tight Flexible Conduit.
 4. Boxes, enclosures, and cabinets include the following:
 5. Device Boxes.
 6. Outlet Boxes.
 7. Pull and Junction Boxes.
 8. Cabinets and Hinged Cover Enclosures.
 9. Conduit Bodies.
 10. Rigid Non-Metallic Conduit.
- B. Install all conduits necessary for a complete installation, but not provided for in the Electrical Drawings. Conduit and boxes in finished areas shall be concealed in chases, furring, concrete slabs and/or above suspended ceilings. No exposed conduit shall be installed within public areas.
- C. Conduit shall be carefully installed, properly and adequately supported as required to comply with the requirements outlined herein and as required by the National Electrical Code to provide a neat, workmanlike installation. Horizontal conduit runs shall be supported by clamps, pipe straps, special brackets, or heavy iron tie, tied to the black iron structural members supporting the ceiling. Fastening of conduit to masonry walls, floor or partitions require malleable pipe clips with screws and suitable expansion sleeves.
- D. All conduits shall be cut accurately to measurements established at the building and shall be installed without springing or forcing.
- E. All required inserts shall be drilled-in and all openings required through concrete or masonry shall be saw cut or core drilled with tools specifically designed for this purpose.

- F. Swab out and remove all burrs from conduit before any wires are pulled.
- G. Layout and install conduit run as to avoid proximity to hot pipes. In no case shall a conduit be run parallel within one (1) foot of such pipes. Where crossings are unavoidable and then the conduit shall be kept at least six (6) inches from the covering of the pipe and cross it at no less than a ninety (90) degree angle.
- H. Provide fire stops where conduits penetrate fire rated walls and/or floors.
- I. All conduit installation, whether run exposed or concealed, shall be approved by the Consulting Engineer or designated alternate prior to installation.
- J. Seismically brace all conduits required to be seismically braced per National and Local Building Codes

PART 3 - EXECUTION

3.01 INSTALLATION MANAGMENT

- A. Project Manager's Duties and Responsibilities
 - 1. The Contractor shall provide to the State, as a part of the prefabrication submittal, the name of the Project Manager that will provide all duties and responsibilities as specified herein, during the term of the project.
 - a. The State reserves the right to approve or disapprove the individual that shall be designated as the Project Manager.
 - b. If at any point during the term of the project, and for any reason, the Project Manager is replaced, it shall be the responsibility of the Contractor to submit such information onto the State expeditiously for approval prior to any position replacement.
 - 2. The Project Manager shall maintain the ability of making all managerial decisions on behalf of the Contractor on a day-to-day basis and shall retain the authority of accepting notices of deduction, inspection reports, payment schedules and any other project related correspondence on behalf of the State.
 - 3. The Project Manager shall schedule and attend weekly project management meetings, during which time all system related issues are discussed, scheduled, confirmed and/or resolved.
 - a. The project management meetings shall continue weekly until such time that the Contractor and State schedule otherwise. The scheduling of the project management meetings shall be approved by the State prior to commencement.
 - 4. The Project Manager shall be available during normal business hours (8:00 a.m. to 5:00 p.m.) within two (2) hours by phone during the term of the project.
 - a. After normal business hours, they shall be available within four (4)

- b. hours by phone during the term of the project.
 - b. If the Project Manager is not available within the allotted time frame, the Contractor may designate another employee to temporarily act as the Project Manager in all correspondence with the State.
 - c. The Contractor shall ensure that any individual temporarily assuming the duties of the Project Manager is at equal or higher level in the Contractor's managerial chain of command.
5. Upon notification by the State, of any project related installation issue, or issue that may contradict the system specifications as stated herein, the Project Manager shall respond to such issue, verbally and/or in writing within an eight (8) hour period.
- a. Responses to such issues as stated above shall include a clear understanding of the issue, along with a tentative plan of action, reflecting milestones and/or deadlines to resolve the issue.
 - b. Where appropriate, based on the overall importance of the project issue, the Project Manager shall follow-up their initial response with a written response to the issue within twenty-four (24) hours of identification of the issue.

3.02 CONNECTION TO EXISTING SYSTEMS

- A. The system shall be configured by the Contractor to permit access to certain camera views only by TSA workstations. Coordinate with TSA for these views. Other cameras may be viewed by the Dispatch Control Room staff on their existing workstation(s).
- B. The tie-in to the existing networked systems shall be done in a manner that ensures that there will be no system outages on the existing system. The contractor on this project shall be required to coordinate with the existing authorized service provider as part of their work on this project for such things including but not limited to device naming conventions and IP address.
- C. The contractor shall provide all information including but not limited to floorplan drawings for Interactive Graphical User Interface development and alarm point/camera call-up views to the existing service provider in an expeditious manner so that they can program the system.

3.03 EXAMINATION

Site Verification of Conditions

- 1. Continuously verify that the site conditions agree with the Contract Documents and the design package. Submit a report to the State documenting changes to the site or conditions that affect the performance of the system to be installed. For those changes or conditions, which affect system installation or performance, provide (with the report) specification sheets, or written functional requirements to support the findings, and a cost estimate to correct the deficiency. No deficiency shall

- be corrected without written permission from the State.
2. Specific mounting locations, exact wire and cable runs, and conduit routing have not been specified or delineated on the Security Device Drawings. Coordinate all aspects of the Work with the Consulting Engineer or designated alternate.

3.04 PREPARATION

Protection: The Contractor shall provide protection necessary to safeguard his/her own Work from damage by his/her own operations and others. Unless the Contractor proves to the State's satisfaction that their Work has been damaged by others, the Contractor shall, at his/her own cost and expense, promptly repair, adjust, and clean all defective installations as shown on the punch list prepared by the State.

3.05 INSTALLATION

- A. Should any questions of union jurisdiction arise, the Contractor shall immediately take steps to settle such disputes and shall use such labor as may be determined to have jurisdiction, at no additional cost to the State. Should he/she fail to take expeditious action, he/she shall be responsible for any time lost because of delays arising from such a dispute.
- B. Provide code compliant fire proofing techniques for all penetrations of fire rated partitions and slabs, where the penetrations are made by or used for installation of the Security System.
- C. Coordinate the routing of wire and cable requiring isolation from power, radio frequency (RF), electromagnetic interference (EMI), telephone, etc. with the Consulting Engineer or designated alternate.
- D. Run all wire and cable continuous from device location to the final point of termination. No mid-run cable splices shall be allowed.
- E. Furnish and install all cable such that ample slack is supplied at the camera end of the cable to compensate for any final field modifications in location. The approximately three (3) feet extra cable shall be bundled and neatly wrapped to permit future use.
- F. Wire and cable within junction boxes, power distribution cabinets and other security enclosures shall be neatly installed, completely terminated, pulled tight with slack removed and routed in such a way as to allow direct, unimpeded access to the equipment within the enclosure. All wire and cable shall be bundled and tied.
- G. Provide grommets and strain relief material where necessary to avoid abrasion of wire and excess tension on Wire and Cable.
- H. Make connections with solder-less devices, mechanically and electrically secured in accordance with the manufacturers' recommendations. Wire nuts shall not be an acceptable means of connecting wire and cable.

- I. All exterior devices shall be sealed and protected against all weather conditions including heat, cold, moisture, dust, and sand.
- J. All system wiring within vertical riser shafts (as required) shall be bundled, wrapped, and tied to the structure at three-meter intervals in order to isolate it from other wire and cable within the shaft. Additionally, all wire and cable within the shaft shall be supported at least every two floors using Slack Grips (Split Mesh Lace Closing) or approved equal. Provide all personnel and equipment necessary to install and support the cable.

3.06 COORDINATION

- A. Coordinate locations of all devices with the State and Consulting Engineer or designated alternate prior to installation.
- B. Coordinate and verify the location of each piece of rack-mounted equipment with the Consulting Engineer or designated alternate prior to installation.
- C. Coordinate all initial camera partitioning and setup with the Consulting Engineer or designated alternate prior to installation prior to initial programming and data entry.
- D. Coordinate final camera locations, desired views, and camera housing and mount requirements with the State and Consulting Engineer or designated alternate prior to installation prior to installation.
- E. Coordinate camera housing and mount finishes with the State and Consulting Engineer or designated alternate prior to installation prior to installation.
- F. Coordinate finishes and colors of all equipment with the State and Consulting Engineer or designated alternate prior to installation. Submit all finish and graphics for all equipment in public areas to the State and Consulting Engineer or designated alternate prior to installation for approval prior to installation.
- G. Verify acceptance of each type of specified request-to-exit hardware for each application with local life safety code officials.
- H. Verify fail-safe and fail-secure lock requirements with the local Life Safety Code Officials.
- I. Contractor or equipment manufacturer logos or names shall not be visible on equipment in public areas.
- J. Provide tamper proof fasteners for all equipment in public areas. Fastener finish shall match equipment finish.
- K. Equipment: Provide equipment as indicated on the Drawings and specified herein. Additional specific installation requirements are as follows:
 - 1. Cameras
 - a. Field verify the exact location and positioning of all cameras with the State and Consulting Engineer or designated alternate prior to

- b. installation prior to installation.
- b. Confirm views with the State and Consulting Engineer or designated alternate prior to installation prior to final installation and adjust camera positions and lens sizes as required.

L. System Programming and Data Entry

1. Coordinate with the existing authorized system provider on all system programming and setup of the VSS System including, but not limited to the following:
 - a. Graphical Maps and Icons: Update all graphical maps and symbols in the ACS to reflect the modifications made to the building as part of this project. Import all floorplan background information provided by the Architect and produce a complete set of graphical maps depicting all Video Surveillance System points in the system.
 - b. Coordinate all camera text, including descriptors, alarm messages, Camera call up, map call up and identification with the State and Consulting Engineer or designated representative.
2. Coordinate with the existing authorized system provider for all initial system programming and setup of the VSS including, but not limited to the following:
 - a. Initial setup for the interface with the ACS System. The interface shall provide for automatic Camera selection upon alarms within the ACS as defined in the Specification. Coordinate automatic Camera selection, real-time record initialization, and status alarm annunciation requirements with the State and Consulting Engineer or designated alternate prior to programming.
 - b. Graphical Maps and Icons: Coordinate with the State to obtain architectural backgrounds for implementation as graphical maps within the system. Import all floorplan background information provided by the Architect and produce a complete set of graphical maps depicting all VSS points within the system.
 - c. On-screen alphanumeric identification of each Camera, on each Monitor. Coordinate descriptors with the State and Consulting Engineer or designated alternate prior to programming.
 - d. Automatic selection of a Camera adjacent to a Card Reader upon an invalid card use. Coordinate automatic camera selection requirements with the State and Consulting Engineer or designated alternate prior to system programming.
3. Coordinate with the existing system provider on all data needed to make the Security System operational. Deliver the data to the existing authorized system provider on data entry forms, Contractor's field surveys and all other pertinent information in the Contractor's possession required for complete installation of the database. Identify and request from the existing authorized system provider any additional data needed to make the Security System fully operational and integrated.

M. Labeling

1. Label all controls as necessary to agree with their function.
2. Mark all Wire and Cable in common at both ends using a permanent method such as self-laminating cable marking tape. The tags shall be attached to the wire and able nylon cable ties in an accessible location so that they can easily be read. Tags shall be installed when wire and cables are installed. Labeling shall agree with Record Documentation.
3. Place wire identification numbers at each end of the conductor involved by using sleeve type, heat shrinkable markers. The markers shall be installed to be readable from left to right or top to bottom.
4. Mark all connectors with common designations for mating connectors. The connector designations shall be indicated on the Record Drawings.
5. Coil all spare conductors in the device back-box, panel wire way, or top of panel where wire way is not provided. These conductors shall be neatly bundled and tagged.

3.07 CONSTRUCTION

A. Interface with Other Work

1. Power Requirements
 - a. 120VAC AC power dedicated to security and on generator backup shall be provided by the Electrical Contractor with coordination from the Security Contractor.
 - b. Connect to the AC power and provide UL listed power supplies and transformers to distribute low voltage power to the system components as required.
 - c. Provide hinged cover terminal cabinets with tamper switches for all power supplies, transformers, and power distribution terminal strips. Provide all conduit and wiring from the AC power facilities to the terminal cabinets.

3.08 REPAIR/RESTORATION

- A. The Contractor, upon receiving notice from State that the Contractor has furnished inferior, improper or unsound Work or materials (including equipment) (whether worked or unworked), or Work or materials at variance with that which is specified, will, within twenty-four (24) hours, proceed to remove such Work or materials and make good all other Work or materials damaged thereby, and, at the option of the State, the Contractor shall immediately replace such Work or materials with Work or materials as specified. The removal, replacement and repair shall be performed at such times and with manpower sufficient, in the judgment of the State, so as not to avoid disturbance to occupants, or other ongoing work.
- B. If the Contractor does not remove such unsound Work within a reasonable time, the State may remove it and may store the material at the expense of the Contractor. If the Contractor does not pay the expenses of such removal within

ten (10) days' time thereafter, the State may, upon ten (10) days' written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor and all expenses of the sale.

- C. The State shall always have the authority, until Final Completion and acceptance of the Work, to inspect and reject Work and materials which in its judgment are not in conformity with the Drawings and Specifications, and its decision in regard to character and value of Work shall be final and conclusive on both contracting parties. If the State permits said Work or materials to remain, the State shall be allowed the difference in value or shall at its election have the right to have said Work or materials repaired or replaced, as well as the damage caused thereby, at the expense of the Contractor, at any time within one year after the completion of the entire project, or within such longer period as may be covered by any guaranty; and neither payments made to the Contractor, nor any other acts of the State, shall be construed as evidence of acceptance, waiver or estoppels.
- D. Any expense incurred by the State in connection with the foregoing, shall be borne by the Contractor, and the State may withhold money due to the Contractor or recover money already paid to the Contractor, to the extent of such expense.

3.09 SYSTEM ACCEPTANCE

- A. Prior to any final acceptance testing, the Contractor shall submit two sets of preliminary (draft) Record Documents to the State. The preliminary Record Documents are to be used by the State to conduct the system final test.
- B. Submit a paragraph-by-paragraph completion matrix indicating completion or delinquency for each item included in the Specification and all subsequent addenda and bulletins as part of the Work. Indicate completion of the requirement by the word "Completed" following each paragraph number. Indicate delinquency for the requirement by the words "To Be Completed" following the applicable paragraph number. Should work on any item be under way, but not yet fully complete, indicate the extent (or lack thereof) of completion to date, and the proposed date of completion.
- C. Conduct a complete test of the entire Security System and provide the State and Consulting Engineer or designated alternate with a written report on the results of that test. During this test, place the integrated Security System in service, and calibrate and test all equipment.
- D. The Contractor shall submit documentation indicating completion of the testing to the State and Consulting Engineer or designated alternate before conducting System Acceptance testing. All items are required to be complete before a final inspection of the security system. If for some reason the Contractor is unable to fully comply with any of the listed conditions, a written statement describing the exception is to be submitted with the checklist for review. The checklist shall accompany the written certification to the State and Consulting Engineer or designated alternate that the installed complete Security System has been calibrated, tested, and is fully functional as specified herein.
- E. Following completion of the initial testing and correction of any noted

deficiencies, the State and Consulting Engineer or designated alternate shall conduct Final Acceptance testing.

- F. After completion of Final Acceptance testing the State shall conduct a fifteen -day (15) burn-in test. The intent of the burn-in test shall be to prove the Security System by placing it in real operating conditions. During this period the Security System shall be fully functional and programmed such that all points, interfaces, controls, reports, messages, prompts, etc. can be exercised and validated. Record and correct any system anomaly, deficiency, or failure noted during this period. The issuing of the Final Acceptance Certificate is based on the successful completion of the burn-in testing.
- G. To sufficiently demonstrate the VSS functionality, the State may have the contractor intentionally introduce faults into the system to demonstrate its resiliency. These tests shall not be allowed to adversely affect the long-term operation of the system, but rather demonstrate the ability of the system to operate in a fault condition.
- H. The State retains the right to suspend and/or terminate testing at any time when the system fails to perform as specified. If it becomes necessary to suspend the test, all of the State's fees and expenses related to the suspended test will be deducted from the Contractor's retainage. Furthermore, in the event it becomes necessary to suspend the test, the Contractor shall work diligently to complete/repair all outstanding items to the condition called for in the Specification and as indicated on the Security Drawings. The Contractor shall supply the State with a detailed completion schedule outlining phase-by-phase completion dates and a tentative date for a subsequent punch list retest. During the final acceptance test, no adjustments, repairs, or modifications to the system will be conducted without the permission of the State.

3.10 CLEANING

- A. Prior to the final acceptance test, coordinate with the State and Consulting Engineer for security related construction clean-up and patch work requirements. Security equipment closets and similar areas should be free of accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, remove all waste materials, rubbish, the Contractor's and its subcontractors' tools, construction equipment, machinery, and all surplus materials.
- B. The Contractor shall utilize good housekeeping practice with respect to his/her Work including cleanup of all dirt and debris created by the Contractor during his installation operations daily.
- C. The Contractor shall at his own expense collect and dispose of packing and debris in an environmentally responsible manner at the end of each working shift. This shall include recycling packaging materials and excess copper wire.
- D. The Contractor shall be on call during the Warranty to answer any questions the State might have. Maintain time sheets verifying the total hours of training provided. The State reserves the right to use any excess training hours, not used by the time of system completion, for future training as requested by the

State until the total number of training hours has been completed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section, except for Connections of Video Surveillance System to Existing Systems, will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Work for Connections of Video Surveillance System to Existing Systems required by the State shall be paid for under allowance items in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the State Engineer. The Contractor shall not be allowed to include overhead, profit, insurances and/or any other mark-ups which shall be considered incidental to and included in the LUMP SUM PRICE.

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
16780.1	Video Surveillance Systems	Lump Sum
16780.2	Video Surveillance Systems Existing TSA Checkpoint Work (Phase 2)	Lump Sum
16780.3	Connections of Video Surveillance Systems to Existing Systems	Allowance

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 PRICE.

END OF SECTION