

DIVISION OF STATE PARKS

State of Hawaii  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION  
Honolulu, Hawaii

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BOARD OF LAND AND NATURAL RESOURCES

Suzanne D. Case  
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

Job No. H87C836D  
Kekaha Kai State Park  
Mahaiula Improvements  
North Kona, Hawaii

Civil Engineer:	Okahara & Associates, Inc.
Mechanical Engineer:	Okahara & Associates, Inc.
Architect:	Richard Matsunaga & Associates Architects, Inc.

April 2016

State of Hawaii  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION  
Honolulu, Hawaii

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CONTRACT SPECIFICATIONS AND PLANS

Job No. H87C836D  
Kekaha Kai State Park  
Mahaiula Improvements  
North Kona, Hawaii

Approved: \_\_\_\_\_



CURT A. COTTRELL  
Administrator  
Division of State Parks

Approved: \_\_\_\_\_



CARTY S. CHANG, P.E.  
Chief Engineer  
Engineering Division

April 2016

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PLANS (Bound Separately)

DEPARTMENT OF LAND AND NATURAL RESOURCES INTERIM GENERAL  
CONDITIONS, DATED OCTOBER 1994 (Bound Separately)

NOTICE TO BIDDERS  
(Chapter 103D, HRS)

COMPETITIVE BIDS for Job No. H87C836D, Kekaha Kai State Park, Mahaiula Improvements, North Kona, Hawaii shall be submitted to the Department of Land and Natural Resources, Engineering Division on the specified date and time through the Hawaii State e-Procurement (HIePRO). HIePRO is accessible through the State Procurement Office website at [www.spo.hawaii.gov](http://www.spo.hawaii.gov).

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

The project is located in North Kona, Hawaii at (3) 7-2-005: 003.

The work shall generally consist of various site improvements and repairs such as repairing and repainting the existing walkway handrails, installing new ADA accessible picnic tables and BBQ pits with concrete pad, refurbishing existing BBQ pits, repairs to existing vault toilet buildings and constructing a new storage building.

Due to the nature of work contemplated, bidders must possess a valid State Contractor's license, classification "A".

A voluntary pre-bid conference will be held at the Engineering Division Conference Room, located at the Kalanimoku Building, 1151 Punchbowl Street, Room 221, Honolulu, HI 96813 on August 23, 2016, at 2 P.M.

The estimated cost of construction is \$650,000.

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

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

Since the estimated cost of construction is \$250,000 or more, the apprenticeship agreement preference pursuant to Hawaii Revised Statutes §103-55.6 (ACT 17, SLH 2009) shall apply.

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

# INFORMATION AND INSTRUCTIONS TO BIDDERS

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## INFORMATION AND INSTRUCTIONS TO BIDDERS

- A. PROJECT LOCATION AND SCOPE OF WORK: The project location and scope of work shall be as generally described in the Notice to Bidders.
- B. PROPOSALS: Bidders shall submit their bid, including the completed proposal form, bid bond, and any other documents required by the solicitation as part of their bid through the State of Hawaii e-Procurement System (HIePRO). See Item D, PROPOSAL FORM.
- C. GENERAL CONDITIONS: The Department of Land and Natural Resources Interim General Conditions dated October 1994, as amended, shall be made a part of these contract specifications and are referred to hereafter as the General Conditions.
- D. PROPOSAL FORM: **The Bidders shall fill out and upload the electronic copy of the proposal form to the HIePRO website when submitting the bid. Bid Proposals shall not be mailed, faxed or delivered to the State, unless requested to do so after the designated closing date. The successful Bidder shall fill out and print a hard copy of the proposal form, sign and submit the form with the contract award package.**
- E. OMISSIONS OR ERASURES: Any proposal which contains any omission or erasure or alteration not properly initialed, or conditional bid, or other irregularity may be rejected by the Board of Land and Natural Resources (Board).
- F. NOTICE OF INTENT TO BID AND QUESTIONNAIRE:  
A Notice of Intent to Bid is not required for this project. In compliance with HRS Section 103D-310, the lowest responsive and responsible bidder may be required to complete a questionnaire. When requested by the State, the completed questionnaire shall be submitted to the Chief Engineer for evaluation. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.
- G. BID SECURITY: A bid security will be furnished by each bidder as provided in sub-section 2.7 of the General Conditions. The successful bidder's bid security will be retained until Contract execution and furnished a performance and payment bond in an amount equal to one hundred percent (100%) of the total Contract price, including an amount estimated to be required for extra work, is furnished.
- The Board reserves the right to hold the bid securities of the four lowest bidders until the successful bidder has entered into a contract and has furnished the required performance bond. All bid securities will be returned in accordance with sub-section 3.5 of the General Conditions.
- Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond within the time stated in the proposal, the bid security shall be forfeited as required by law.
- H. CONTRACTOR'S LICENSE REQUIRED: The Board will reject all bids received from contractors who have not been licensed by the State Contractors License Board in accordance

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

- I. IRREGULAR BIDS: No irregular bids or propositions for doing the work will be considered by the Board.
- J. WITHDRAWAL OF BIDS: No bidder may withdraw his bid between the time of the opening thereof and the award of contract.
- K. SUCCESSFUL BIDDER TO FILE PERFORMANCE AND PAYMENT BONDS: The successful bidder will be required to file performance and payment bonds each; in the amount equal to the total contract price, including amounts estimated to be required for extra work, as provided in sub-section 3.6 of the General Conditions.
- L. NUMBER OF EXECUTED ORIGINAL COUNTERPARTS OF CONTRACT DOCUMENTS: If requested by the Board, six copies of the Contract, performance and payment bonds shall be executed.
- M. CHANGE ORDERS: No work of any kind in connection with the work covered by the plans and specifications shall be considered as change order work, or entitle the Contractor to extra compensation, except when the work has been ordered in writing by the Chief Engineer (Engineer) and in accordance with sub-section 4.2 of the General Conditions.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

dividing the total number of hours worked on the contract by Hawaii residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees with shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

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

- U. WATER AND ELECTRICITY: The Contractor shall make all necessary arrangements and pay all expenses for water and electricity used in the construction of this project.
- V. PUBLIC CONVENIENCE AND SAFETY: The Contractor shall conduct construction operations with due regard to the convenience and safety of the public at all times. No materials or equipment shall be stored where it will interfere with the safe passage of public traffic. The Contractor shall provide, install, and maintain in satisfactory condition, all necessary signs, flares and other protective facilities and shall take all necessary precautions for the protection of the work and the convenience and safety of the public. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the General Conditions.
- W. WORK TO BE DONE WITHOUT DIRECT PAYMENT: Whenever the contract that the Contractor is to perform work or furnish materials of any kind for which no price is fixed in the contract, it shall be understood that the Contractor shall perform such work or furnish said materials without extra charge or allowance or direct payment of any sort. The cost of performing such work or furnishing said material is to be included by the Contractor in a unit price for the appropriate item unless it is expressly specified that such work or material is to be paid for as extra work.
- X. AS-BUILT DRAWINGS: As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required. All authorizations given by the Engineer to deviate from the plans shall be drawn on the job site plans. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded on the as-built drawings. Final as-built drawings shall be submitted to the Engineer for review and approval. After the Engineer approves the as-built drawings, the contractor shall submit an electronic copy in Adobe PDF format on CD ROM.
- Y. ASBESTOS CONTAINING MATERIALS: The use of asbestos containing materials or equipment is prohibited. The Contractor shall insure that all materials and equipment incorporated in the project are asbestos-free
- Z. WORKER SAFETY: The Contractor shall provide, install and maintain in satisfactory condition all necessary protective facilities and shall take all necessary precautions for the protection and safety of its workers in accordance with the Occupational Safety and Health Standards for the State of Hawaii. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the

General Conditions.

- AA. TOILET FACILITIES: All toilet facilities constructed at the project site shall be in accordance with the Public Health Regulations of the State Department of Health (DOH). All necessary precautions shall be observed at the project site. The use of sanitary facilities shall be strictly enforced and workers violating these provisions shall be promptly discharged.
- BB. SIGNS: Whenever the project involves closing or obstructing any public thoroughfare, the Contractor shall provide traffic signs conforming to the applicable provisions of the current edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways", published by the Federal Highway Administration as directed by the Engineer for the purpose of diverting or warning traffic prior to the construction area. All traffic signs shall bear proper wording stating thereon the necessary information as to diverting or warning traffic.

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

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

- CC. FIELD OFFICE AREA FOR DEPARTMENT: When indicated in the Proposal, the Contractor shall provide a housed working area of at least 100 square feet adjacent to the Contractor's office for the Department's use. This area will be used by the Engineer to perform tests and to store equipment. As a minimum, the field office shall include the following: standard sized office desk and chair, lighting, ventilation, window-type air conditioning rated at 5,000 BTU, door and window with locking hardware, electrical outlets, and working communications facilities (a cellular telephone is acceptable). The Department will pay for all long distance toll charges made by the Engineer.
- DD. QUANTITIES: All bids will be compared on the basis of quantities of work to be done as shown in the Proposal; the quantities shown in the Unit Price items are estimated, being given as a basis for comparison of bids. The Board reserves the right to increase or decrease the quantities given under the items or delete items entirely as may be required during the progress of the work.
- EE. OTHER HEALTH MEASURES: Forms of work site exposure or conditions which may be detrimental to the health or welfare of workers or of the general public shall be eliminated or reduced to safe levels as required by the DOH codes, standards, and regulations. Suitable first aid kits and a person qualified to render first aid, as specified in the DOH regulations, shall be provided at all times when work is scheduled.
- FF. HAWAII BUSINESS OR COMPLIANT NON-HAWAII BUSINESS REQUIREMENT: Bidders (Contractors) shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR.

GG. COMPLIANCE WITH §3-122-112 HAR:

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

- A. **TAX CLEARANCE REQUIREMENTS (HRS Chapter 237):** Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.
- B. Department of Labor (DLIR) “**Certificate of Compliance**”. (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers’ Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.
- C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) “**Certificate of Good Standing**”. Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

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

P R O P O S A L

FOR

DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION  
State of Hawaii

JOB NO. H87C836D  
KEKAHA KAI STATE PARK  
MAHAIULA IMPROVEMENTS  
NORTH KONA, HAWAII

\_\_\_\_\_, 2016

Chief Engineer  
Engineering Division  
Department of Land and Natural Resources  
State of Hawaii  
Honolulu, Hawaii

Dear Sir:

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to construct a new storage and water tank building, complete repairs to the existing men's and women's vaulted toilets and existing walkway handrails, refurbish existing BBQ pits, construct new ADA BBQ pits and picnic table as indicated in the plans, as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Bidders, Information and Instructions to Bidders, Proposal, Detailed Specifications, Interim General Conditions, Plans, and any and all addenda for:

JOB NO. H87C836D  
KEKAHA KAI STATE PARK  
MAHAIULA IMPROVEMENTS  
NORTH KONA, HAWAII

on file in the office of the Engineering Division for the TOTAL BASE BID (Items 1 to 80) of:

\_\_\_\_\_ Dollars (\$\_\_\_\_\_)

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

Item No.	Quantity	Unit	Description	Unit Price	Total
<b><u>GENERAL</u></b>					
1.	1	LS	Temporary Erosion Control Measures (silt fence, etc.), in place complete.		\$ _____
2.	1	EA	Project Sign.	\$ _____	\$ _____
3.	1	Allow	Field Office.		\$ <u>5,000.00</u>
<b><u>NEW ACCESSIBLE BBQ PITS</u></b>					
4.	67	SF	Reinforced Concrete BBQ Pit Slab.	\$ _____	\$ _____
5.	16	SF	Reinforced Concrete BBQ Pit Counter.	\$ _____	\$ _____
6.	2	EA	Remove Tree.	\$ _____	\$ _____
7.	90	SF	8" CMU BBQ Pit, Wall & Counter.	\$ _____	\$ _____
8.	2	EA	BBQ Grill.	\$ _____	\$ _____
<b><u>REFURBISHED BBQ PITS</u></b>					
9.	1	L.S.	Refurbishing of Existing BBQ Pits.		\$ _____
<b><u>ACCESSIBLE PICNIC TABLE</u></b>					
10.	4	CY	4" Thick Concrete Walkway and Pad.	\$ _____	\$ _____
11.	2	EA	Wood Picnic Table.	\$ _____	\$ _____
<b><u>HANDRAILS</u></b>					
12.	1	LS	1-1/4" O.D. Galvanized Steel Pipe Rail.		\$ _____
13.	1	LS	Re-Paint Rails.		\$ _____
<b><u>STORAGE AND WATER TANK BUILDING</u></b>					
14.	1	LS	Job Supervision.	\$ _____	\$ _____
15.	1	LS	Dumpster Rental.	\$ _____	\$ _____
16.	76	LF	Remove Concrete Slab & TS-.	\$ _____	\$ _____
17.	60	SF	Remove CMU Wall w/Rock Veneer.	\$ _____	\$ _____
18.	30	LF	Remove Screen.	\$ _____	\$ _____
19.	4	EA	Remove Signage.	\$ _____	\$ _____
20.	12	EA	Remove Louver.	\$ _____	\$ _____
21.	12	EA	Remove Acrylic Panel & Trim.	\$ _____	\$ _____
22.	765	SF	Remove Roofing & Roof Framing.	\$ _____	\$ _____
23.	34	CY	Earthwork.	\$ _____	\$ _____

Item No.	Quantity	Unit	Description	Unit Price	Total
24.	17	CY	Base Course.	\$ _____	\$ _____
25.	11	CY	Reinforced Concrete Footing.	\$ _____	\$ _____
26.	514	SF	Reinforced Concrete Interior Slab.	\$ _____	\$ _____
27.	28	LF	Reinforced Concrete Pedestals.	\$ _____	\$ _____
28.	105	SF	Reinforced Concrete Landing.	\$ _____	\$ _____
29.	17	SF	Concrete Cricket.	\$ _____	\$ _____
30.	38	SF	Patch Reinforced Concrete Sidewalk.	\$ _____	\$ _____
31.	11	LF	Concrete Window Sill.	\$ _____	\$ _____
32.	92	LF	Concrete Wainscot Trim.	\$ _____	\$ _____
33.	365	SF	Cement Fiber Siding & Trims.	\$ _____	\$ _____
34.	421	BF	2 x & 4 x Wall Framing.	\$ _____	\$ _____
35.	105	SF	2 x Picket.	\$ _____	\$ _____
36.	95	BF	1 x Ceiling Furring Strips.	\$ _____	\$ _____
37.	438	BF	1 x Wall Furring Strips.	\$ _____	\$ _____
38.	1,432	SF	T-1-11 Roof Sheathing.	\$ _____	\$ _____
39.	4,081	BF	Roof Framing.	\$ _____	\$ _____
40.	16	EA	Roof Penetration Curb.	\$ _____	\$ _____
41.	174	BF	2 x Roof Nailer.	\$ _____	\$ _____
42.	1,250	LB	Rough Carpentry.	\$ _____	\$ _____
43.	1	EA	6/0 x 7/0 FRP/Louver, Frame & HW-.	\$ _____	\$ _____
44.	1	EA	8/8 x 9/0 Roll-Up Door, Frame & HW-.	\$ _____	\$ _____
45.	2	EA	3/0 x 7/0 FRP, Frame & HW-.	\$ _____	\$ _____
46.	34	SF	Louvers.	\$ _____	\$ _____
47.	6	EA	Signage.	\$ _____	\$ _____
48.	51	LF	Chain Link Fence.	\$ _____	\$ _____
49.	1	EA	Chain Link Gate.	\$ _____	\$ _____
50.	1,726	LF	8" CMU Walls.	\$ _____	\$ _____
51.	45	SF	Expanded Metal Screen.	\$ _____	\$ _____
52.	184	SF	Moss Rock Veneer.	\$ _____	\$ _____
53.	1,432	SF	Preformed Metal Roofing.	\$ _____	\$ _____

Item No.	Quantity	Unit	Description	Unit Price	Total
54.	910	SF	Insulation.	\$ _____	\$ _____
55.	25	LF	Ridge Cap.	\$ _____	\$ _____
56.	210	LF	Rake/Edge Flashing.	\$ _____	\$ _____
57.	36	LF	Counterflashing.	\$ _____	\$ _____
58.	16	EA	Solar Tube/Vent Flashing.	\$ _____	\$ _____
59.	4	EA	Vent Pipe Flashing.	\$ _____	\$ _____
60.	8	EA	Solar Tube Daylighting.	\$ _____	\$ _____
61.	184	SF	Waterproofing Membrane.	\$ _____	\$ _____
62.	8,613	SF	Exterior & Interior Painting.	\$ _____	\$ _____
63.	379	SF	Gypsum Bd Ceiling/Soffit.	\$ _____	\$ _____
64.	379	SF	Mud, Tape, Finish & Accessories.	\$ _____	\$ _____
65.	260	SF	Epoxy Floor Coating.	\$ _____	\$ _____
66.	260	SF	Concrete Sealer.	\$ _____	\$ _____
67.	254	SF	Clean Tile Floor & Base.	\$ _____	\$ _____
68.	1	LS	Temporary Portable Toilets.		\$ _____
69.	8	EA	Solar Powered Exhaust Fan.	\$ _____	\$ _____
70.	1	EA	Water Storage Tank.	\$ _____	\$ _____
71.	10	LF	2" Sch. 40 PVC.	\$ _____	\$ _____
72.	20	LF	1" Sch. 40 PVC.	\$ _____	\$ _____
73.	2	EA	¾" Hose Bibb.	\$ _____	\$ _____
74.	1	EA	2" Ball Valve.	\$ _____	\$ _____
75.	8	EA	10x10 Exhaust Grille.	\$ _____	\$ _____
76.	4	EA	Remove and Replace Toilet Pedestal, in place complete.	\$ _____	\$ _____
77.	1	LS	Cleanup.	\$ _____	\$ _____
78.	1	EA	Accessible portable toilet that meets ADA standards for the duration of restroom closure for renovations. Toilet shall be serviced a min. of four times a week (Sun, Mon, Wed, Fri) and shall be maintained in accordance with the Public Health Regulations of the Dept. of Health.	\$ _____	\$ _____

79.	1	EA	Standard toilet that for the duration of restroom closure for renovations. Toilet shall be serviced a min. of four times a week (Sun, Mon, Wed, Fri) and shall be maintained in accordance with the Public Health Regulations of the Dept. of Health.	\$ _____	\$ _____
<b>SUBTOTAL BASE BID (Items 1-79 Inclusive)</b>					\$ _____
80.	1	LS	Mobilization and Demobilization (not to exceed 10% of the Subtotal Base Bid)		\$ _____
<b>TOTAL BASE BID (Items 1-80 Inclusive)</b>					\$ _____

HAWAII PRODUCTS PREFERENCE AND/OR USE OF HAWAII PRODUCTS

In accordance with Act 175, SLH 2009, the Hawaii products preference is applicable to this solicitation. Hawaii products may be available for items noted on the Offer Form. The Hawaii Products List is available on the SPO webpage at <http://hawaii.gov/spo>. Click on *Procurement of Goods, Services and Construction-Chapter 103D, HRS*; under *Procurement* click on *Preferences, Hawaii Products* and select *Hawaii Products List* to view.

Bidder offering a Hawaii product (“HP”) shall identify the HP in the table below. Any person desiring a Hawaii product preference shall have the product(s) certified and qualified, if not currently on the Hawaii Products List, prior to the deadline for receipt of offer(s) specified in the procurement notice and solicitation. The responsibility for certification and qualification shall rest upon the person requesting the preference.

Persons desiring to qualify their product(s) not currently on the Hawaii Product List, shall complete Form SPO-38, *Certification for Hawaii Product Preference*, and submit the completed form to the Procurement Officer providing any additional information required by the Procurement Officer. One form shall be completed and submitted for each product. Form SPO-38 is available on the SPO webpage at <http://hawaii.gov/spo>, under the *Quicklinks* menu click on *Forms for Vendors/Contractors/Services Providers*.

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

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

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price

RECYCLED PRODUCTS PREFERENCE

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

<u>DESCRIPTION</u>	<u>RECYCLED PRODUCT COST</u>	<u>NONRECYCLED PRODUCT COST</u>
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____
_____	\$ _____	\$ _____

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

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

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

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

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

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

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

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

## APPRENTICESHIP AGREEMENT PREFERENCE

1. If applicable to this project, any bidder seeking the preference must be a party to an apprenticeship agreement registered with the State Department of Labor and Industrial Relations (DLIR) at the time the bid is submitted for each apprenticeable trade the bidder will employ to construct the project. “Employ” means the employment of a person in an employer-employee relationship.
  - a. The apprenticeship agreement shall be registered with the DLIR and conform to the requirements of Hawaii Revised Statutes Chapter 372.
  - b. Subcontractors do not have to be a party to an apprenticeship agreement for the bidder to obtain preference.
  - c. The bidder is not required to have apprentices in its employ at the time the bid is submitted to qualify for the preference.
2. A bidder seeking the preference must state the apprenticeable trade the bidder will employ for each trade to be employed to perform the work by submitting a completed signed original Certification Form 1 verifying participation in an apprenticeship program registered with DLIR. “Apprenticeable trade” shall have the same meaning as “apprenticeable occupation” pursuant to Hawaii Administrative Rules (HAR) §12-30-5.
  - a. The *Certification Form 1* shall be authorized by an apprenticeship sponsor listed on the DLIR list of registered apprenticeship programs. “Sponsor” means an operator of an apprenticeship program and in whose name the program is approved and registered with the DLIR pursuant to HAR §12-30-1.
  - b. The authorization shall be an original signature by an authorized official of the apprenticeship sponsor.
  - c. The completed signed original Certification Form 1 for each trade must be submitted with the bid. Previous certifications shall not apply.
  - d. When filling out the *Certification Form 1*, the name of Apprenticeable Trade and Apprenticeship Sponsor must be the same as recorded in the List of Construction Trades in Registered Apprenticeship Programs that is posted on the DLIR website. “Registered apprenticeship program” means a construction trade program approved by the DLIR pursuant to HAR §12-301 and §12-30-4.
  - e. The *Certificate Form 1* and the List of Construction Trades in Registered Apprenticeship Programs is available on the DLIR website at: <http://hawaii.gov/labor/wdd>.
3. Upon receiving the *Certification Form 1*, the Procurement Officer will verify that the apprenticeship program is on the List of Construction Trades in Registered Apprenticeship Programs and that the form is signed by an authorized official of the Apprenticeship Program Sponsor. If the programs and signature are not confirmed by the DLIR, the bidder will not qualify for the preference.
4. If the bidder is certified to participate in an apprenticeship program for each trade which will be employed by the bidder for the project, a preference will be applied to decrease the bidder’s bid

amount by five percent (5%) for evaluation purposes.

5. Should the bidder qualify for other preferences (e.g. Hawaii Products), all applicable preferences shall be applied to the bid price.

#### CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS PROHIBITED

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.

## CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Base Bid (Items 1 to 80) selected by the Board of Land and Natural Resources. Write the total of bid items 1 to 80 on page P-1.

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

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

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

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

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

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

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

After the proposals are opened and read, the figures will be extended and/or totaled in accordance with the bid prices of the acceptable proposals and the totals will be compared. In the comparison of bids, words written in the proposal shall govern over figures and unit prices will govern over totals. Until the award of the contract, however, the right will be reserved to reject any and all proposals and to waive any defects or technicalities as may be deemed best for the interest of the State.

It is also understood and agreed that liquidated damages in the amount of One hundred fifty and 00/100 (\$150.00) for each and every calendar day in excess thereof prior to completion of the contract shall be withheld from payments due to the Contractor.

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

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

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

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

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

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

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

**RECEIPT OF ADDENDA**

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

<u>Addendum</u>	<u>Date Received</u>	<u>Addendum</u>	<u>Date Received</u>
No. 1	_____	No. 5	_____
No. 2	_____	No. 6	_____
No. 3	_____	No. 7	_____
No. 4	_____	No. 8	_____

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

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

JOINT CONTRACTORS OR SUBCONTRACTORS  
TO BE ENGAGED ON THIS PROJECT

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

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

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

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

In completing the Joint Contractors or Subcontractors List, describe the specialty contractor’s nature and scope of work to be performed for this project and provide the complete firm name of the joint contractor or subcontractor in the respective columns. If the Bidder is a general contractor and providing the work of the required specialty contractor, fill in the Bidder’s (general contractor’s) name and nature and scope of work to be performed on this project.

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

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

<b>COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR</b>	<b>NATURE AND SCOPE OF WORK TO BE PERFORMED</b>

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

(Cross Out Those Not Applicable)

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_)

as required by law.

Respectfully submitted,

\_\_\_\_\_  
Name of Company, Joint Venture  
or Partnership

\_\_\_\_\_  
Contractor's License No.

By \_\_\_\_\_  
Signature (\*4)

Title \_\_\_\_\_

Print Name \_\_\_\_\_

Date \_\_\_\_\_

Address \_\_\_\_\_

Telephone No. \_\_\_\_\_

E-Mail Address \_\_\_\_\_

NOTES:

1. Surety bond underwritten by a company licensed to issue bonds in this State;
2. Legal tender; or
3. A certificate of deposit; share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by, and payable on demand to the State by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration.
  - A. These instruments may be utilized only to a maximum of \$100,000.
  - B. If the required security or bond amount totals over \$100,000, more than one instrument not exceeding \$100,000 each and issued by different financial institutions shall be accepted.
4. Please attach to this page evidence of the authority of this officer to submit bids on behalf of the Company and also the names and residence addresses of all officers of the Company.
5. Fill in all blank spaces with information asked for or bid may be invalidated. PROPOSAL MUST BE INTACT, MISSING PAGES MAY INVALIDATE YOUR BID.

**End of Proposal**

## SPECIAL PROVISIONS

Amend INTERIM GENERAL CONDITIONS, dated October 1994, as follows:

### Section 2 – Proposal Requirements and Conditions

1. **AMEND** Section 2.1 Qualification of Bidder with the following:

Written Notice of Intent to Bid or Offer: A written Notice of Intent to Bid is not required for the Solicitation.

Standard Qualification Questionnaire: Bidders may be required to complete a standard qualifications questionnaire. When requested, the information shall be furnished within two working days or longer at the discretion of the Engineer. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.

Hawaii Business or Compliant Non-Hawaii Business Requirement: Bidders shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR. A certified letter is not required prior to bid opening.

Compliance with §3-122-112 HAR: As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the following documents to the Department.

- A. Tax Clearance (HRS Chapter 237): Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.
- B. Department of Labor (DLIR) “Certificate of Compliance”. (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers’ Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.
- C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) “Certificate of Good Standing”. Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

**Hawaii Compliance Express.** Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at <http://vendors.ehawaii.gov> to acquire a “Certificate of Vendor compliance” indicating that bidder’s status is compliant with requirements of §103D-310(c), HRS, shall be accepted for contracting and final payment purposes.

Bidders that elect to use the new HCE services will be required to pay an annual fee of \$15.00 to the

Hawaii Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

2. **ADD** Section 2.4a, Pre-Bid Conferences

Required Pre-bid Conferences: For construction and design-build projects with an estimated value of \$500,000 or more and solicited under the competitive sealed bid method (103D-302 HRS); and for construction and design-build projects with an estimated value of \$100,000 or more and solicited under the competitive sealed proposal method (103D-303 HRS); a pre-bid conference is required.

Other Pre-Bid Conferences: The Department may require a pre-bid conference for construction or design-build projects that are below the dollar threshold listed in above or when projects have special or unusual requirements.

Other Conditions: The Department may require the prospective Bidders to make a physical inspection of the project site and make attendance at the pre-bid conference a condition for submitting an offer.

Nothing stated at the pre-bid conference shall change the solicitation unless a change is made by written addendum.

3. **DELETE** Section 2.5, Addenda and Interpretations, in its entirety and replace with the following:

“Discrepancies, omissions, or doubts as to the meaning of drawings and specifications should be communicated using the question and answer section on the HIEPRO solicitation for interpretation and must be received in the time frame set in the HIEPRO solicitation. Any interpretation, if made and any supplemental instructions will be in the form of written addenda to the plans and specifications and made available prior to the offer due date. It shall be the prospective bidder’s sole responsibility to verify and obtain any said addenda. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.”

**Section 3 – Award and Execution of Contract**

1. **AMEND** Section 3.3, Award of Contract, by deleting “sixty (60)” and replacing with “ninety (90)” in the first paragraph.

2. **AMEND** Section 3.3, Award of Contract, by adding the following after the first paragraph:

“If the contract is not awarded within the ninety (90) days, the Department may request the successful Bidder to extend the time for the acceptance of its bid. The Bidder may reject such a request without penalty; and in such case, the Department may at its sole discretion make a similar offer to the next lowest responsive and responsible bidder and so on until a bid is duly accepted or until the Department elects to stop making such requests.”

3. **AMEND** Section 3.9, Notice to Proceed, by deleting “180 days” and replacing with “one (1) year” in the last paragraph.

4. **ADD** Section 3.10, Protests:

**“3.10 PROTESTS**—Pursuant to Section 103D-701, Hawaii Revised Statutes, an actual or prospective offeror who is aggrieved in connection with the solicitation or award may submit a protest. Any protest

shall be submitting in writing to the Chairperson, Department of Land and Natural Resources, 1151 Punchbowl Street, Honolulu, Hawaii 96813, or designee as specified in the solicitation.

A protest shall be submitted in writing within five (5) working days after the aggrieved person knows or should have known the facts giving rise thereto; provided that a protest based upon the content of the solicitation shall be submitted in writing prior to the date set for receipt of offers. Further provided that a protest of an award or proposed award shall be submitted within five (5) working days after the posting of the award of the contract.

The notice of award, if any, resulting from this solicitation shall be posted on the Procurement System on the SPO website: <http://hawaii.gov/spo2/>.

### **Section 5 – Control of Work**

**AMEND** Section 5.8 Value Engineering Incentive by deleting “\$100,000” and replacing with “\$250,000” in the first paragraph.

### **Section 6 – Substitution of Materials and Equipment**

**ADD** the following to Section 6.3 Sub-paragraph b:

4. If the substitution meets all the requirements of the specifications and plans.

### **Section 7 – Prosecution and Progress**

1. **DELETE** Section 7.2d in its entirety and replace with the following:

“d. Insurance Requirements

#### 1. Obligation of Contractor

The Contractor shall not commence any work until it obtains, at its own expense, all required insurance. Such insurance must have the approval of the Department as to limit, form and amount and must be maintained with a company authorized by law to issue such insurance in the State of Hawaii.

All insurance described herein will be maintained by the Contractor for the full period of the contract and in no event will be terminated or otherwise allowed to lapse prior to written certification of final acceptance of the work by the Department.

Certificate(s) of Insurance acceptable to the Department shall be filed with the Engineer prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies will not be canceled or changed until at least thirty days written notice has been given to the Engineer by registered mail. The insurance policies shall name the State of Hawaii, its officers and employees as an additional insured and such coverage shall be noted on the Certificate. Should any policy be canceled before final acceptance of the work by the Department, and the Contractor fails to immediately procure replacement insurance as specified, the Department, in addition to all other remedies it may have for such breach, reserves the right to procure such insurance and deduct the cost thereof from any money due to the Contractor.

Nothing contained in these insurance requirements is to be construed as limiting the extent of Contractor's responsibility for payment of damages resulting from its operations under this contract, including the Contractor's obligation to pay liquidated damages, nor shall it affect the Contractor's separate and independent duty to defend, indemnify and hold the Department harmless pursuant to other provisions of this contract. In no instance will the Department's exercise of an option to occupy and use completed portions of the work relieve the Contractor of its obligation to maintain the required insurance until the date of final acceptance of the work.

All insurance described herein shall cover the insured for all work to be performed under the contract, all work performed incidental thereto or directly or indirectly connected therewith, including traffic detour work or other work performed outside the work area, and all change order work.

The Contractor shall, from time to time, furnish the Engineer, when requested, satisfactory proof of coverage of each type of insurance required or a copy of the actual policies covering the work. Failure to comply with the Engineer's request may result in suspension of the work, and shall be sufficient grounds to withhold future payments due the Contractor and to terminate the contract for Contractor's default.

## 2. Types of Insurance

The Contractor shall purchase and maintain insurance described below which shall provide coverage against claims arising out of the Contractor's operations under the contract, whether such operations be by the Contractor itself or by the subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

- (a) Worker's Compensation. The Contractor and all subcontractors shall obtain full worker's compensation insurance coverage for all persons whom they employ or may employ in carrying out the work under this contract. This insurance shall be in strict conformity with the requirements of the most current and applicable State of Hawaii Worker's Compensation Insurance laws in effect on the date of the execution of this contract and as modified during the duration of the contract.
- (b) Commercial General Liability Insurance and Automobile Insurance. Contractor's commercial general liability insurance and automobile liability insurance shall both be obtained in a combined, single limit of not less than \$1,000,000 per occurrence that shall include coverage for bodily injury, sickness, disease or death of any person, arising directly or indirectly out of, or in connection with, the performance of work under this contract.

The Contractor's property damage liability insurance shall provide for a single combined limit of not less than \$1,000,000 for all damages arising out of injury to or destruction of property of others including the Department's, arising directly or indirectly out of or in connection with the performance of the work under this contract including explosion or collapse.

The Contractor shall either:

- i. Require each of its subcontractors to procure and to maintain during the life of its subcontract, subcontractors' comprehensive general liability, automobile liability

and property damage liability insurance of the type and in the same amounts specified herein; or

- ii. Insure the activities of its subcontractors in its own policy.

The Contractor will be permitted, in cooperation with insurers, to maintain a self insured retention for up to 25% of the per occurrence combined single limits of the commercial general liability and the automobile liability policies. The existence of the self insured retention must be noted on the certificate of insurance coverage submitted to the Department or else it will be understood that the insurer is providing first dollar coverage for all claims. For all claims within the self-insured retention amount, the rights, duties and obligations between the Contractor and the Department shall be identical to that between a liability insurer and the Department, as an additional insured, as if there was no self-insured retention.

- (c) **Builder's Risk Insurance.** Unless included in the Specifications of this project, the Contractor shall not be required to provide builder's risk insurance. If required as noted in the Specifications, builder's risk insurance shall be provided during the progress of work and until final acceptance by the Department upon completion of the contract. It shall be "All Risk" (including but not limited to earthquake, windstorm and flood damage) completed value insurance coverage on all completed work and work in progress to the full replacement value thereof. Such insurance shall include the Department as additional name insured. The Contractor shall submit to the Engineer for its approval all items deemed to be uninsurable. The policy may provide for a deductible in an amount of up to 25% of the amount insured by the policy. With respect to all losses up to any deductible amount, the relationship between the Contractor and the Department shall be that of insurer and additional insured as if no deductible existed".

**2. DELETE** Section 7.16 in its entirety and replace with the following:

**"RESPONSIBILITY FOR DAMAGE CLAIMS; INDEMNITY** – The Contractor shall indemnify the State and the Department against all loss of or damage to the State's or the Department's existing property and facilities arising out of any act or omission committed in the performance of the work by the Contractor, any subcontractor or their employees and agents. Contractor shall defend, hold harmless and indemnify the Department and the State, their employees, officers and agents against all losses, claims, suits, liability and expense, including but not limited to attorneys' fees, arising out of injury to or death of persons (including employees of the State and the Department, the Contractor or any subcontractor) or damage to property resulting from or in connection with performance of the work and not caused solely by the negligence of the State or the Department, their agents, officers and employees. The State or the Department may participate in the defense of any claim or suit without relieving the Contractor of any obligation hereunder. The purchase of liability insurance shall not relieve the Contractor of the obligations described herein.

The Contractor agrees that it will not attempt to hold the State and its Departments and Agencies and their officers, representatives, employees or agents, liable or responsible for any losses or damages to third parties from the action of the elements, the nature of the work to be done under these specifications or from any unforeseen obstructions, acts of God, vandalism, fires or encumbrances which may be encountered in the prosecution of the work.

The Contractor shall pay all just claims for materials, supplies, tools, labor and other just claims against the Contractor or any subcontractor in connection with this contract and the surety bond will not be

released by final acceptance and payment by the Department unless all such claims are paid or released. The Department may, but is not obligated to, withhold or retain as much of the monies due or to become due the Contractor under this contract considered necessary by the Engineer to cover such just claims until satisfactory proof of payment or the establishment of a payment plan is presented.

The Contractor shall defend, indemnify and hold harmless the State and its Departments and Agencies and their officers, representatives, employees or agents from all suits, actions or claims of any character brought on account of any claims or amounts arising or recovered under the Worker's Compensation Laws or any other law, by-law, ordinance, order or decree.

### **Section 8 – Measurement and Payment**

1. **DELETE** Section 8.7a in its entirety and replace with the following:

- a. Tax Clearances from the State of Hawaii Department of Taxation and Internal Revenue Service, subject to section 103D-328, HRS, current within two months of issuance date indicating that all delinquent taxes levied or accrued under State Statutes against the contractor have been paid.

2. **ADD** Section 8.7d, Certificate of Compliance:

- d. A Certification from the Contractor affirming that the Contractor has, as applicable, remained in compliance with all laws as required by Section 103D-310, HRS, and Section 3-122-112, HAR. A contractor making a false affirmation shall be suspended and may be debarred pursuant to section 103D-702, HRS.
  1. Certification of Compliance for Final Payment, State Procurement Office Form-22. Must be Signed Original.

3. **ADD** Section 8.7e, Hawaii Compliance Express:

- e. In lieu of submitting the tax clearances from Taxation and IRS, and SPO Form -22, the Contractor may choose to use the Hawaii Compliance Express as described on page SP-1 of this Special Provisions.

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## SECTION 01019

### GENERAL SPECIFICATIONS

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

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

##### 1.2 GENERAL

- A. Examination of Premises: The Contractor shall contact the Engineer and obtain permission before visiting the site.
- B. All lines and grades shall be established by a licensed surveyor , or licensed Civil Engineer, registered in the State of Hawaii. The Contractor shall submit evidence of current and valid registration.
- C. Notices: The Contractor shall notify the Engineer and give at least three (3) working days notice before starting any work.
- D. Disruption of Utility Services: All work related to the temporary disconnection of electrical system shall be pre-arranged with the Engineer so that any disruption of such services will be kept to a minimum. In the event temporary power hook-up is required, the Contractor shall provide the necessary services.
- E. Contractor's Operations
  - 1. The Contractor must employ, insofar as possible, such methods and means of carrying out the work so as not to cause any interruption or interference to the facility's operations. Where the Contractor's operations would result in interruptions which would hamper the operations of the facilities, the Contractor shall rearrange the schedule of work accordingly.
  - 2. The Contractor shall maintain safe passageway to and from the facility for the user agency personnel and the public at all times.
- F. Lead Paint
  - 1. When the project includes paint to be disturbed that was applied prior to 1980, it shall be assumed to contain lead. The Contractor shall inform its employees, subcontractors, and all other persons engaged in the project that lead containing paints are present in the existing buildings at the job site and to follow the

requirements of the Department of Labor and Industrial Relations, Division of Occupational Safety and Health, Title 12, Subtitle 8, Chapter 148, Lead Exposure in Construction, Hawaii Administrative Rules (Chapter 12-148, HAR).

G. Parking Policy for Contractor

1. The Contractor and its employees will not be allowed to park in zones assigned to facility personnel.
2. Areas to be used by the Contractor shall be as designated by the Engineer. Any lawn damaged by the Contractor shall be restored as instructed by the Engineer at no cost to the State.

H. Toilet Accommodations: The Contractor may use the existing toilet facilities if so designated by the Engineer; however, it is the Contractor's responsibility to keep same clean and in a sanitary condition at all times.

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

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

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

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

M. Responsibility

1. The State will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the prime Contractor in matters pertaining to other trades employed on the job. The Contractor shall be responsible for coordinating the work of all trades on the job.
2. Should the Contractor discover any discrepancy in the plans or specifications, the Contractor shall immediately notify the Engineer before proceeding any further with the work, otherwise, the Contractor will be held responsible for any cost involved in correction of work placed due to such discrepancy.

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

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

P. Drawings and Specifications

1. The Contractor shall not make alterations in the drawings and specifications. In the event the contractor discovers any errors or discrepancies, the Contractor shall immediately notify the Engineer in accordance with the General Conditions.
2. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the work.
3. Specifications and drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.

Q. Required Submittals

1. Required submittals as specified in the Technical Sections of these specifications include one or more of the following: Shop drawings; color samples; material samples; technical data; schedules of materials; schedules of operations; guarantees; operating and maintenance manuals; and as-built drawings.
2. The Contractor shall make a comprehensive list of the required submittals, by Specification Section, and submit this list to the Engineer within 15 days after notice to proceed.
3. As-Built Drawings: When as-built drawings are required for submittal, the following shall apply:
  - a. As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required.
  - b. All deviations from alignments, elevations and dimensions which are

stipulated on the plans shall be recorded in red on the as-built drawings.

- c. The following procedure shall be followed:
- 1) Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans.
  - 2) Within two weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean copy of plans using a red pencil. Any deletions shall be so noted and redrawn as necessary. The Contractor shall stamp or mark the tracings "AS-BUILT", and also sign and date each drawing so marked.
  - 3) The Contractor shall submit the as-built drawings to the Engineer for review and approval. After the Engineer approves the as-built drawings, the Contractor shall submit an electronic copy in Adobe PDF format on CD ROM.
  - 4) Any as-built drawing which the Engineer determines does not accurately record the deviation shall be corrected by the State, and the Contractor shall be charged for the services.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

PART 1 - GENERAL

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

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

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

<u>Abbreviation</u>	<u>Company</u>
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPA	American Wood Preservers Association 1625 Eye Street Washington, DC 20006
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CBM	Certified Ballast Manufacturers 2120 Keith Building Cleveland, OH 44115
CMAA	Crane Manufacturers Association of America, Inc. (Formerly called: Overhead Electrical Crane Institute - OEI) 1326 Freeport Road Pittsburgh, PA 15238
CRSI	Concrete Reinforcing Steel Institute 180 North La Salle Street Chicago, IL 60601
CSA	Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario, M9W IR3, Canada
DEMA	Diesel Engine Manufacturer's Association 122 East 42nd Street New York, NY 10017

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

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

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

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01100

ARCHAEOLOGICAL PROTECTION

PART 1 - GENERAL

- 1.1 This section covers the requirements for the protection and preservation of historical sites and values.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

- 3.1 **CONSTRUCTION METHOD:** Representatives of the State will from time to time examine the area as work proceeds. If historical values are noted, the State may order a halt to the work in the vicinity of the historical values until the State can examine further. The Contractor shall notify the State if he finds anything he suspects to be of historic significance and shall discontinue further work in the vicinity of the find until the State can examine the area. In either case, further work in the vicinity of such historical or suspected historical values may proceed only upon approval by the State. Such approval can be normally expected within one week and shall in no case require more than one month.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop drawings shall be required for:

1. Division 16 - Electrical Work.
2. Any others as called for in the plans, specifications or by the Engineer.

B. Other required submittals shall include:

1. Piping Layout.
2. Manufacturer's Data.
3. Certificates of Warranty.
4. Any others as called for in the plans, specifications, or by the Engineer.

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

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

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

CONTRACTOR NAME

PROJECT: \_\_\_\_\_

\_\_\_\_\_

JOB NO: \_\_\_\_\_

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

DATE RECEIVED \_\_\_\_\_

SPECIFICATION SECTION \_\_\_\_\_  
SPECIFICATION PARAGRAPH \_\_\_\_\_  
DRAWING NUMBER \_\_\_\_\_  
SUBCONTRACTOR NAME \_\_\_\_\_  
SUPPLIER NAME \_\_\_\_\_  
MANUFACTURER NAME \_\_\_\_\_

CERTIFIED BY: \_\_\_\_\_

- C. This stamp, "filled in", should appear on the title sheet of each shop drawing, on a cover sheet of submittals in an 8-1/2" x 11" format, or on one face of a cardstock tag (min. 3" x 6") tied to each sample. The tag on the samples should state what the sample is so that, if the tag is accidentally separated from the sample, it can be matched up again. The back of this tag will be used by the Engineer for his receipt, review, and log stamp and for any comments that relate to the sample.
- D. All submittals for material, equipment, and shop drawings listed in the contract documents, including dimensioned plumbing shop drawings, shall be required and shall be reviewed by the Engineer, prior to any ordering of materials and equipment.
- E. Unless otherwise noted, the Contractor shall submit to the Engineer for his review eight copies of all shop drawings, piping layout, and/or catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) required for the construction. Drawings shall be submitted in sufficient time to allow the Engineer not less than twenty regular working days for examining the drawings.
- F. The drawing shall be accurate, distinct, and complete and shall contain all required information, including satisfactory identification of items, units and assemblies in relation to the contract drawings and specifications.
- G. Unless otherwise approved by the Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the drawings or other approved means that the Contractor has checked the shop drawings and that the work or equipment shown is in accordance with contract requirements and has been checked for dimensions and relationship with work of all other trades involved. All deviations from the plans and specifications shall be listed. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the contract documents and will be returned to the Contractor for resubmission in the proper form.
- H. When the shop drawings have been reviewed by the Engineer, two sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the drawing may be rejected and one set will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit

eight copies of the drawings, unless otherwise directed by the Engineer. No changes shall be made by the Contractor to the resubmitted shop drawings other than those changes indicated by the Engineer. The resubmittal shall be so indicated on the shop drawing.

- I. The review of such drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for correctness of the dimensions, fabrication details, and space requirements or for deviations from the contract drawings and specifications, unless the Contractor has called attention to such deviations, in writing, by a letter accompanying the drawings and the Engineer approved the change or deviations, in writing, at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, he shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.
- J. The approval of the above drawings, lists, prints, specifications, or other data shall in no way release the Contractor from his responsibility for the proper fulfillment of the requirements of this contract nor for fulfilling the purpose of the installation nor from his liability to replace the same should it prove defective or fail to meet the specified requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01505

### MOBILIZATION AND DEMOBILIZATION

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

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

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

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

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 - EXECUTION

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

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

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

END OF SECTION

## SECTION 01530

### BARRICADES

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Description. This work shall consist of furnishing, installing and maintaining barricades in accordance with the requirements of the contract.

Barricade application shall be provided for in the latest edition of the FHWA publication, Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), and as amended.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. Lumber: Lumber for rails, frames and braces shall be dry, sound, undamaged, well seasoned, and free from any defect which may impair their strength and durability.
- B. Hardware: Nails shall be galvanized wire nails. As many and as large a size as is practicable shall be used.
- C. Paints: Paints shall be exterior enamel paint of the best grade or first line as made by approved manufacturers.
- D. Sheet Reflecting Material: Sheet reflecting material shall conform to the applicable requirements of Subsection 712.20(C) of the "Standard Specifications for Road and Bridge Construction".
- E. Alternate Designs: Alternate barricade designs such as plastic molded barricades may be used subject to the Engineer's approval. The Contractor shall submit shop drawings or catalog cuts for approval.

#### PART 3 - EXECUTION

##### 3.1 CONSTRUCTION REQUIREMENTS

- A. General: Barricades shall be constructed in a first class, workmanlike manner in accordance with details shown on the plans and as specified herein.

Barricades shall be in good condition and approved by the Engineer for use within the project limits. Barricade application and installation shall be as shown on the plans and as directed by the Engineer in accordance with the guidelines provided in the latest edition of

the FHWA publication, Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), and any amendments or revisions thereof as may be made from time to time.

Sand bags or other approved weights shall be provided where required or as directed by the Engineer. Sand bags or other approved weights shall not be placed on any striped barricade rail.

Steady burn and/or flashing lamps shall be required on selected barricades used during hours of darkness. Locations shall be as shown on the plans and as directed by the Engineer. Lamps shall be attached on the barricade ends closest to the traveled way and shall be visible to the motorist.

Barricades furnished and paid for as provided for as provided herein may be used for temporary detours, construction phasing, or other temporary traffic control work.

Barricades furnished and paid for use in temporary detours or construction phasing may be used for permanent location called for on the plans.

Upon completion of the construction work, barricades shall be left in place, relocated, or removed and disposed of as shown on the plans or as directed by the Engineer. Barricades left in place, or relocated to new permanent locations shall become the property of the State. Barricades directed to be removed and disposed of shall become the property of the Contractor.

- B. Painting: Wooden rails, frames and braces shall be given a prime coat and 2 finish coats of new white exterior enamel paint. Rail faces to be reflectorized may be left unpainted unless otherwise specified or directed.
- C. Reflectorization: Reflectorization of barricade rails shall be done in a first class, workmanlike manner and the attachment of reflective sheeting shall be as shown on the plans, specified herein, or as directed and approved by the Engineer.

Both vertical faces of each barricade rail shall be reflectorized as shown on the plans.

Wooden rails shall be reflectorized with one of the following:

1. Reflective sheeting specified in Subsection 712.20(C)(4) of the "Standard Specifications for Road and Bridge Construction" and backed with a 26 gage galvanized steel sheet, or
2. a hardened aluminum backed reflective sheeting as specified in Subsection 712.20(C)(5) of the "Standard Specifications for Road and Bridge Construction."

D. Color: Rails, frames and braces shall be white.

The front and back faces of barricade rails shall have 6-inch wide alternative colored and white striped sloping downward toward the traveled way at an angle of 45 degrees with the vertical. The colored stripes shall be either orange or red in accordance with the following requirements:

1. Orange and white stripes shall be used in the following conditions:
  - a. Construction work.
  - b. Detours.
  - c. Maintenance work.
2. Red and white stripes shall be used in the following conditions:
  - a. On roadways with no outlet (ie. dead-ends, cul-de-sacs).
  - b. Ramps or lanes closed for operational purposes.
  - c. Permanent or semipermanent closure or termination of a roadway.

E. Maintenance: Barricades shall be kept in good condition throughout their usage during construction until the end of the contract.

F. The Contractor shall repair, repaint, clean or replace the barricades as required and as directed by the Engineer to maintain their effectiveness and appearance.

The Constructor shall immediately replace all lost, stolen or damaged barricades, lamps, sand bags and other approved weights.

Barricades used during construction phasing, temporary detours or other temporary traffic control work shall be cleaned and repaired as necessary, prior to being relocated to a permanent location shown on the plans or as directed.

No extra payment will be made for any repair work, repainting, or cleaning of barricades. The Engineer shall determine the suitable condition of each barricade and shall determine when each barricade shall be repaired, repainted or cleaned.

END OF SECTION

## SECTION 01567

### POLLUTION CONTROL

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

###### A. Rubbish Disposal

1. No burning of debris and/or waste materials shall be permitted on the project site.
2. No burying of debris and/or waste material except for materials which are specifically indicated elsewhere in these specifications as suitable for backfill shall be permitted on the project site.
3. All unusable debris and waste material shall be hauled away to an appropriate off-site dump area. During loading operations, debris and waste materials shall be watered down to allay dust.
4. No dry sweeping shall be permitted in cleaning rubbish and fines which can become airborne from floors or other paved areas. Vacuuming, wet mopping or wet or damp sweeping is permissible.
5. Enclosed chutes and/or containers shall be used for conveying debris from above to ground floor level.
6. Clean-up shall include the collection of all waste paper and wrapping materials, cans, bottles, construction waste materials and other objectionable materials, and removal as required. Frequency of clean-up shall coincide with rubbish producing events.

###### B. Dust

1. The Contractor shall prevent dust from becoming airborne at all times including non-working hours, weekends and holidays in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 60 - Air Pollution Control.
2. The method of dust control and costs shall be the responsibility of the Contractor. Methods of dust control shall include the use of water, chemicals or asphalt over surfaces which may create airborne dust.
3. The Contractor shall be responsible for all damage claims in accordance with Section 7.16 - "Responsibility for Damage Claims" of the GENERAL CONDITIONS.

C. Noise

1. Noise shall be kept within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 46 - Community Noise Control for Oahu. The Contractor shall obtain and pay for the Community Noise Permit from the State Department of Health when the construction equipment or other devices emit noise at levels exceeding the allowable limits.
2. All internal combustion engine-powered equipment shall have mufflers to minimize noise and shall be properly maintained to reduce noise to acceptable levels.
3. Pile driving operations shall be confined to the period between 9:00 a.m. and 5:30 p.m., Monday through Friday. Pile driving will not be permitted on weekends and legal State and Federal holidays.
4. Starting-up of construction equipment meeting allowable noise limits shall not be done prior to 6:45 a.m. without prior approval of the Engineer. Equipment exceeding allowable noise levels shall not be started-up prior to 7:00 a.m.

D. Erosion

1. During interim grading operations, the grade shall be maintained so as to preclude any damage to adjoining property from water and eroding soil.
2. Temporary berms, cut-off ditches and other provisions which may be required because of the Contractor's method of operations shall be installed at no cost to the State.
3. Drainage outlets and silting basing shall be constructed and maintained as shown on the plans to minimize erosion and pollution of waterways during construction.

E. Others

1. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, the Contractor shall prevent any material from being carried onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutters and catch basins unless treated to comply with the State Department of Health water pollution regulations.
2. Trucks hauling debris shall be covered as required by PUC Regulation. Trucks hauling fine materials shall be covered.
3. No dumping of waste concrete will be permitted at the job-site.

4. Except for rinsing of the hopper and delivery chute, and for wheel washing where required, concrete trucks shall not be cleaned on the job-site.
5. Except in an emergency, such as a mechanical breakdown, all vehicle fueling and maintenance shall be done in a designated area. A temporary berm shall be constructed around the area when runoff can cause a problem.
6. When spray painting is allowed such spray painting shall be done by the "airless spray" process. Other types of spray painting will not be allowed.

F. Suspension of Work

1. Violations of any of the above requirements or any other pollution control requirements which may be specified in the Technical Specifications herein shall be cause for suspension of the work creating such violation. No additional compensation shall be due the Contractor for remedial measures to correct the offense. Also, no extension of time will be granted for delays caused by such suspensions.
2. If no corrective action is taken by the Contractor within 72 hours after a suspension is ordered by the Engineer, the State reserves the right to take whatever action is necessary to correct the situation and to deduct all costs incurred by the State in taking such action from monies due the Contractor.
3. The Engineer may also suspend any operations which he feels are creating pollution problems although they may not be in violation of the above-mentioned requirements. In this instance, the work shall be done by force account as described in Subsection 4.2b - "Additional Work" of the GENERAL CONDITIONS and paid for in accordance with Subsection 8.4b - "Force - Account Work" therein. The count of elapsed working days to be charged against the contract in this situation shall be computed in accordance with Subsection 7.18 - "Contract Time" of the GENERAL CONDITIONS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

## SECTION 01581

### PROJECT SIGN

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

Furnish all labor, materials and equipment necessary to construct and install all project sign as specified hereinafter.

##### 1.2 SUBMITTAL

The contractor shall provide the Engineer with six (6) shop drawings of the project sign for review and approval by the Engineer prior to ordering the sign.

##### 1.3 LETTER STYLE

Copy is centered and set in Adobe Type Futura Heavy. If this specific type is not available, Futura Demi Bold may be substituted. Copy should be set and spaced by a professional typesetter and enlarged photographically for photo stencil screen process.

##### 1.4 ART WORK

Constant elements of the sign layout - frame, outline, stripe, and official state information - may be duplicated following drawing measurements, or be reproduced and enlarged photographically using a layout template if provided. The "STATE OF HAWAII" masthead should be reproduced and enlarged as specified, using the artwork provided.

##### 1.5 TITLES

The specific major work of the project under construction is emphasized by using 3-3/4" type, all capitals. Secondary information such as location or buildings uses 2-1/4" type, all capitals. Other related information of lesser importance uses letter heights as indicated on 01581-3, upper / lower case letters.

Design should follow the example on page 01581-3.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. LUMBER

1. Panel is 3/4" exterior grade high density overlaid plywood, with resin-bonded surfaces on both sides.
2. 4"x4" sign posts shall be Douglas Fir No. 1 or better.

#### B. PAINTS & INKS

Screen print inks are matte finish. Paints are satin finish, exterior grade. References to Ameritone Color Key Paint are for color match only.

COLOR:	1.	1BL10A	Bohemian Blue
	2.	2H16P	Softly (White)
	3.	2VR2A	Hot Tango (Red)
	4.	1M52E	Tokay (Gray)

#### C. CONCRETE

Concrete shall be class B with a 2,500 psi 28-day compressive strength.

## PART 3 - EXECUTION

### 3.1 GENERAL

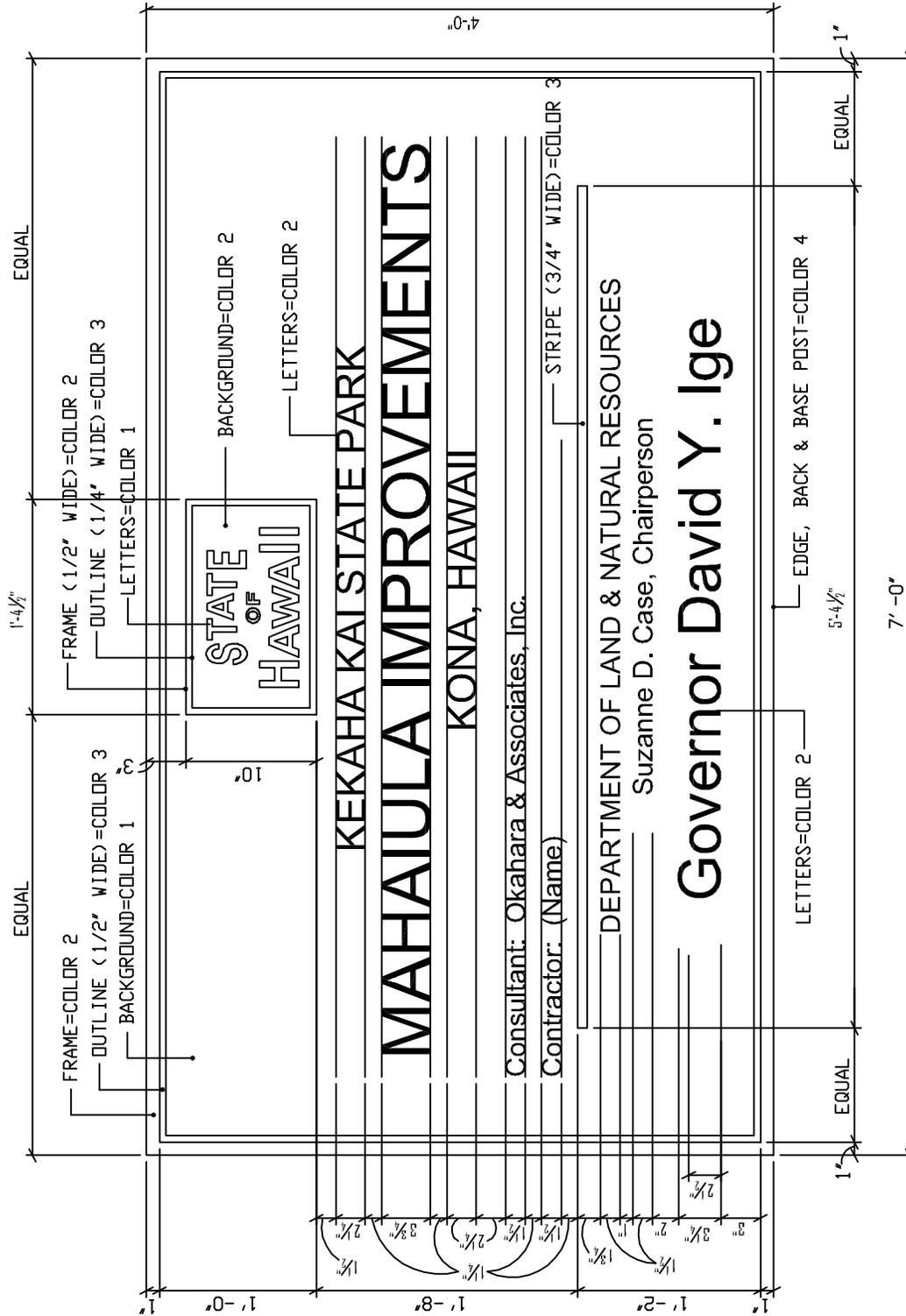
- A. The Project Sign shall be constructed with new materials as specified above.
- B. The Project sign shall be installed at the location indicated on the drawings or as designated by the Engineer. The project sign shall be erected upon commencement of work.

### 3.2 MEASUREMENTS AND PAYMENT

The construction of the project sign, including all equipment, labor and material necessary to furnish and install the project sign will be paid for under the "Project Sign" proposal item.

END OF SECTION

Project Sign  
01581-2



NOTE: Number of signs required 1

## DIVISION 2 - SITE CONSTRUCTION

### SECTION 02070

#### SELECTIVE DEMOLITION

##### PART 1 - GENERAL

###### 1.1 SUMMARY

- A. Extent of selective demolition work is indicated on drawings. Selective demolition work includes but is not limited to removal and subsequent disposal of all non- hazardous materials indicated or required to be removed.
- B. It shall be the responsibility of the Contractor to examine the project site and determine the existing conditions.
- C. Execute all work in an orderly and careful manner with due consideration for all items of work to remain.
- D. Obvious conditions which exist at the site shall be accepted as part of the work, even though they may not be clearly indicated on the Drawings and/or described herein, or may vary there from.
- E. All debris of any kind accumulated from the work of this Section shall be disposed off the site.
- F. Protect all building interior & exterior to remain at all times from damage during construction work. Coordinate with roofing work to provide temporary cover, weather protection, waterproofing, etc. as required over unfinished work area at the end of each day and during rain to prevent damage.
- G. Schedule construction work in sections or phases to be able to enable at least one set of restroom facility to remain operational.
- H. Protect all existing conditions surrounding the work area, including but not limited to walkways, parking, landscaping, etc. at all times from damage.
- I. Any damage as a result of demolition work and any neglect to provide protection shall be fixed new at no cost to the State.
- J. Demolish and remove work as indicated on the drawings and as required to perform work under this project.
- K. Temporarily disconnect and remove all existing overhead utilities if required during renovation work. Obtain State's written approval of all utility outages prior to performing work. Re-install and reconnect utility service when new work is complete.
- L. Burning of any debris on-site will not be permitted.
- M. Permits, Notice, Etc.:
  - 1. The Contractor shall procure and pay for all necessary permits, certificates, or approvals that may be required in connection with this work.

2. The Contractor shall serve proper notice and consult with the Contracting Officer regarding any temporary barricades and disconnections of electrical or other utility lines in the area which may interfere with the removal work, and all such lines where necessary shall be properly disconnected or relocated before commencing with the work.
- N. Carefully remove and store materials indicated for relocation or reinstallation at project site location as approved by the Contracting Officer. All damage caused by the Contractor's operations shall be repaired as approved by the Contracting Officer at no additional cost to the State.
  - O. Related Work Described Elsewhere: Contractor shall review SECTION 01715 - EXISTING CONDITIONS -ASBESTOS/LEAD/HAZARDOUS MATERIAL SURVEY.
- 1.2 SUBMITTALS
- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
  - B. Schedule: Submit two copies of schedule indicating proposed methods and sequence of operations for selective demolition work to the Contracting Officer for review prior to commencement of work. Include coordination for temporary shut-off and continuation of utility services as required, together with details for weather protection, dust and noise control protection.
- 1.3 JOB CONDITIONS
- A. Condition of Structure: The State assumes no responsibility for actual condition of items or portions of structure to be demolished.
  - B. Existing Conditions: Conditions existing at time of commencement of contract will be maintained by the State insofar as practicable.
  - C. Occupied Spaces: Do not interfere with use of adjacent occupied spaces. Maintain free and safe passage to and from occupied spaces.
  - D. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor, may be removed as work progresses. Transport salvaged items from site as they are removed. Storage or sale of removed items on site will not be permitted.
  - E. Explosives: Use of explosives will not be permitted.
  - F. Utility Services: The existence of exposed and concealed utility line other than those shown on the drawings is not definitely known. Should any other utility lines be encountered, the Contractor shall immediately notify the Contracting Officer and follow his direction as to procedure. Maintain existing utilities indicated.
  - G. Protections: Provide temporary barricades and other forms of protection as required to protect the general public, staff, and students from injury due to selective demolition work.
    1. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of elements to be demolished, and adjacent facilities or work to remain.

2. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
  3. Life safety procedures and provisions shall be in conformance with all applicable Federal, State, and City & County regulations, including HIOSH.
  4. Provide accessibility around temporary structures conforming to 2010 ADA, Chapter 2 and other chapters as specified in Chapter 2.
  5. Remove protections, obstructions, and barricades at completion of work.
  6. Where barriers are erected or placed to facilitate the work, barriers shall not affect or impact the facility's fire exiting route or alarm systems.
- H. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from the Contracting Officer. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations, as directed by the Contracting Officer.
- I. Dust Control:
1. Keep dust within acceptable levels at all times, including non-working hours, weekends and holidays, in conformance with Chapter 60.1 – Air Pollution Control of the State Department of Health, Public Health Regulations, latest edition.
  2. Only wet grinding or cutting of concrete will be allowed on exterior surfaces.
  3. Mechanical dry sweeping not permitted. Vacuuming, wet mopping, approved limited dry hand, wet or damp sweeping is acceptable.
  4. During loading operations, water down debris and waste materials to allay dust.
  5. The method of dust control and all costs incurred thereof shall be the responsibility of the Contractor.
- J. Noise Control: As specified in SECTION 01567 – POLLUTION CONTROL.
- K. Fire Safety: Fire safety during demolition shall comply with Chapter 16 of the 2006 NFPA 1 – Fire Code, as amended and Chapter 1 of the 2009 NFPA 241.
- L. Demolition Work: Conform to State of Hawaii, Occupational Safety and Health Standards; Subtitle 8, Division of Occupational Safety and Health; Part 3, Construction Standards; Chapter 131.1, Demolition.
- M. Other Controls:
1. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, the Contractor shall prevent any material from being spilled onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutter and catch basins unless treated to comply with Department of Health pollution regulations.

2. Trucks hauling materials shall be covered as required by PUG regulation. Trucks hauling fine materials shall be covered.
- N. Existing Conditions: The Contractor shall be responsible for protection of existing conditions for the entire duration of the project. Damage to the existing conditions as a result of the work if this section shall be corrected at no additional cost to the State.

## PART 2 – PRODUCTS (NOT USED)

## PART 3 -EXECUTION

### 3.1 GENERAL

#### A. Existing Conditions

1. The Drawings show general information only. Examine the site to determine the exact existing conditions, character, extent of the work to be performed and demolition operations required to complete the new work.

#### B. Existing Utilities

1. The existence of underground utility lines other than those shown on the Drawings is not definitely known. Verify all utility line locations prior to the start of any work.
2. It is understood and agreed that certain lines cannot be or have not been located and no indication is contained on any of the Drawings or referred to in the specifications (i.e. storm drainage, electrical, plumbing, sewer, water, or telephone); therefore, exercise extreme caution during demolition and like work. Should any such lines be encountered, written notice shall be given to the Engineer, and no further work in the area shall proceed until adequate investigation has been made, the line identified, and instructions are issued as to how to proceed.
3. The Contractor is liable for any and all damages associated with his activities, which may disrupt services as a result of any utility line damage.

#### C. Equipment: The use of proper equipment is the responsibility of the Contractor.

#### D. Protection of Utilities: Preserve in operating condition all active utilities traversing or within and about the site; protect all such property and items. Promptly repair and notify the affected utility company of any damage to such utility or work caused by work under this Contract.

#### E. Protection of Bodies of Water: The Contractor shall be responsible for conducting his/her operations so as not to impact environmentally sensitive water bodies (the ocean and any ponds) in the vicinity of the proposed improvements. It is the Contractor's responsibility to know the locations of the certified shoreline, shoreline set back, tidal fluctuation zones, and to ensure that all operations within these areas comply with applicable regulations and do not adversely impact these water bodies. The Contractor shall ensure that no debris or silt runoff is deposited into the ocean or any existing pond on the project site. The Contractor shall be responsible for any remediation measures necessary to mitigate water pollution caused by the Contractor's operations.

- F. Protection of Archaeological Sites: State of Hawaii, Department of Land and Natural Resources, State Parks Archaeology Branch has determined that archaeological sites exist on the project site. The Contractor shall contact Tracy Tam-Sing of the Archaeology Branch prior to construction, and shall follow all requirements of these documents to protect said archaeological sites. The Contractor shall not remove, modify, or damage any archaeological site identified to be protected during the course of the work and shall be solely responsible for any negative impacts to such sites caused by the construction work.

### 3.2 INSPECTION

- A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Inventory existing conditions of structure surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; photograph, video or otherwise document and file with the Contracting Officer prior to starting work.
- B. Test all equipment that is to be relocated or reinstalled prior to disconnection. File a list of discrepancies with the Contracting Officer prior to disconnection and relocation. Allow the Contracting Officer five (5) working days to verify discrepancies prior to removal.

### 3.3 PREPARATION

- A. Provide temporary security type weatherproof enclosures for exterior openings resulting from demolition work.

### 3.4 BARRICADES AND ENCLOSURES

- A. As specified in SECTION 01530 - BARRICADES.

### 3.5 SELECTIVE DEMOLITION

- A. All work shall be executed as indicated on the plans, with due consideration for all items to remain.
- B. Limits of pavement removal shall be as shown on the plans or as directed by the Engineer. Saw cut along the excavation line to produce a uniform break line both vertically and horizontally. Remove paving so as to prevent spalling, cracking or other damage to adjacent paving which is to remain. The Contractor shall at his own expense remove and replace damaged pavement outside the limits of removal. Reuse of demolished concrete or asphalt paving, as rubble fill shall not be permitted.
- C. Removal of existing signs or bollards includes foundations below grade.
- D. Cover any open trenches, holes, depressions and pits left open at the end of the working day with steel plates.
- E. Plug or cap all existing utilities to be abandoned and not interfering with the work. Remove and dispose of existing piping within the limits of new work.
- F. Perform selective demolition work, including all exterior improvements indicated on the drawings, in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.
  - 1. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction. All dust shall be suppressed by a fog spray or other approved method.

2. Water and sewer facilities shall be available for the remainder of the building and in operating condition at all times.
  3. Extent of demolition and removal as shown are minimum requirements. Contractor shall be responsible for the extent of work required to properly accommodate the methods of construction required for the new work. Additional work required to accommodate construction shall be considered incidental to the new work and shall be done at no additional cost to the State.
- G. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to the Contracting Officer in written, accurate detail. Pending receipt of directive from the Contracting Officer rearrange selective demolition schedule as necessary to continue overall job progress without delay.

### 3.5 PROTECTIONS

- A. Provide temporary barricades and other forms of protection as required to protect the general public from injury due to demolition work.
1. Erect temporary barricades as required, to prevent people from entering into project area to the extent as accepted by the Contracting Officer. The extent of barricade may be adjusted as necessary with the acceptance of the Contracting Officer. This work shall be accomplished at no extra cost to the State.
  2. When necessary, the Contractor shall provide, erect and maintain lights, barriers, etc., as required by traffic and safety regulations with special attention to protection of life.
  3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or elements to be removed, and adjacent facilities or work to remain.
  4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
  5. Life safety procedures and provisions shall be in conformance with all applicable Federal, State, and City and County regulations, including HOSHA.
  6. Remove protections at completion of work.

### 3.6 DRY ROT AND TERMITE DAMAGES

- A. All dry rot and termite damage discovered during the progress of the selective demolition work shall be reported to the Contracting Officer for inspection and recommendation. Failure to report such damage that result in poor roof installation and/or roof leakage or inability to support or fasten new work shall be made good by the Contractor at no cost to the State.
- B. All materials used to replace deteriorated areas shall match the existing material in size, shape, species and shall be preservative treated.

### 3.7 DAMAGES

- A. Promptly repair damages caused to adjacent facilities by demolition work at no cost to the State.

3.8 TRAFFIC

- A. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close, block or otherwise obstruct streets, walks or other occupancies or used facilities without permission from the Contracting Officer. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations, as directed by the Contracting Officer.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish, and other materials resulting from demolition operations from building site daily. Transport and legally dispose of materials off site.
- B. Burning of removed materials is not permitted on project site.

3.10 HAZARDOUS MATERIALS

- A. If additional hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

3.11 CLEAN UP AND REPAIR

- A. Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave areas broom clean.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.
- C. All existing grass areas disturbed or damaged due to construction or ingress or egress to the site shall be repaired to original conditions. Grass areas shall be recultivated, topsoiled, and then grassed with the same kind and type of material as existing, in a manner approved by and to the satisfaction of the Contracting Officer.

END OF SECTION

## SECTION 02100

### CLEARING AND GRUBBING

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. The work covered in this section shall consist of furnishing all labor, materials, equipment, tools and incidentals necessary for clearing and grubbing as shown on the plans and specified herein.

##### 1.2 REFERENCES

- A. Section 201 of the “Standard Specifications for Road and Bridge Construction”, State of Hawaii, Department of Transportation, Highways Division, dated 2005 or as amended, is hereby incorporated into and made part of these specifications by reference unless otherwise modified hereinafter with the exception of paragraphs “Measurement” and “Payment”.
- B. Hazardous Material Survey Report for Kekaha Kai State Park Improvement Project by Myounghee Noh & Associates dated June 5, 2013.
- C. Soil Investigation Report for Kekaha Kai State Park Improvement Project by Myounghee Noh & Associates dated June 10, 2013.
- D. Special Management Area Use Permit No. SMA 15-000062 and Shoreline Setback Variance No. SSV 15-000010.

##### 1.3 PERMITS AND FEES

- A. The Contractor shall obtain and pay for all necessary permits required to perform this work.

##### 1.4 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.

#### PART 2 – PRODUCTS (NOT USED)

#### PART 3 - EXECUTION

##### 3.1 PROTECTION OF ITEMS TO REMAIN

- A. The Contractor shall continually maintain adequate protection of trees, shrubbery, topographic features and all other items indicated to remain.
- B. Protection of Bodies of Water: The Contractor shall be responsible for conducting his/her operations so as not to impact environmentally sensitive water bodies (the ocean and any ponds) in the vicinity of the proposed improvements. It is the Contractor’s responsibility to

know the locations of the certified shoreline, shoreline set back, tidal fluctuation zones, and to ensure that all operations within these areas comply with applicable regulations and do not adversely impact these water bodies. The Contractor shall ensure that no debris or silt runoff is deposited into the ocean or any existing pond on the project site. The Contractor shall be responsible for any remediation measures necessary to mitigate water pollution caused by the Contractor's operations.

- C. Protection of Archaeological Sites: The Contractor shall contact Tracy Tam-Sing of the State of Hawaii, Department of Land and Natural Resources, State Parks Archaeology Branch prior to construction, and shall follow all requirements to protect any archaeological sites. The Contractor shall not remove, modify, or damage any archaeological site identified to be protected during the course of the work and shall be solely responsible for any negative impacts to such sites caused by the construction work.
- D. Hazardous Materials: A hazardous material survey and soil investigation report have been conducted for the project site; assumed lead containing paints (LCP) are located at the existing bathrooms. Contractor shall be responsible for familiarizing him/herself with these reports and adhering to all recommendations.
- E. Special Management Area (SMA) Use Permit: Contractor shall comply with all requirements of the SMA Permit for this project.

### 3.2 CLEARING AND GRUBBING

- A. The overall limits of the clearing and grubbing, as shown on the plans, shall be staked prior to construction.
- B. The Contractor shall clear the area within the grading limits of all vegetative material and obstructions necessary for the proper reception, construction, execution and completion of other work specified in this contract. Vegetative material includes trees, logs, stumps, roots of downed trees, brush, grass and weeds. Obstructions include buildings, lumber, fences, trash piles and other unwanted materials.
- C. Within the grading limits and where indicated on the drawings, grub the entire ground surface of all grass, weeds, stumps, roots and other objectionable materials down to at least 12 inches below the existing ground surface.
- D. No excavation or filling shall be undertaken until area has been cleared and grubbed.
- E. The Contractor shall protect from injury and damage all surrounding plants, pavements, buildings, utilities, etc., and shall leave all in as good a condition as at present. Any damage to existing improvements shall be repaired or replaced by the Contractor to the satisfaction of the Engineer.

### 3.3 DISPOSITION OF MATERIAL

- A. All materials resulting from the clearing and grubbing work, shall be removed from the project limits. Remove rubbish and debris from the jobsite daily, unless otherwise directed; do not allow accumulations inside or outside any buildings or roadways. The Contractor shall transport and legally dispose of materials off site. Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas.
- B. If hazardous materials are encountered during the clearing and grubbing operations, comply with applicable State, Federal and local regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
- C. Burning of removed materials is not permitted on the project site.

#### 3.4 INSPECTION AND APPROVAL

- A. Prior to the construction of any new work, the Engineer shall inspect the area that has been cleared and grubbed. The Contractor shall not proceed until the clearing and grubbing work has been approved by the Engineer. Should the Contractor install any new work without the Engineer's approval, the Engineer may require the Contractor to remove the installed work for inspection and reconstruct at no additional cost to the State. The State may inspect the cleared and grubbed area in place of the Engineer.

END OF SECTION

## SECTION 02200

### EARTHWORK

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Furnish all labor, materials, tools, and equipment necessary to complete the site excavation, filling, backfilling, rough and finish grading, overhauling, stockpiling, trench excavation and backfilling, and related items necessary to complete the site grading for the project.

##### 1.2 COORDINATION WITH OTHER SECTIONS

- A. Clearing and grubbing as specified in SECTION 02100 – CLEARING AND GRUBBING.

##### 1.3 REFERENCES

- A. Section 203 – Excavation and Embankment of “Hawaii Standard Specifications for Road and Bridge Construction, 2005” is hereby incorporated into and made part of these specifications by reference unless otherwise modified hereinafter with the exception of paragraphs “Method of Measurement” and “Basis of Payment”.
- B. Hazardous Material Survey Report for Kekaha Kai State Park Improvement Project by Myounghee Noh & Associates dated June 5, 2013.
- C. Soil Investigation Report for Kekaha Kai State Park Improvement Project by Myounghee Noh & Associates dated June 10, 2013.
- D. Special Management Area Use Permit No. SMA 15-000062 and Shoreline Setback Variance No. SSV 15-000010.

##### 1.4 ORDINANCES AND PERMITS

- A. The Contractor shall comply with all applicable ordinances and regulations and obtain the required permits. All grading work shall comply with Chapter 10 of the Hawaii County Code, as amended.
- B. The Contractor shall comply with the provisions of Chapter 11-55 Water Pollution Control and Chapter 11-54 Water Quality Standards of the Hawaii Administrative Rules, Department of Health, State of Hawaii. The Contractor shall also be responsible for acquisition and payment for permits under the National Pollutant Discharge Elimination System (NPDES) as required.

##### 1.5 UNFORESEEN CONDITIONS BELOW GRADE

- A. Soil borings have not been performed for this project. Bidders shall examine the site and shall draw their own conclusions therefrom as to the character of materials to be encountered.

- B. The existence of active underground utility lines within the construction area is not definitely known other than those indicated in their approximate locations on the Drawings. Should any unknown line be encountered during excavation, the Contractor shall immediately notify the Contracting Officer of such discovery. The Contracting Officer shall then investigate and issue instructions for the preservation or disposition of the unknown line. The Contracting Officer shall issue authorization for extra work only as he deems necessary.
- C. Unforeseen Subsurface Conditions
  - 1. If any conditions not described in the Contract Documents (such as perched water, seepage, and/or lenticular or confined strata of a potentially adverse nature) are encountered during grading, these conditions shall be immediately brought to the attention of the Engineer so that supplemental recommendations may be made to treat these problems.
  - 2. Should excavations encounter loose or unsuitable conditions, lava tubes, or voids, the Contractor shall notify the Engineer immediately so that supplemental recommendations may be given.

#### 1.6 LAYOUT OF PROJECT

- A. The Contractor shall verify all lines, levels, elevations and improvements indicated on the drawings before any excavation begins. All lines and grades shall be verified by a Surveyor or Civil Engineer licensed in the State of Hawaii. Any discrepancy shall be immediately brought to the attention of the Engineer and any change shall be made in accordance with his instruction. Starting of clearing and grubbing operations shall be construed to mean that the Contractor agrees that the existing grades and improvements are essentially correct as shown. The Contractor shall not be entitled to extra payment if existing grades and improvements are in error after his verification thereof, or if he fails to report the discrepancies before proceeding with any work whether within the area affected or not.
- B. The Contractor shall be responsible for performing his/her own field verification of the topographic survey to familiarize him/herself with any conditions that may have changed since the date the survey was taken.

#### 1.7 PROTECTION OF BODIES OF WATER

- A. The Contractor shall be responsible for conducting his/her operations so as not to impact environmentally sensitive water bodies (the ocean and any ponds) in the vicinity of the proposed improvements. It is the Contractor's responsibility to know the locations of the certified shoreline, shoreline set back, tidal fluctuation zones, and to ensure that all operations within these areas comply with applicable regulations and do not adversely impact these water bodies. The Contractor shall ensure that no debris or silt runoff is deposited into the ocean or any existing pond on the project site. The Contractor shall be responsible for any remediation measures necessary to mitigate water pollution caused by the Contractor's operations.

#### 1.8 ARCHAEOLOGICAL SITES

- A. The Contractor shall contact Tracy Tam-Sing of the State of Hawaii, Department of Land and Natural Resources, State Parks Archaeology Branch prior to construction, and shall follow all requirements to protect any archaeological sites. The Contractor shall not remove, modify, or damage any archaeological site identified to be protected during the course of the work and shall be solely responsible for any negative impacts to such sites caused by the construction work.

#### 1.9 HAZARDOUS MATERIALS

- A. A hazardous material survey and soil investigation report have been conducted for the project site. While insignificant levels of lead were present in the soil, Contractor shall be responsible for familiarizing him/herself with these reports and adhering to all recommendations.

#### 1.10 SPECIAL MANAGEMENT AREA (SMA) USE PERMIT:

- A. Contractor shall comply with all requirements of the SMA Permit for this project.

#### 1.11 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Soil Testing Lab Accreditation: The Contractor shall retain and pay for an independent soil testing laboratory with at least one Licensed Civil Engineer specializing in Geotechnical Engineering to provide monitoring and testing services. The soil testing laboratory shall be accredited by the American Association of State Highway and Transportation Officials (AASHTO) or the American Association for Laboratory Accreditation, and shall be accredited in the soils tests required under this contract. The soil testing laboratory shall meet the requirements of ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.

The Contractor shall furnish to the Engineer for approval, a copy of the Certificate of Accreditation and Scope of Accreditation and latest directory of the accrediting organization for accredited laboratories. The scope of the laboratory's accreditation shall include the test methods required by the Contract.

The Contractor shall submit certified test results to the Engineer in accordance with Section 01300-SUBMITTALS. All test results must be approved before the Contractor can proceed with placing subsequent layers or materials.

Should imported fill be utilized on this project, a sample of the proposed material should be submitted to the independent soil testing laboratory for testing. A letter from the testing laboratory stating that the imported material meets the requirements of this section shall be submitted to the Engineer prior to delivery of the material to the job site.

- C. Field density tests shall be taken to determine whether the specified levels of compaction are being consistently attained. Testing shall be done as indicated.

1. Structural and Yard Fill: One (1) compaction test for every 1500 square feet of each lift.
2. Trench Backfill: One (1) Compaction test per lift for every 100 lineal feet with a minimum of one (1) test per lift for each line.

## 1.12 DOCUMENTS

- A. The Contractor shall have the following documents available for the use of the Contracting Officer at the job site:
  1. Grading Ordinance (Chapter 10 of the Hawaii County Code).
  2. Hawaii Administrative Rules, Chapter 11-55 Water Pollution Control and Chapter 11-54 Water Quality Standards, Department of Health, State of Hawaii.
  3. ASTM D1557.
  4. Grubbing or Grading Permit from the County of Hawaii, if required.
  5. NPDES Permit Application and Nationwide General Permit Coverage Letter (NGPC), if required.
  6. Hawaii Standard Specifications for Road, Bridge, and Public Works Construction, dated 2005 with the latest applicable amended sections.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. All materials excavated shall be considered to be unclassified and shall be paid for as such, whether earth, boulders, solid rock, concrete, steel, rubbish, wood, or other materials.
- B. Fill and Backfill Material
  1. Yard fill: Yard fill shall be used for all areas where no concrete slabs or A.C. pavements are to be constructed. Fill materials shall be non-expansive soil, free from debris, perishable or combustible materials, sod, and stones larger than 6 inches in maximum dimension and shall have a plasticity index not greater than 20. Any rock shall be well distributed in earth or other fine material with all voids filled and shall not be placed within 3 feet of the finished grade.
  2. Structural fill: Structural fill shall be used in areas where new concrete or A.C. paving is to be constructed and shall be non-expansive, granular, well-graded material with a 3 inch maximum particle size and less than 20 percent by weight passing the No. 200 sieve. The fill material shall be free from clumps of soil, organic debris, adobe or other deleterious matter.

The plasticity index for that portion of soil passing the #40 sieve shall not be greater than 10. The CBR expansion value shall be no greater than 1%. Recycled asphalt pavement shall not be used as structural fill.

3. Base Course/Cushion Fill under concrete slabs and stairs: All concrete slabs on grade and stairways shall be underlain by a cushion of clean #3 Fine gravel (ASTM C33, Size No. 67), with thickness as shown on the Plans.
- C. Temporary geotextile silt fencing shall have the following properties:
1. Geotextile shall be a woven fabric made of polypropylene fibers.
  2. Minimum Roll Width: 3 ft.
  3. Grab Tensile Strength: 100 lbs. (ASTM D-4632)
  4. Elongation: 15% (ASTM D-4632)
  5. Mullen Burst Strength: 275 psi (ASTM D-3786)
  6. Coefficient of Water Permeability: 15 gal/min/SF
  7. Trapezoidal Tear Strength: 50 lbs. (ASTM D-4533)
  8. Puncture Strength: 60 lbs. (ASTM D-4833)

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. No excavation or filling shall be undertaken until the area has been cleared and grubbed.
- B. Install temporary erosion, dust and siltation control measures as shown on the Drawings or ordered by the Engineer. Other types of BMP measures equal to silt fencing are allowed. Remove temporary measures after permanent measures have been established.
- C. All excavation shall be protected and guarded against danger to life, limb and property.
- D. Excavation, embankment and grading shall comply with the Ordinances of the County of Hawaii, as amended, and as specified herein.
- E. Shoring, cribbing and lagging, as required to safely preserve the excavations and earth banks from damages resulting from the work, shall be provided and installed by the Contractor.
- F. The Contractor shall at all times control the grading around building areas so that the ground is adequately sloped to prevent any water from flowing into building areas and open trench excavations. All excavations shall be kept free from standing water. The Contractor shall do all pumping and draining that may be necessary to remove water to the extent

required in carrying on the work. The Contractor shall obtain the NOI (Notice of Intent) permit from the State Department of Health for any dewatering activities.

Lowering or raising of water table in areas where ground settlement or other detrimental effects may be induced is expressly prohibited. In such areas, the excavated spaces shall be sealed prior to the pumping of water or other approved means employed by the Contractor. The Contractor shall be responsible for disposal of the pumped liquids. Water from dewatering and other construction operations shall not be discharged directly into the storm drainage system. The method of discharge shall comply with Department of Health Regulations.

Construction equipment which require water in their operation shall not be used in the vicinity or within the building area without the approval of the Engineer.

- G. The Contractor shall use the best management practices to reduce the amount of soil erosion resulting from the grading work.

The work areas and haul roads, including any unpaved roadways leading to the project site, shall be continuously watered to prevent the generation of dust. Granular materials shall be spread over all unpaved haul routes. An 8-inch thick layer of #2 crushed rock or a stabilized construction entrance as shown on the Drawings shall be installed as necessary at delivery access points to reduce tracking mud onto public roadways.

All truck tires shall be free of mud before leaving the job site and entering a public roadway. The Contractor will clean all roads of mud and dirt resulting from his operations at no additional cost to the State.

H. Laying Out

1. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a surveyor or a civil engineer licensed in the State of Hawaii, at the Contractor's expense. The Contractor shall be solely responsible for their accuracy. The Contractor shall erect and maintain substantial batter boards showing construction of lines and levels.
2. Should any discrepancies be discovered in the dimensions given in the plans, the Contractor shall immediately notify the Engineer before proceeding any further with the work, otherwise he will be held responsible for any costs involved in correction of construction placed due to such discrepancies. The Contractor shall be responsible for re-establishing property corners or survey control points that are destroyed by his operations.

3.2 EXCAVATION

A. General Requirements

1. Excavation shall be done so as to obtain the elevations called for on Drawings, allowing for fill, grading, topsoil and drainage away from buildings as necessary.

2. Usable Materials as approved by the Engineer shall be stockpiled (for later use as fill material) in a location designated by the Engineer. Crushing basalt fragments may be necessary prior to reuse in compacted fills. This material may also be excavated directly to fill at the Contractor's option, provided that the materials conform to the requirements of the intended use as specified hereinbefore and sub grade preparation requirements have been met in the fill areas.
3. Non-usable Material such as mud, soft material, volcanic ash, and expansive soils and excess materials shall become the property of the Contractor and shall be disposed of outside the project boundary limits at locations that have been approved by the County of Hawaii.
4. Blasting shall not be permitted on this project.

B. Structural Excavation

1. All footings shall be founded on 12 inches minimum of compacted structural fill. In cut areas, the existing basalt rock shall be over-excavated to allow for the 12-inch fill layer. All clayey silt/volcanic ash under slabs, walks and road pavements shall be removed and replaced with structural fill consisting of 3-inch minus granular material.
2. Unless specified otherwise in the plans, the excavation shall allow for four inches minimum of compacted cushion fill under all concrete walkways and slabs-on-grade.
3. Excavation for footings and foundation shall have level beds, with stepped levels where necessary; localized soft spots shall be over-excavated and removed and the resulting void backfilled with approved structural fill properly compacted in accordance with these specifications.
4. Trenching for foundation footings and grade beams shall be made to the depth and dimensions called for on the Drawings. Bottom of trenches shall be level, solid and free from loose material. All foundation and footings must be carried to the depth shown on the plans. Over-excavation shall be corrected as specified, for which no extra compensation will be allowed.
5. When suitable bearing for foundations is not encountered at the elevation indicated on Drawings, the Contractor shall immediately notify the Engineer and shall not proceed any further until the necessary instructions for resumption of work have been received.
6. Lava tubes and cavities may be encountered during excavation. Contractor shall inform Engineer immediately of each discovery and work shall be done in accordance with his instructions.

3.3 FILL AND BACKFILL

A. General Requirements

1. Filling operations shall be performed so as to bring the entire project area to the finished grades shown on the Drawings, allowing for topsoil, concrete slab, or A.C. paving and base course.

2. At the time of compaction, the moisture content of fill and backfill material shall be such that the relative compactions specified can be obtained with the compacting equipment being used. At all times, it shall be the responsibility of the Contractor to employ such means as may be necessary to obtain a uniform optimum moisture content throughout the material being compacted.
  3. Soft or loose soils that do not readily compact and/or volcanic ash should be excavated and replaced with compacted structural fill at no cost to the State.
  4. All non-basalt areas to receive fill shall be scarified, moisture conditioned to near optimum moisture content and compacted to a minimum of 95 percent relative compaction as determined by ASTM D1557 for a minimum depth of eight (8) inches.
  5. In areas with gravelly material, the exposed gravelly material should be scarified to a depth of 6 inches and recompact to a minimum of 95 percent compaction, as determined by ASTM D 1557, prior to placement of the fill.
  6. All fill slopes shall be at 2:1 or flatter as shown on plans, unless otherwise noted. Fill slopes exceeding 15 feet in height shall include benches a minimum of 8 feet in width with the benches constructed at intervals not exceeding 15 feet in vertical height.
  7. Fill placed in areas which existing slopes are steeper than 5:1 (horizontal to vertical) shall be continually benched as the fill is brought up in lifts.
- B. Yard Fill
1. Yard fill shall be placed in layers, 8 inches or less in loose thickness, and compacted to 95 percent of maximum density as determined by the ASTM D1557 procedure.
- C. Structural Fill for Pavement Areas
1. Structural fill is required under all slabs and pavement areas and shall be placed in layers, 8 inches or less in loose thickness, moisture conditioned to near optimum moisture content, and compacted to at least 95 percent of maximum density as determined by ASTM D1557 procedure.
- D. Placing, Spreading, and Compacting Fill Material
1. When moisture content of the fill material is below optimum, water shall be added until the moisture content is optimum to ensure that the proper compaction can be obtained. When the moisture content of the fill material is above optimum, the fill material shall be aerated until the optimum moisture content is obtained.
  2. Recompaction: Where test results indicate that the moisture content of the fill is not suitable, or that insufficient compaction has been obtained, the fill shall be reconditioned and recompact prior to placing additional fill material. The Contractor shall be responsible for placing and compacting approved fill material in accordance with these Specifications. If the Contractor fails to meet the compaction requirements, he shall stop hauling or reduce his rate of haul, furnish additional

spreading, watering and/or compaction equipment as may be required, or make any other adjustments necessary to produce a satisfactory compacted fill. When the work is stopped by rain, filling shall not resume until the Engineer has verified that the moisture content and the density of the fill surface are satisfactory.

3. During construction, all fill surfaces shall be sloped to provide positive surface drainage and to prevent ponding of water. If it appears that rain is imminent, the Contractor shall roll the surface with smooth rollers or rubber-tired equipment to seal the surface against excessive infiltration of water. Temporary surface drains and ditches shall be provided by the Contractor as necessary to expedite runoff and to prevent erosion.

#### E. Slopes and Final Grading

1. The Contractor will be required to obtain a minimum relative compaction of 95 percent of maximum dry density out to the finish fill slope face. Fill slopes shall be constructed by over-building and cutting-back to the finished grades to expose a well-compacted surface.
2. Excavation and embankment shall be finished with all slopes cut true and straight, in accordance with the lines and grades shown in the Drawings. All slopes, whether old or new, shall be maintained with true and smooth surfaces. Over breaks shall be trimmed smoothly and neatly. The tops and ends of all slopes shall be flared and rounded.
3. All cut and fill slopes shall be protected from erosion by approved methods immediately upon their completion.
4. Cut Slopes
  - a. If any conditions not anticipated, such as perched water, seepage, lenticular or confined strata of a potentially adverse nature are encountered during grading, these conditions shall be analyzed by the Engineer and recommendations shall be made to treat these problems. The Contractor shall halt the grading work in such areas until the recommendations are made.
  - b. Unless otherwise specified in the Drawings, no cut shall be excavated higher or steeper than that allowed by the County Ordinances. If there are substantial discrepancies in the elevations of the existing ground at the top of the slope which could result in a higher or steeper slope or could affect the location of the toe of slope, the Contractor shall immediately inform the Engineer of such conditions, so that the Drawings can be revised accordingly.
  - c. Cut slopes shall be 2H:1V or flatter, unless otherwise recommended by the Engineer.

### 3.4 GRADING TOLERANCES

- A. All graded surfaces shall be finished to within 0.10 feet from the grades and cross sections indicated on the plans.

### 3.5 PROTECTION

- A. Protect benchmarks, property monuments, fences, and roads.
- B. Protect any above and below grade utilities that are to remain.
- C. Protect newly graded surfaces from traffic and erosion; keep areas free of trash and debris. Repair and re-establish grades in settled, rutted, and eroded areas.
- D. Repair all damages caused by and resulting from construction activities in accordance with the requirements these specifications and as directed by the Engineer.

### 3.6 CLEAN UP

- A. Clean up and remove all debris accumulated from construction operations from time to time, when and as directed by the Engineer. Upon completion of the construction work and before final acceptance of the work, remove all surplus materials, equipment, etc., and leave entire job site clean and neat.

END OF SECTION

## SECTION 02821

### CHAIN LINK FENCES AND GATES

#### PART 1 - GENERAL

##### 1.1 GENERAL REQUIREMENTS

- A. Furnish materials, labor and equipment necessary to install all chain link fences and the gates to the limits shown and as detailed on the plan and as specified herein.

##### 1.2 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Submit manufacturer's literature and data on fence materials showing compliance with these specifications.
- C. Submit shop drawings for welded gates.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. Chain Link Fence Fabric shall be 2-inch unless otherwise shown or specified, be galvanized and conform to ASTM A392, Class 1. The hot-dipped galvanized fabric shall contain not less than 1.2 ounces per sq. ft. of uncoated wire surface as determined by stripping test ASTM A90 and under the PREECE Test (ASTM A239), shall withstand 6 or more 1-minute dips before reaching the end point. All fabric shall be free from barbs, icicles or other hazardous projections resulting from galvanizing. Aluminum clad fabric shall be an acceptable alternate to the hot-dipped galvanized fabric provided it is of the same gauge as the latter. The fabric wire shall be knuckled at the top and bottom of the fabric.
- B. Tie Wire shall be 12-gauge (9 gauge for gates) soft annealed galvanized steel wire as called for on the plans.
- C. Tension Bar shall be 3/16" thick by 3/4" wide mild steel bar for attachment of a fabric to a terminal post.
- D. Brace Band shall be formed from steel bands at least 1/8" thick by 3/4" wide.
- E. Tension Band shall be formed from steel bands at least 12 gauge thick by 3/4" wide.
- F. Tension Rod shall be 3/8" dia. mild steel rod threaded at one end and hooked 180 degrees at the other.
- G. Fittings:

1. Post Cap and Eye Top shall be of one-piece cast iron construction and shall attach securely onto their respective posts.
2. Coupling for top rails shall be outside sleeve type, at least 6 inches long and crimped at center.
3. Rail Ends shall be snug, one-piece fittings for top and brace rails with holes to receive 5/16" bolts for securing to rail end bands.
4. Double Rail Ends shall be similar to rail and except for an additional 1/2" hole to receive the hooked end of a tension rod.

H. Composition and Finish of Metal Parts: All metal parts and fittings, including tracks, gate hardware and frames, shall be of steel, malleable iron or wrought iron and shall be galvanized by the hot-dip process, after fabrication, in conformance with ASTM A153. The coating on all parts shall be continuous and smooth; that is, free from barbs, icicles or other projections. Bolts may be cadmium-plated in conformance with ASTM A165 instead.

I. Gate Hardware:

1. Hinges shall be heavy duty offset type permitting 180-degree swing using double clamping method of attachment and manufactured or forged malleable iron. All hinges shall be of appropriate size and capacity for the particular gate being supported and/or operated.
2. Unless otherwise shown or specified, padlocking provisions for walk gate shall be a fork latch assembly or as indicated in the plans, and that for a drive gate shall be an industrial drop rod guide and latch assembly as indicated in the plans. Walk gates will be provided with a "panic" type gate exit device as detailed in the plans.
3. Padlock for gate latch shall be pin cylinder type with brass case and a 5/16" dia. hardened steel shackle. Keying system and other applicable items shall be in conformance with Section 08710 – FINISH HARDWARE.

J. Posts, Rails and Braces shall be of standard weight, hot-dipped galvanized, welded and seamless steel pipes conforming to ASTM A120 or hot-dipped galvanized pipes with chromate conversion and polyurethane coatings ("Tuf 40" by American Tube Co., Inc. or approved equal). Posts of the latter type of pipes shall be sized in accordance with and have the minimum properties shown on the plans.

Additionally, Tuf 40 type pipes shall not be used where welded pipe frames are called for on plans.

K. Tension Wire shall be of 7-gauge coiled spring or 6-gauge plain galvanized wire.

L. Barbed Wire:

1. Furnish class III galvanized wire conforming to Federal Specification RR-F-221 and ASTM A475-98 and A474-98. High Tensile Wire must conform to ASTM A854/A854M-98 and A679/A679M-00.
  2. Furnish 12½ gage or heavier double twisted wire OR 13½ to 15½ gage high-tensile, double twisted wires. Barbs shall be 14 gage or heavier, 4-point barbs on 4- or 5-inch centers.
  3. Minimum strand breaking strength shall be 950 foot pounds.
- M. Concrete for post footings shall be Class 2500.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION AND WORKMANSHIP

##### A. General:

1. Metal fencing and gates of the various types called for shall be erected in strict conformance with the plans and these specifications. The gates and hardware shall provide intended freedom of operation. Posts shall be plumb and in line. Welding shall be done in accordance with latest AWS standards. However, no splicing of posts, rails or braces shall be accepted. Where changes in line occur with an angle of deflection of 30 degrees or more, the change point will be considered a corner and a corner post shall be installed there. End, corner, and gate posts for fences with 5-foot and wider fabric shall be braced to the nearest line post with horizontal braces and tension rods. The horizontal braces shall be spaced midway between top rail and ground and securely fastened to posts as shown on plans. Where fencing is placed along a curve with radius of 50 feet, or less, horizontal braces (and tension rods) shall be installed between all posts in like manner. Pull posts, at maximum intervals of 300 feet, shall be braced and trussed in both directions as specified above.
  2. Posts shall be plumb and in line. No splicing of posts will be permitted. Horizontal rails shall be installed at the top, bottom, and midpoint of the posts or as shown on the drawings.
  3. Field Touch-Ups: Field welds shall be cleaned of flux and spatter and all damaged galvanizing removed, all hazardous projections ground off, properly prepared, and then heavily coated with self-curing inorganic zinc coating. Manufactured coatings shall be applied in strict accordance with manufacturer's printed specifications. Damage to existing painted surfaces shall be touched up.
- B. Fence Posts, except as otherwise indicated or specified, shall be spaced not more than 10 feet apart. In curved fence sections having a radius of 50 feet or less, the posts shall be spaced as shown on the plans. Line posts shall be set so that top of the eye top shall be at the same height as the fence fabric.

- C. Top Rails for fences shall pass through and bear firmly on the base of eye tops, form a continuous brace from end to end of each stretch of fence, and be securely fastened to terminal posts with rail ends and brace bands. Couplings for the top rails shall be installed at intervals of 24 feet maximum.
- D. Chain Link Fabric shall be fastened on the side of the posts as designated, and shall be mounted on the posts so that the bottom of the fabric will be no more above the finished grade than called for on the plans. High points of the ground shall be excavated as necessary. The fabric shall be stretched taut and securely fastened to the posts. Ends of wire ties shall be bent back so as not to be a hazard. Between posts, the top edge of the fabric shall be fastened to the top rail and the lower edge to the tension wire or bottom rail with tie wire of size and at spacing as called for on the plans. Tension wire shall be stretched tight and shall be installed in a straight line between posts. Tension bars extending the full height of the fence and tension bar bands shall be used for fastening fabric to end, corner, pull and gate posts.

Bolted tension bands shall be placed at top and bottom of stretcher bars and spaced at 12-inch intervals. Fastenings to line posts shall be made with tie wire of size and at spacing as called for on the plans.

- E. Gates shall be of size specified in plans. The corners of gate frames shall be fastened together and reinforced with malleable iron fittings or by welding as approved. Welds shall be ground smooth. Where sizes permit, frames shall be galvanized after fabrication, otherwise all welds shall be finished as specified for touching up abrasions and field welds. All drive gate frames for fences 4 feet and higher and walk gate frames for 6-foot high fence shall be cross-trussed with tension rods welded to frame at hooked end. Fabric specified for the fence shall be attached to the sides of the gate frame with full-height tension bars and tension bar bands at top, bottom and 12 inches + o.c. along tension bars with 9-gauge tie wires shall be placed along the top and bottom of the gate at corners and 6 inches + o.c. in between. The gates shall be hung by at least two hinges. For the drive gates, latches of the crop rod type shall be provided and shall be of the full gate height, arranged to engage the gate catch. For walk gates, a forked latch or panic exit device shall be provided. Catch for the drop rod shall be galvanized pipe and set in concrete. Gate hold-backs shall be positioned to secure and support the free end of the gate in full open position and/or as shall be accessible from both sides of the gates.
- F. Barbed Wire: Place barbed wire on the top of the fence as shown on the plans and attach to the outside of posts. Tension in the barbed wire shall be such that ten (10) pounds of pressure, applied midway between posts, causes no more than four (4) inches of displacement from the straight line between the posts.

Splicing of barbed wire is permitted, provided that no more than two splices, spaced a minimum of 50 feet apart occur in any run of fence. Use wrap or telephone type splices for the longitudinal barbed wire with each end wrapped around the other wire for not less than six complete turns.

- G. Fastening Barbed Wire: Terminate barbed wire at each corner, gate, end, and in-line pull post and when connecting to existing fence. Wrap wire ends around posts and then itself for a minimum of four turns.

Fasten each strand of barbed wire to line posts. Use approved wire clips or ties to fasten wire securely to posts.

### 3.2 FINAL CLEAN-UP

- A. All exposed metal surfaces shall be clean and free of cement. All surplus earth resulting from metal fencing work that is not used in the grading work shall be cleaned up and disposed of off-site. All debris resulting from work of this section shall be removed from the site.

END OF SECTION

## DIVISION 3 - CONCRETE

### SECTION 03300

#### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Slabs-on-grade.

##### 1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: other pozzolans, subject to compliance with requirements.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Steel reinforcement and accessories.
  - 4. Curing compounds.
- D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
  - 1. Aggregates.
- E. Field quality-control reports.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
  - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specifications for Structural Concrete."
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Section 601 - Structural Concrete of the 2005 Hawaii Standard Specifications for Road and Bridge Construction is hereby incorporated into and made part of the specifications by reference unless otherwise modified hereinafter with the exception of paragraphs "Method of Measurement" and "Basis of Payment".
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

## PART 2 - PRODUCTS

### 2.1 FORM-FACING MATERIALS

- A. Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
- B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

### 2.2 STEEL REINFORCEMENT

- A. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed bars, ASTM A 934/A 934M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.
- B. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A, Type 1 coated, plain-steel wire, with less than 2 percent damaged coating in each 12-inch wire length.

### 2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

### 2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I/II.
- B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

## 2.5 ADMIXTURES

- A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

## 2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Stego Industries, LLC; Stego Wrap 15 mil Class A.

## 2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Construction Chemicals - Building Systems; Confilm.
    - b. Dayton Superior Corporation; Sure Film (J-74).
    - c. Euclid Chemical Company (The), an RPM company; Eucobar.
    - d. Sika Corporation; SikaFilm.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Construction Chemicals - Building Systems; Kure 200.

- b. Conspec by Dayton Superior; W.B. Resin Cure.
- c. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
- d. Edoco by Dayton Superior; Res X Cure WB.
- e. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.

## 2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

## 2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## 2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

- B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
  - 1. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.
  - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## 2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Concrete: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: As indicated at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.50.

## 2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
  - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
  - 2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
  - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

## PART 3 - EXECUTION

### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  - 1. Class B, 1/4 inch for formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

### 3.4 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  1. Lap joints 6 inches and seal with manufacturer's recommended tape.

### 3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

### 3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
  2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of

concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

### 3.8 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
- B. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
  - 1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
  - 1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces exposed to view.
  - 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.
- F. All exposed concrete finishes shall meet the requirements of ADAAG unless otherwise specified.

### 3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

### 3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
    - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

### 3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to

manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

### 3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: State will engage a special inspector to perform field tests and inspections and prepare test reports.
- B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
1. Steel reinforcement placement.
  2. Verification of use of required design mixture.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Compression Test Specimens: ASTM C 31/C 31M.

- a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
4. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  5. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  6. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
  7. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  8. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
  9. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Engineer.
  10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION

DIVISION 4 - MASONRY

SECTION 04816

CONCRETE UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Ties and anchors.
5. Miscellaneous masonry accessories.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Material Certificates: For each type and size of the following:
1. Masonry units.
    - a. Include material test reports substantiating compliance with requirements.
    - b. For masonry units, include data and calculations establishing average net-area compressive strength of units.
  2. Cementitious materials. Include brand, type, and name of manufacturer.
  3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  4. Grout mixes. Include description of type and proportions of ingredients.
  5. Reinforcing bars.
  6. Anchors, ties, and metal accessories.

- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
  - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
  - 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- D. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

#### 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### 1.6 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  2. Protect sills, ledges, and projections from mortar droppings.
  3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## PART 2 - PRODUCTS

### 2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

### 2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  2. Provide square-edged units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90.
  1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi
  2. Density Classification: Medium weight.

### 2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II. Provide natural color or white cement as required to produce mortar color indicated.

- B. Aggregate for Mortar: ASTM C 144.
  - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
- C. Aggregate for Grout: ASTM C 404.
- D. Water: Potable.

#### 2.4 REINFORCEMENT

- A. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed bars, ASTM A 934/A 934M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.

#### 2.5 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
  - 1. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A, Type 1 coated, plain-steel wire, with less than 2 percent damaged coating in each 12-inch wire length.

#### 2.6 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- B. Postinstalled 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 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

#### 2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

## 2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Use portland cement-lime mortar unless otherwise indicated.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide Type S mortar.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
  - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
  - 2. Verify that foundations are within tolerances specified.
  - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.

- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

### 3.3 TOLERANCES

#### A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

#### B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

#### C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  1. Fasten partition top anchors to structure above and build into top of partition.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

### 3.6 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.

### 3.7 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  2. Limit height of vertical grout pours to not more than 60 inches.

### 3.8 FIELD QUALITY CONTROL

- A. Testing and Inspecting: State will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 1 special inspections according to the "International Building Code."
  1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  3. Place grout only after inspectors have verified proportions of site-prepared grout.

### 3.9 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent

construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

### 3.10 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off State's property.

END OF SECTION

## DIVISION 5 - METALS

### SECTION 05500

#### METAL FABRICATIONS

##### PART 1 - GENERAL

###### 1.1 SUMMARY

- A. Provide all miscellaneous metal as indicated on the drawings and as specified herein, including, but not limited to hand rails, sign posts, fence & gates, miscellaneous framing and supports (include all anchors, angles, bolts for items, and other accessories), and all others required for the complete installation of all work.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 09901 – PAINTING: Metal painting.
  - 2. SECTION 02821 – CHAINLINK FENCE & GATE

###### 1.2 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in metal fabrications, including paint products and grouts.
- C. Shop Drawings: Submit shop drawings as required for all work in accordance with the contract drawings. Shop Drawings are intended to show accurate fabrication and installation methods reflecting true site conditions. Contractor shall verify that all the details shown in the shop drawings does indeed show actual site conditions/dimensioning prior to start of work. Shop drawings shall be referenced to sheet and detail being depicted. Show manner in which Contractor intends to fabricate work; show size and extent of all welds, anchors, etc. Include plans, elevations, component details, and attachments to other Work. Indicate materials and profiles of each metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items. Include setting drawings, templates, and directions for installing anchor bolts and other anchorages.
- D. Samples for Verification: Submit samples for each profile and pattern of fabricated metal and for each type of metal finish required, prepared on metal of same thickness and alloy indicated for the Work. If finishes involve normal color and texture variations, include sample sets, consisting of two or more units, showing the full range of variations expected. Include 6-inch-long samples of linear shapes.
- E. Qualification Data: Submit data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Conformance: Where materials or fabrications are indicated to comply with certain requirements for design loading and system performance, include structural computations, material properties, and other information needed to verify conformance.

- G. Certifications: Submit certificates of asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free, and mercury free paint.

### 1.3 QUALITY ASSURANCE

- A. Shop Assembly: Preassemble 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. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in service performance, as well as sufficient production capacity to produce required units.
- C. Qualifications of Welders: Only welders certified in the arc welding process shall perform work in connection with the work in this section. Comply with AMERICAN WELDING SOCIETY, AWS B3.0 for welding procedure and performance qualification.

### 1.4 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

### 1.5 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. 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.

### 1.6 GUARANTEE

- A. Provide a two (2) year guarantee, which shall commence from Project Acceptance Date.
- B. The Surety shall not be held liable beyond two (2) years of the Project Acceptance Date.

## PART 2 - PRODUCTS

### 2.1 MATERIALS AND COMPONENTS

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Stainless Steel Pipe: Type 316 stainless steel, standard weight (schedule 40), satin finish, with sizes and configurations as shown on the Drawings.
- C. Steel Plates, Shapes and Bars: ASTM A 36/A 36M, hot-dip galvanized.

- D. Steel Pipe: ASTM A 53/A 53M, Grade B, minimum yield stress of 35,000 psi, hot dip galvanized, standard weight (Schedule 40), unless otherwise indicated.
- E. Steel Tube: ASTM A 500 or ASTM A 501, hot-dip galvanized.
- F. Steel Wire Mesh Screen: Plain Square Mesh Weave 1 inch center to center openings and 0.250 inch Wire with 56.3 percent free area, hot-dip galvanized.
- F. Aluminum Extruded Bars and Tubes: ASTM B 221, alloy 6063-T5/T52, clear anodized.
- G. Aluminum Plates and Sheets: ASTM B 209, alloy 6061-T6, clear anodized.
- H. Brackets, Flanges, and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- I. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## 2.2 FASTENERS

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Provide stainless steel fasteners where dissimilar metals are joined or where indicated. Select fasteners for the type, grade, and class required or as indicated.
- B. Steel Bolts: Regular hexagon-head type, ASTM A 307, hot-dip galvanized.
- C. Stainless Steel Bolts and Screws: ASTM F 593, Type 316.
- D. Lag Bolts and Screws: ASME B18.2.1, hot-dip galvanized.
- E. Washers and Nuts: Same material and finish as bolts.
- F. Expansion Anchors:
  - 1. Anchor Bolt and Sleeve: Anchor bolt and sleeve assembly of carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5 with capability to sustain without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
  - 2. Metal Anchor Bolts, Straps, Hangers, Brackets and Other Inserts: Furnish to other trades the anchor bolts, straps, hangers, brackets and other inserts which are necessary for the final installation of work under this and other trades, where not specified to be furnished under the other sections of the specifications. This trade shall also furnish templates if required by others and shall check the installation of all bolts and inserts for accuracy. Anchor bolts and washers of same quality as bolt. All items shall be galvanized except use stainless steel at aluminum metals.

- G. Cast-in-Place Anchors in Concrete: Threaded or wedge type; 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 required, hot-dip galvanized, ASTM A 153/ A 153M.
- H. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required, hot dipped galvanized.

### 2.3 FABRICATION, GENERAL

- A. Workmanship: Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in the finished product. Work to dimensions shown or accepted on the shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for the various components of the Work.
- B. Form exposed work true to line and level, with accurate angles and surfaces and with straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces. Provide welds behind finish surfaces without distorting or discoloring exposed side.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat head (countersunk) screws or bolts.
- E. Provide for anchorage of the type shown, coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- F. Cut, reinforce, drill, and tap miscellaneous metal work to receive finish hardware and similar items.
- G. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- H. Galvanizing: Provide all steel fabrications with hot-dip galvanized coating, unless otherwise indicated, as follows:
  - 1. ASTM A 153/A 153M for galvanizing iron and steel hardware.
  - 2. ASTM A 123/A 123M for galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strip 1/8-inch thick and heavier, and assembled steel products.

### 2.4 CORROSION PROTECTION

- A. Where metals are incompatible to other materials, the contact areas of these materials shall be back coated before erection with an approved bituminous paint or other insulation coating as recommended by the metal fabricator.

## 2.5 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures.
- B. Fabricate items of sizes, shapes and dimensions required. Furnish steel washers.

## 2.6 EQUIPMENT AND MISCELLANEOUS FRAMING SUPPORTS

- A. Provide equipment and miscellaneous framing and supports, as required to complete work.
- B. Fabricate equipment and miscellaneous framing and supports to sizes, shapes and profiles indicated. Except as otherwise shown, fabricate from steel shapes, plates, and steel bars, for supports, of welded construction using mitered joints for field connection.
- C. Galvanize all miscellaneous units and supports unless otherwise specified.
- D. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Galvanize all miscellaneous frames and supports.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Prior to all work of this section, the Contractor shall carefully inspect the installed work of all other trades and verify that all such work is complete to the point where fabrication and installation of the work of this section may properly commence.
- B. The Contractors shall make all required measurements in the field to ensure proper and adequate fit of all metal fabrication items.
- C. Installer must examine the areas and conditions under which metal fabrication items are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

### 3.2 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment, and elevation, plumb, level, true, and free from rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
- C. Connections: Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth, and touch-up repair

paint. Do not weld, cut, or abrade the surfaces of units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of weld made, and methods in correcting welding work.
  - 1. Clean areas to be repaired and remove slag from welds. Heat surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread molten material uniformly over surfaces to be coated and wipe off excess material.
- E. Grouting: Mix the specified and accepted grout with potable water and in the consistency recommended by the manufacturer in a non-contaminating container. Mix only the amount of grout that will be placed within the specified pot life of the material. Any grout that has set shall be discarded. Pour the grout in small amounts from one side only, tamping between pours to eliminated air pockets. Cure grout as recommended by the manufacturer.

### 3.3 CLEAN UP

- A. After installation, all surfaces shall be cleaned and ready to receive final treatment. All unused materials, tools and equipment shall be removed from the project site.
- B. All rubbish, debris, fines, etc., accumulated from the work of this section shall be removed from the project site and the area left neat and clean.

END OF SECTION

## DIVISION 6 - WOOD AND PLASTICS

### SECTION 06070

#### WOOD TREATMENT

##### PART 1 – GENERAL

###### 1.1 SUMMARY

- A. Plant preservative and insecticide treatment of lumber and other wood products specified in other Sections of this Specification by pressure and dip methods.
- B. Field treatment of field cut or drilled lumber.

###### 1.2 RELATED SECTIONS

- A. SECTION 06100 - ROUGH CARPENTRY: Lumber products and fire retardant treatment of lumber products.

###### 1.3 REFERENCES

- A. American Wood-Preservers' Association
  - 1. AWPA C2-00: Lumber, Timber, Bridge Ties and Mine Ties-Preservative Treatment by Pressure Processes.
  - 2. AWPA C9-00: Plywood-Preservative Treatment by Pressure Processes.
  - 3. AWPA C31-00: Lumber Used out of Contact with the Ground and Continuously Protected from Liquid Water-Treatment by Pressure Processes.
  - 4. AWPA M4-01: Care of Preservative-Treated Wood Products.
  - 5. AWPA C20-99: Structural Lumber- Fire Retardant Treatment by Pressure Process.
  - 6. AWPA N2-00: Composite Wood Products, Preservative Treatment by Non-Pressure Process.

###### 1.4 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Product Data: Provide data on all treatment products, including field application instructions if applicable.
  - 1. Provide manufacturer's Material Safety Data Sheets on all products, and hazardous materials.
  - 2. Provide ICBO approvals for treatment solutions used.
- C. Preserver Certifications:
  - 1. Provide a Certificate of Treatment showing compliance with these specifications for the following:
    - a. Kiln drying.
    - b. Method of treatment performed, including dip treatment.

- D. Contractor's Certification: Provide a certification letter stating that all wood used on this job including cuts and penetration were treated and coated with preservatives in compliance with requirements of this contract.
- E. Guarantee: Guarantee form for written guarantee.

#### 1.5 REGULATORY REQUIREMENTS

- A. Comply with State OSHL (Occupancy Safety and Health Law) and pollution controls regulations of the State Department of Health and EPA.

#### 1.6 QUALITY ASSURANCE

- A. Source Limitations for Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.
- B. Comply with the American Wood-Preservers' Association standards as described in the applicable building or residential code. Preservatives shall be EPA registered.
- C. Do not use preservatives containing arsenic or other EPA banned chemicals.
- D. Do not use Perma-Clear 65 or other zinc naphthanate and permethrin products.

#### 1.7 DELIVERY STORAGE AND HANDLING

- A. Protect AWPA C31 inorganic boron treated wood from contact with the ground, rain or other sources of liquid water until permanent installation of covering construction.

#### 1.8 GUARANTEE

- A. Provide a two (2) year guarantee to replace all treated wood which is attacked by subterranean termites.
- B. Provide a five (5) year guaranty to replace all treated wood which is attacked by dry wood termites or deteriorates due to dry rot. This guarantee period supersedes the guarantee provisions of the Interim General Conditions (IGC). The Surety shall not be held liable beyond two (2) years of the Project Acceptance Date.
- C. Guarantee periods shall commence on Project Acceptance Date.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. Mill lumber to finish size and shape prior to treating, and treat before assembly. Plywood may be treated in regular panel sizes.
- B. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece, or omit marking and provide certificates of treatment compliance issued by inspection agency.

## 2.2 PRESSURE TREATMENT WITH WATER-BORNE PRESERVATIVES

### A. Treating Solutions:

1. Copper azole, Type A (CBA-A).
2. Inorganic boron (SBX).

### B. Treatment Methods:

1. General:
  - a. All water-borne treatment methods require incising of lumber of nominal 2-inch thickness (1-1/2 inches actual dimension).
  - b. Choice of treatment method and conditions of use of each treating solution shall conform to the treatment schedule contained in Part 3.
2. CBA-A: Treatment methods, depth of penetration and treating solution retention shall conform to AWPA C2 for lumber and C9 for plywood.
3. SBX: Treatment method shall conform to AWPA C31. Treating solution retention shall be a minimum of 0.28 pounds per cubic foot (equivalent to 0.42 DOT).

### C. Drying:

1. Before Treatment:
  - a. CBA-A Treatment: Wood shall be air dried or kiln-dried before treatment to an average moisture content of 28 percent or less per AWPA standards.
  - b. SBX Treatment: Wood having a moisture content higher than 28 percent is acceptable when treating with SBX.
2. After Treatment: All one-inch and 2-inch lumber and all plywood shall be dried to a moisture content of 19 percent or less after treatment.

## 2.3 PRESSURE TREATMENT WITH OIL-BORNE PRESERVATIVES

### A. Treating Solution:

1. 0.50 percent by weight chlorpyrifos, 0.75 percent by weight 3-iodo-2-propynyl butyl carbamate (IPBC). The solvent used in formulating the preservative solution shall meet the requirements of AWPA hydrocarbon solvent Type C, Standard P9, Paragraph 3.1.
2. For interior application use low odor mineral spirits as solvent.

### B. Treatment Methods: Treated wood shall attain the following net retention requirements: 0.0175 pounds of Chlorpyrifos per cubic foot of wood, 0.035 pound of 3-Iodo-2 propynyl butyl carbamate per cubic foot of wood.

### C. Drying:

1. Before Treatment: All wood treated with oil-borne preservatives shall be kiln-dried to an average moisture content of 12 percent to 15 percent per AWPA standards.
2. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

## 2.4 PRESERVATION BY DIP TREATMENT

- A. Treating Solution:
  - 1. Any of the Oil-Borne Preservatives listed above.
  - 2. A solution of one quart chlopyrifos in 55 gallons of a 0.50 percent IPBC solution.
- B. Treatment Methods:
  - 1. Immersion treat for a minimum period of 15 minutes.
  - 2. Do not incise lumber scheduled to be left unpainted or receive a clear finish.
- C. Drying:
  - 1. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

## 2.5 FIELD TREATMENT

- A. Treatment Method:
  - 1. Treat in accordance with AWPA Standard M4-98 using two heavy brush coats of a treating solution.

## PART 3 – EXECUTION

### 3.1 SCHEDULE OF TREATMENTS

- A. Species:
  - 1. Treat all wood species except all-heart redwood.
  - 2. All water-borne and oil-borne treatment solutions are applicable to Douglas-fir and hem-fir species except for CBA-A treatment which is acceptable for hem-fir species only.
- B. Application:
  - 1. Pressure Treatment:
    - a. General: Unless otherwise stipulated, all lumber and plywood shall be pressure treated.
    - b. Hardwood flooring and exposed lumber 1-1/2 inch (net thickness) and over that will be unpainted or receive a clear finish shall be and pressure treated with oil-borne preservative. Do not incise lumber.
    - c. SBX treated wood shall not be used in areas exposed to direct precipitation (e.g. exposed decking, trellises, fencing, etc.) unless painted or covered with a finish material.
  - 2. Dip Treatment: All finish lumber under 1-1/2 inch net thickness (except hardwood flooring); finish plywood; and mill work items, such as for cabinet work, shelving and similar wood work that will be exposed to view in the finished work.

3. Field Cuts: Treat end cuts, notches and penetrations into treated lumber or plywood.  
Exception: Cuts and penetrations made in SBX treated wood 2-inches or less in nominal thickness need not be field treated.

END OF SECTION

SECTION 06100  
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking and nailers.

B. Related Requirements:

1. Section 06176 Metal-Plate-Connected Wood Trusses for wood trusses made from dimension lumber.

1.2 DEFINITIONS

A. Exposed Framing: Framing not concealed by other construction.

B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. WCLIB: West Coast Lumber Inspection Bureau.
2. WWPA: Western Wood Products Association.

1.3 QUALITY ASSURANCE

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of rough bucks, blocking, and similar supports to allow proper attachment of other work.

B. Wood Preservative Treatment: In accordance with Section 06070 – Wood Treatment.

1.4 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Certificates: provide a certificate of treatment showing compliance with the specifications, and a certificate of dryness for all wood specified to be dried after treatment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. 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. Store materials away from threat of termite or other infestation.

## PART 2 - PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. .
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.
- C. Wood Treatment: Treat all rough lumber in accordance with Section 06070 – Wood Treatment.

### 2.2 DIMENSION LUMBER FRAMING

- A. Grade: As indicated.
  - 1. Species:
    - a. Douglas fir-larch; WCLIB or WWPA.

### 2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
- B. For items of dimension lumber size, provide Construction or No. 2 and the following species:
  - 1. Douglas fir-larch; WCLIB or WWPA.

### 2.4 PLYWOOD

- A. General: Comply with U.S. Product standard PS I for softwood plywood, Group 1, Douglas Fir, Exterior Grade.

### 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
  - B. Nails, Brads, and Staples: ASTM F 1667.
  - C. Power-Driven Fasteners: NES NER-272.
  - D. Wood Screws: ASME B18.6.1.
- 2.6 METAL FRAMING ANCHORS
- 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. Simpson Strong-Tie Co., Inc., stainless steel.
- 2.7 MOISTURE BARRIER
- A. ASTM D226, Type II, No. 30, asbestos free, asphalt saturated roofing felt as required to separate wood from concrete or masonry surfaces and as required.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate blocking and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- G. 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.

- H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- I. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- J. End-Cut Sealing: Immediately after end cutting each member to final length, apply at saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.
- K. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.
- L. Retreat cut and penetrated lumber in accordance with Section 06070 – Wood Treatment.

### 3.2 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.

### 3.3 RAFTER FRAMING INSTALLATION

- A. Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
- B. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

### 3.4 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 rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

## SECTION 06176

### METAL-PLATE-CONNECTED WOOD TRUSSES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Wood roof trusses.
  - 2. Wood truss bracing.
  - 3. Metal truss accessories.

##### 1.2 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

##### 1.3 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for trusses.
  - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
  - 2. Indicate sizes, stress grades, and species of lumber.
  - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
  - 6. Show splice details and bearing details.
- B. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

##### 1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
  - 1. Metal-plate connectors.

2. Metal truss accessories.

## 1.5 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
  1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
  2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in Hawaii.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Engineer and authorities having jurisdiction.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
  1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
  2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
  3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design metal-plate-connected wood trusses.
- B. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
  1. Design Loads: As indicated.
  2. Maximum Deflection Under Design Loads: As indicated.
- C. Comply with applicable requirements and recommendations of the following publications:

1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
  2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
  3. TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

## 2.2 DIMENSION LUMBER

- 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. Provide dressed lumber, S4S.
  3. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- B. Minimum Chord Size for Roof Trusses: As indicated.
- C. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 06100 Rough Carpentry.

## 2.3 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with the ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- 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 all trusses unless otherwise indicated.

## 2.4 METAL CONNECTOR PLATES

- 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. Alpine Engineered Products, Inc.; an ITW company.
  2. MiTek Industries, Inc.; a subsidiary of Berkshire Hathaway Inc.
- B. Source Limitations: Obtain metal connector plates from single manufacturer.
- C. General: Fabricate connector plates to comply with TPI 1.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304, and not less than 0.035 inch thick.

## 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
  2. Provide of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.

## 2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 94 percent zinc dust by weight.
- B. Protective Coatings: SSPC-Paint 22, epoxy-polyamide primer.

## 2.7 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

## 2.8 SOURCE QUALITY CONTROL

- A. Special Inspections: State will engage a qualified special inspector to perform special inspections.
1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of

the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.

2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate does not comply with the Contract Documents.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs. Install fasteners through fastener holes in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
  1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
  1. Install bracing to comply with Section 06100 Rough Carpentry.
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not meet requirements.

1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Engineer.

### 3.2 REPAIRS AND 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 wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- C. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- D. Protective Coating: Clean and prepare exposed surfaces of metal connector plates. Brush apply primer, when part of coating system, and one coat of protective coating.
  1. Apply materials to provide minimum dry film thickness recommended by coating system manufacturer.

END OF SECTION

## SECTION 06200

### FINISH CARPENTRY

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Provide all finish carpentry as indicated on the drawings, complete, including, but not limited to, the following:
  - 1. Miscellaneous materials.
  - 2. Install door hardware, miscellaneous specialties, and any other items specified to be installed under this section but furnished under other sections of these specifications.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 06070 - WOOD TREATMENT: Wood treatments.
  - 2. SECTION 08710 - FINISH HARDWARE: Hardware for installation.
  - 4. SECTION 09901 - PAINTING: Wood painting.

##### 1.2 DELIVERY, STORAGE AND HANDLING

- A. Deliver lumber, plywood, trim, and millwork to job site in an undamaged condition. Stack materials to ensure ventilation and drainage. Protect against dampness before and after delivery. Store materials under cover in a well-ventilated enclosure and protect against extreme changes in temperature and humidity. Do not store products in building until wet trade materials are dry.

##### 1.3 QUALITY ASSURANCE

- A. Lumber: Identify each piece or each bundle of lumber, millwork, and trim by the grade mark of a recognized association or independent inspection agency that is certified by the Board of Review, American Lumber Standards Committee, to grade the species.
- B. Plywood: Each sheet of plywood shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of the plywood. Mark shall identify plywood by species group or span rating, and shall show exposure durability classification, grade, and compliance with APA L870.
- C. Hardboard: Materials shall bear a marking or statement identifying the producer and the applicable standard.
- D. Pressure-Treated Lumber and Plywood: Each treated piece shall be inspected in accordance with AWPA M2.

##### 1.4 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Product Data: Submit manufacturer's printed data, showing texture, density, catalog cuts, and installation instructions and indicating the usage of engineered or recycled wood products, and environmentally safe preservatives.

- C. Samples: Samples shall be of sufficient size to show patterns, color ranges, and types, as applicable, of the material proposed to be used.
- D. Certificates:
  - 1. Provide certificates of grade from the grading agency on graded but unmarked lumber or plywood attesting that materials meet the grade requirements specified herein.
  - 2. Provide certificates of compliance unless materials bear certification markings or statements.

## PART 2 – PRODUCTS

### 2.1 WOOD

- A. Sizes and Patterns of Wood Products
  - 1. Yard and board lumber sizes shall conform to ALSC PS 20. Provide shaped lumber and millwork in the patterns indicated and standard patterns of the association covering the species. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the applicable standard.
- B. Trim, Finish, and Frames
  - 1. Provide species and grades listed for materials to be paint finished. Provide materials that are to be stain, natural, or transparent finished one grade higher than that listed. Provide species indicated for materials to be transparent finished. Run trim, except window stools and aprons with hollow backs.
- C. Softwood Plywood: PS1, thicknesses as indicated.
  - 1. Plywood: Interior type, A-B Grade, any species group.
- D. Siding:
  - 1. Panel siding shall be hardboard or plywood. Product Standard PS1, exterior type, Grade B-C, medium density overlay one side, 4 feet wide, maximum practicable lengths, 3/8-inch thick, smooth face, and grooved as selected from manufacturer's standard pattern.
- E. Hardboard: PS-58, tempered type, 1/4 inch thick.

### 2.2 SOFFITS

- A. Hardboard and Plywood
  - 1. Hardboard and plywood soffits shall be siding grade hardboard, 7/16 inch thick; plywood, and grooved as selected from manufacturer's standard pattern, APA L870, exterior type, Grade A-C plywood panel siding, 11/32 inch thick for 24 inch on centers maximum span with all edges supported.

### 2.3 MOISTURE CONTENT OF WOOD PRODUCTS

- A. Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products at time of delivery to the job site, and when installed, shall be as follows:
  - 1. Exterior Treated and Untreated Finish Lumber and Trim 4 inches Nominal or Less in Thickness: 19 percent.

2. Exterior Wood Siding: 15 percent.
  3. Moisture content of other materials shall be in accordance with the applicable standards.
- 2.4 PRESERVATIVE TREATMENT OF WOOD PRODUCTS
- A. Wood Treatment: Treat all finish carpentry lumber in accordance with SECTION 06070 - WOOD TREATMENT.
  - B. Nonpressure Treatment
    1. Treat woodwork and millwork, such as exterior trim, and door trim, in accordance with WDMA I.S.4, with either 2 percent copper naphthenate, 3 percent zinc naphthenate, or 1.8 percent copper-8-quinolinolate. Provide a liberal brushcoat of preservative treatment to field cuts and holes.
- 2.5 FABRICATION
- A. Quality Standards (QS)
    1. The terms "Premium," "Custom," and "Economy" refer to the quality grades defined in AWI AWS. Items not specified to be of a specific grade shall be Custom grade. The AWI QS is superseded by all contract document requirements indicated or stated herein.

## PART 3 – EXECUTION

- 3.1 FINISH WORK
- A. Provide sizes, materials, and designs as indicated and as specified. Apply primer to finish work before installing. Joints shall be tight and constructed in a manner to conceal shrinkage. Miter trim and moldings at exterior angles and at returns. Material shall show no warp after installation. Fasten finish work with finish nails. Provide blind nailing where practicable. Set face nails for putty stopping.
  - B. Exterior Finish Work:
    1. Machine-sand exposed flat members and square edges. Machine-finish semi-exposed surfaces. Construct joints to exclude water. In addition to nailing, glue joints of built-up items with waterproof glue as necessary for weather-resistant construction. Provide well distributed end joints in built-up members. Provide shoulder joints in flat work. Hold backs of wide-faced miters together with metal rings and waterproof glue. Fascias and other flat members, unless otherwise indicated, shall be 3/4 inch thick. Provide door and window trim in single lengths. Provide braced, blocked, and rigidly anchored cornices for support and protection of vertical joints. Install soffits in largest practical size. Joints of plywood shall occur over center lines of supports. Fasten soffits with aluminum or stainless steel nails. Back prime all concealed surfaces of exterior trim.
  - C. Door Frames:
    1. Set plumb and square. Provide solid blocking at not more than 16 inches o.c. for each jamb. Position blocking to occur behind hinges and lock strikes. Double wedge frames and fasten with finishing nails. Set nails for putty stopping.

### 3.2 SOFFITS

- A. Wood – Panels shall be applied with edges at joints spaced in accordance with manufacturer's instructions and with all edges backed with framing members. Panels shall be nailed 3/8 inch from edges at 6 inches on center and at intermediate supports at 12 inches on center. Panels shall be installed using the maximum practical lengths.

### 3.3 FASCIAS AND EXTERIOR TRIM

- A. Exposed surfaces and square edges shall be machine sanded, caulked, and constructed to exclude water. Joints of built-up items, in addition to nailing, shall be glued as necessary for weather-resistant construction. End joints in built-up members shall be well distributed. Joints in flat work shall be shouldered. Backs of wide-faced miters shall be held together with metal rings and glue. Fascias and other flat members shall be in maximum practicable lengths. Cornices shall be braced, blocked, and rigidly anchored for support and protection of vertical joints.

END OF SECTION

## DIVISION 7 – THERMAL AND MOISTURE PROTECTION

### SECTION 07411

#### PREFORMED METAL ROOFING

##### PART 1 - GENERAL

###### 1.1 SUMMARY

- A. Provide all preformed field-assembled standing seam metal roofing, and other related work as indicated on the drawings and specified herein.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 07620 - SHEET METAL FLASHING AND TRIM: Coordinate flashing installation not part of this section.
  - 2. SECTION 07920 - JOINT SEALANTS: Field-applied sealants.

###### 1.2 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Product Data: Submit manufacturer's product specifications, standard details, certified product test results, installation instructions, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.
- C. Shop Drawings: Submit shop drawings with layouts of panels, details of edge conditions, joints, panel profiles, supports, anchorages, trim, flashings, underlayment, closures, and special details. Distinguish between factory- and field- assembled work.
- D. Performance Certification:
  - 1. Roofing panel supplier shall submit certification that panels meet performance requirements in paragraph entitled "Performance Requirements" herein below. Provide design analysis and calculations to substantiate mechanical attachments to resist wind-uplift.
  - 2. Manufacturer's Technical Representative shall submit certification that roofing panels have been installed according to the manufacturer's instructions and is free of defects in material and workmanship.
- E. Samples: Submit sample panels 12-inches long by actual panel width, in the profile, style, and color indicated. Include clips, caps, fasteners, closures, and other exposed panel accessories.
- F. Contractor Certification: Submit a signed certificate from the Manufacturer stating that the Contractor is an approved installer of the Manufacturer's Complete Roofing System and that the installation crew has been trained in the system's proper installation by the Manufacturer or the Technical Representative of the Manufacturer. The certificate shall include a listing of the location, size of project, and date of five (5) successful installations of the system by the Contractor within the previous three (3) years.

- G. Technical Representative Certification: Submit a signed certificate from the Manufacturer designating its Technical Representative for the project and attesting that this person is both qualified and authorized to act on its behalf of this position in respect to the Complete Roofing System.
- H. Warranty Certification: Submit a signed certificate from the Manufacturer or its technical Representative stating that the plans and specifications for the project have been reviewed and fully comply with the Manufacturer's design standards and meet the requirements for warranty of the Complete Roofing System for the specified period.
- I. Warranty: Submit written warranty as specified in paragraph entitled "WARRANTY" hereinbelow.

### 1.3 WARRANTY

- A. Furnish written two (2) year warranty from the project acceptance date, jointly signed by Roofing Contractor, Flashing and Sheet Metal Contractor and General Contractor which shall provide for repairs or replacement of roofing and flashing where leaking occurs due to faulty materials and workmanship at no extra cost to the State.
- B. Provide manufacturer's warranty for coating system under Hawaiian weather conditions, provide following as a guide for expected warranty:
  - 1. The roofing panels and matching flashings with a factory applied Fluoropolymer (Kynar 500) paint finish are free from material defects and shall be warranted for twenty (20) years against peeling, chipping, cracking or color change in excess of 5 NBS units during the term of this warranty. The manufacturer/supplier shall replace or repair as necessary any panels whose factory color finish fails under normal wind and weathering conditions. This paint finish warranty commences upon project acceptance date.
  - 2. Additionally, the metal roofing system components for the project as identified by the Contract Drawings for this project, shall be warranted for a period of fifteen (15) years from the project acceptance date. Manufacturer/supplier shall replace or repair as necessary any component of the roof system supplied by them, when installed and maintained according to Manufacturer's instructions, which fail to provide a watertight and weatherproof system due to defective materials. All labor, materials, general condition, and equipment required to perform any repair work shall be provided by the manufacturer/supplier. Repair work shall be done in a manner that will not disrupt State access to the building.
  - 3. The Surety shall not be held liable beyond two (2) years from the Project Acceptance Date.

### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed metal roof panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance. A company specializing in performing work of this section with minimum five (5) years experience and approved by manufacturer.
- B. Performance Requirements:
  - 1. Wind-Uplift Resistance: Comply with UL 580 for wind-uplift resistance class indicated.

2. Structural Performance: Capable of withstanding the effects of gravity loads and the following loads and stresses, based on testing according to ASTM E 1592
    - a. Wind Loads: Meets requirements of 120 mph, Exposure C windloads, in accordance with current building codes and County of Hawaii Amendments.
    - b. Deflection Limits: Vertical deflections no greater than 1/240 of the span.
  3. Seismic Performance: Provide metal roof panel assemblies capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
- C. Sealants: Provide sealants under SECTION 07920 - JOINT SEALANTS as acceptable to the roofing manufacturer.
- D. Should the manufacturer's warranty requirements necessitate different drawings and details exceeding the requirements of those indicated or specified, provide shop drawings and field adjustments for approval and at no cost to the State.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Deliver panels and other components so they will not be damaged or deformed. Package panels for protection against damage during transportation or handling.
  - B. Exercise care in unloading, storing, and erecting panels to prevent bending, warping, twisting, and surface damage.
  - C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
- 1.6 PRE-INSTALLATION MEETING:
- A. The General Contractor, the authorized roofing manufacturers' representatives or their independent roofing inspectors, roofing installer shall attend a pre-installation meeting. Include other related trades, such as sheet metal contractor, as applicable. Confirm the required participants with the Contracting Officer. Notify participants at least five (5) working days prior to meeting. Intent of the meeting is to review the preparation and installation requirements for the roofing system and to coordinate and schedule the required work.
- 1.7 PROJECT CONDITIONS
- A. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish opening dimensions and proceed with fabricating panels without field measurements or allow for trimming panel units. Coordinate construction to ensure actual locations of structural members and to ensure opening dimensions correspond to established dimensions.

## PART 2 - PRODUCTS

### 2.1 METALS AND FINISHES

- A. Roof Panels: Formed from minimum 22 gauge aluminum sheet conforming to ASTM B 209. Panel configuration shall be as specified. Panel shall be prefinished Kynar 500 as specified. Thicker gauge where required to meet performance requirements.
- B. Finish: Apply the following organic coating in thickness indicated. Furnish appropriate air-drying spray finish in matching color for touchup. Fluoropolymer 2-Coat (Kynar 500) Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight with a total minimum dry film thickness on the exposed top of 1.0 mil and 30 percent reflective gloss when tested according to ASTM D 523, complying with AAMA 2605. Interior/underside finish shall be 1.0 mil manufacturer's standard off white paint finish.
  - 1. Durability: Provide coating field tested under normal range of weather conditions for a minimum of twenty (20) years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of a chalk rating of 8 according to ASTM D 4214; and without fading in excess of 5 Hunter units.
  - 2. Color: Color shall be as indicated or selected and as approved as per item entitled "SUBMITTALS" hereinabove prior to fabrication.

### 2.2 ROOF PANEL ASSEMBLIES

- A. Standing-Seam Metal Roof Panels: Manufacturer's standard factory-formed, standing-seam snap lock metal roof panel assembly with 1-3/4 inch high x 12-inch wide standing-seam, designed for concealed mechanical attachment of panels to roof sheathing or structure. Panels furnished shall be one continuous single panel over the entire roof span; no lapping condition shall be permitted in this project. Panel System shall comply with ASTM E 1637. Clips: Provide minimum 0.0625-inch thick, stainless steel panel clips designed to meet negative-load requirements.

### 2.3 FLASHING AND CLOSURES

- A. Provide flashings, including, but not limited to, ridges, hips, valleys, closures, etc. Formed of prefinished material to match panels of manufacturer's standard and custom fabricated flashings for the panels specified. Configuration of flashings shown on the drawings are intended to indicate basic intent. Other flashings which accomplish the basic intent and is standard with the panel manufacturer may only be acceptable with the approval as per item entitled "SUBMITTALS" hereinabove. Provide metal flashings for locations indicated. Furnish sheet metal flashing items in 8- to 10-foot lengths. Single pieces less than 8-feet long may be used at corners, and at ends of runs. Provide accessories and other items essential to complete the sheet metal installation of the same materials as the items to which they are applied. Connect all pieces of linear flashing by a slip joint to permit thermal movement.

### 2.4 UNDERLAYMENT MATERIALS

- A. Building Paper: Asphalt-saturated felt conforming to ASTM D 226, Type II, No. 30. Provide under metal roofing where indicated on the drawings.

## 2.5 THERMAL INSULATION FOR METAL ROOF PANEL

- A. Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch- wide, continuous, vapor-tight edge tabs; and with a flame-spread index of 25 or less.

## 2.6 MISCELLANEOUS MATERIALS

- A. General: Provide materials and accessories required for a complete panel assembly and as recommended by panel manufacturer, unless otherwise indicated.
- B. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Use stainless-steel fasteners for all applications. Use exposed fasteners with prefinished coated head to match panel color and with composite metal and neoprene washer.
- C. Accessories: Unless otherwise specified, provide components required for a complete panel assembly, including trim, copings, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.
  - 1. Closure Strips: Closed-cell, self-extinguishing, expanded, cellular, rubber or cross-linked, polyolefin-foam flexible closure strips. Cut or pre-mold to match configuration of panels. Provide closure strips where indicated or necessary to ensure weathertight construction.
  - 2. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape.
  - 3. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to seal joints in panel and remain weathertight. Provide sealant recommended by panel manufacturer.
- D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat, unless otherwise indicated. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements indicated for conditions affecting performance of metal panel.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Coordinate panel system with rain drainage work; flashing; trim; and construction of substrates, vents, and other adjoining work to provide a leakproof, secure, and non-corrosive installation.
- B. Promptly remove protective film, if any, from exposed surfaces of metal panels. Strip with care to avoid damage to finish.

### 3.3 PANEL INSTALLATION

- A. General: Comply with panel manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Field cutting exterior panels by torch is not permitted.
  - 2. Install panels with concealed fasteners, unless otherwise recommended by manufacturer.
  - 3. Install panels over solid substrate or structure unless otherwise indicated.
  - 4. Install underlayment under panels as per manufacturer's recommendations where indicated on the drawings.
- B. Install in accordance with the approved erection instructions and shop drawings. Panels shall be in full and firm contact with supports and with each other at side and end laps. Correct defects or errors in the material in a manufacturer's approved manner. Replace materials which cannot be corrected in an approved manner with non-defective material.
- C. Roofing units shall be applied parallel to the roof slope. Provide panel sheets in full lengths from ridge to eave, with no transverse joints except at the junction of ventilators, curbs, and similar openings or as indicated on drawings.
- D. Install components required for a complete panel assembly, including trim, copings, ridge closures, clips, flashings, sealants, fillers, closure strips, and similar items.
- E. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized-asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.
- F. Arrange side laps to leeward of prevailing wind direction.
- G. Install underlayment where specified and where indicated perpendicular to roof slope. Apply in shingle fashion and lap joints a minimum of 4-inches and 6-inches at end laps.
- H. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.
  - 1. Install weatherseal under ridge cap. Flash and seal panels at eave and rake with rubber, neoprene, or other closures to exclude weather.
  - 2. Seal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by panel manufacturer.
  - 3. Prepare joints and apply sealants to comply with requirements of SECTION 07920 - JOINT SEALANTS.
- I. Standing-Seam Roof Panel Assembly: Fasten panels to supports with concealed clip according to panel manufacturer's written instructions.

1. Install clips at each support with self-drilling/self-tapping fasteners.
  2. At end laps of panels, install tape calk between panels.
- J. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4-inch in 20-feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- K. Soffit Panels: shall be applied perpendicular to vertical surface of building. Miter corners.
- L. Inspection: Manufacturer's technical representative shall inspect panels during installation to ensure compliance with these specifications and conformance to manufacturer's installation instructions. Upon completion of the panel system, manufacturer's representative shall provide a written certification that panels have been installed in accordance with manufacturer's instructions and is free of defects in material and workmanship.
- 3.4 CLEANING AND PROTECTING
- A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

END OF SECTION

## SECTION 07460

### FIBER CEMENT VERTICAL PANEL SYSTEM

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Fiber-cement vertical panel system.
  - 2. Trim, flashings, and accessories.

##### 1.2 RELATED SECTIONS:

- A. SECTION 06100 - ROUGH CARPENTRY: Wood furring.
- B. SECTION 07920 - JOINT SEALANTS: Joint sealers and accessories.
- C. SECTION 09901 - PAINTING: Field-applied paint finish.

##### 1.3 REFERENCES

- A. American Society of Civil Engineers (ASCE)
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- B. ASTM International (ASTM):
  - 1. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 2. ASTM C 1186 - Standard Specification for Flat, Non-Asbestos, Fiber-Cement Sheets.
  - 3. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 4. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 5. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
  - 6. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

##### 1.4 SYSTEM DESCRIPTION

- A. Design Requirements: Design and install panel system to withstand minimum wind pressures in accordance with ASCE 7, Building Code, tested to ASTM E 330.

##### 1.5 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.

- B. Product Data: Submit data for each type of product indicated. Indicate panel profiles, sizes, fastening methods, surface texture, and finish.
  - C. Samples:
    - 1. Submit 4 x 6 inch samples of each type of panel indicated herein.
    - 2. Submit 3-inch long samples of each type of trim.
  - D. Warranty: Submit warranty as noted under item entitled "WARRANTY" herein below.
  - E. Quality Control Submittals:
    - 1. Certificates of Compliance: Certification from an independent testing laboratory that panel system meets fire hazard classification requirements.
- 1.6 QUALITY ASSURANCE
- A. Single Source Responsibility: Panels, metal trim, and fasteners furnished by single manufacturer.
  - B. Installer Qualifications: Minimum two (2) years documented experience in work of this Section.
  - C. Pre-Installation Conference:
    - 1. Convene at site two (2) weeks prior to beginning work of this Section.
    - 2. Attendance: Contractor, Construction Manager, panel system installer, and related trades.
    - 3. Review and discuss: Contract Documents, panel system manufacturer's literature, moisture barrier requirements, project conditions, scheduling, and other matters affecting installation.
- 1.7 WARRANTY
- A. Provide manufacturer's non-pro-rated thirty (30) year warranty providing coverage against hail and termite damage and defects in materials and workmanship.
  - B. Provide manufacturer's fifteen (15) year warranty providing coverage against peeling, cracking, and chipping of panel finish.
  - C. Provide installer's two (2) year warranty providing coverage against defects in installation
  - D. The Surety shall not be liable beyond two (2) years from the project acceptance date.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Fiber Cement Vertical Siding System:
  - 1. Source: "HardiePanel HZ10" siding as manufactured by James Hardie Building Products, Inc. or approved equal.
  - 2. Panels shall be in compliance with ASTM C 1186, Grade A, Type II.

3. Panels shall be "Sierra 8-inches" texture with a minimum panel size of 47-1/2 inches wide x 95-1/2 inches long x 5/16 inch thick and weight approx. 2.40lbs/sq. ft.
  4. Fire hazard classification: Panels tested in accordance with ASTM E 84.
  5. Fire-Resistance: Pass test in accordance with ASTM E 119.
  6. Combustibility: Noncombustible, tested in accordance with ASTM E 136.
  7. Structural Performance: Measured in accordance with ASTM E 330.
  8. Finish: Factory prime painted, for field-applied paint finish.
- B. Metal Trim:
1. Material: Extruded aluminum, ASTM B221, 6063-T5 alloy and temper, clear anodized finish.
  2. Shapes:
    - a. Horizontal Trim.
    - b. Drip Cap Trim.
    - c. Inside Corner Trim.
    - d. Outside Corner Trim.

## 2.2 ACCESSORIES

- A. Fasteners: Stainless steel, Tor pan head type as recommended by panel manufacturer, of equal or greater holding power than required by manufacturer's Code compliance reports.
- B. Edge Sealer: Type recommended by panel manufacturer.

## 2.3 FINISHES

- A. Factory Primer: Provide factory applied universal primer.
  1. Primer: Factory primed.
  2. Topcoat: Refer to Section 09901 – PAINTING and Color and Material Schedule.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install panel system in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Block framing between studs where vertical siding horizontal joints occur.
- C. Install metal Z flashing and provide a 1/4 inch gap at horizontal panel joints.
- D. Maintain clearance between siding and adjacent finished grade in accordance with the manufacturer's installation instructions..
- E. Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions.
  1. Touch-up nicks, scrapes, and nail heads in pre-finished siding using the manufacturer's touch-up kit pen.

2. Touch-up of nails shall be performed after application, but before plastic protection wrap is removed to prevent spotting of touch-up finish.
  3. Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.
- F. Install metal trim:
1. Vertical panel-to-panel joints: Install Vertical Trim as indicated.
  2. Horizontal panel-to-panel joints: Install Horizontal Trim as indicated.
  3. Inside corners: Install Inside Corner Trim.
  4. Outside corners: Install Outside Corner Trim.
  5. Over openings in walls and at bottom of walls: Install Drip Cap Trim.
- G. Fasten trim at maximum 24-inches on center.
- H. Leave 1/2-inch gap between horizontal drainage flashings and bottom of panel above. Do not seal this space.
- I. Allow minimum vertical clearance between edge of panel system and adjacent materials in accordance with manufacturer's instructions.
- J. Cut panels to fit around penetrations with maximum 1/4-inch gaps. Smooth and seal cut edges.
- K. Fasten panel system at maximum spacing per manufacturer's Code compliance reports. Place fasteners exposed, minimum 3/8-inch from panel edges and 2-inches from top and bottom edges at panel corners, in orderly fastening pattern.
- L. Apply joint sealer between panel system and adjacent surfaces as specified in SECTION 07920 - JOINT SEALANTS, except at horizontal drainage flashings.

END OF SECTION

## SECTION 07620

### SHEET METAL FLASHING AND TRIM

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide all sheet metal flashing and other related work as indicated on the drawings and as specified herein.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 07411 – PREFORMED METAL ROOFING: Coordination Installation.
  - 2. SECTION 07920 – JOINT SEALANTS: Sealant applications.
  - 3. SECTION 09901 – PAINTING: Sheet metal painting.

##### 1.2 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Product Data: Submit manufacturer's product data of all manufactured items.
- C. Shop Drawings: Submit shop drawings of all required flashing details for approval. No fabrication will be permitted before approval is secured.
- D. Warranty: Submit warranty as noted under item entitled “WARRANTY” herein below.

##### 1.3 WARRANTY

- A. The warranty provisions and number of years for the warrantee by this article shall take precedence over the standard provisions in the GENERAL CONDITIONS.
- B. Project Warranty: Submit Contractor’s warranty, signed jointly by Installer covering work of this section, including all components of flashing system such as panels, base flashing, roofing accessories, fasteners, curbs, collar flashing, and other products, for the following warranty period and conditions:
  - 1. Warranty Period: Two (2) years from the Project Acceptance Date.
  - 2. Warranty shall provide for the repair of all leaks as well as repair and replacement of sheet metal and damage to the building and/or its finishes at no cost to the State.
- C. The Surety shall not be held liable beyond two (2) years from the project acceptance date.

##### 1.4 QUALITY ASSURANCE

- A. All sheet metal fabrications shall conform to State and local codes, SMACNA (latest edition) and industry standards.
- B. Coordinate work with SECTION 07411 – PREFORMED METAL ROOFING to provide required supports and fasteners to comply with roofing performance requirements.

## 1.5 PERFORMANCE REQUIREMENTS

- A. Install flashing and sheet metal work to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without falling, rattling, leaking, and fastener disengagement.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weather-tight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

## 1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and non corrosive installation.

## 1.8 PRE-INSTALLATION MEETING

- A. The General Contractor, the Sheet Metal Contractor and Roofing Installer shall attend a pre-installation meeting. Include other related trades as applicable. Confirm the required participants with the Contracting Officer. Notify participants at least five (5) days prior to meeting. Intent of the meeting is to review the preparation and installation requirements for the roofing system and to coordinate and schedule the required work.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Flashing and Other Sheet Metal flashing: ASTM B 209, 22 gauge unless otherwise indicated of aluminum sheet metal with Kynar 500 finish, same color finish as existing trim color finish.
- B. Vent thru Roof (VTR) Pipe Screen/Clamp: Type 316 stainless steel, 1/2-inch x 1/2-inch x 0.032-inch diameter, unless otherwise indicated, with stainless steel clamp of hex screw, band and housing of size as required. Fasteners: Fasteners shall be manufacturer's standard or custom fabricated stainless steel or copper types at copper materials and stainless steel types at other metal materials. Exposed fasteners where occurs or where required shall be of head to match flashing finish with composite metal and neoprene washer.
- C. Solder: ASTM B 32, of grade and type required for materials to be soldered.
- D. Fasteners: Fasteners shall be manufacturer's standard or custom fabricated stainless steel types at other metal materials. Exposed fasteners where occurs or where required shall be of head to match flashing finish with composite metal and neoprene washer. Revits shall not be used to secure to substrates.

- E. Moisture Barrier: ASTM D 226, Type II, No. 30, asbestos free, asphalt saturated roofing felt.
- F. Cleating: Cleats for sheet metal work shall be provided where required, spaced approximately 12-inches on center, unless otherwise indicated on the drawings. Cleats shall not be less than 3-inches wide by 3-inches long of the same material and weight as the metal being installed unless otherwise indicated.
- G. Adhesive: Type recommended by flashing sheet metal manufacturer for waterproofing and weather resistant seaming and adhesive application of flashing sheet metal.

## 2.2 FABRICATION, GENERAL

- A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. Fabricating: Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Forming: Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
- D. Seams: Fabricate nonmoving seams in sheet metal with flat lock seams. Tin edges to be seamed, form seams, and solder.
- E. Expansion Provisions: Space movement joints at maximum of 10-feet with no joints allowed within 24-inches of corner or intersection. Where lapped or bayonet type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant (concealed within joints).
- F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- G. Separation: Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
- H. Fasteners: Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view unless indicated or approved.
- I. Attachments: Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer. Size shall be as recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

## PART 3 - EXECUTION

### 3.1 INSTALLATION AND WORKMANSHIP

- A. General: Surface to which sheet metal is to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect the application. Installer shall report any unsatisfactory surfaces to the Contractor. All such areas and/or conditions shall be corrected by the Contractor. Proceed with installation only after unsatisfactory conditions have been corrected. In the absence of such a report, the Contractor shall be held responsible for the finished product.
- B. Accessories: All accessories or other items essential for the completeness of the sheet metal installation, though not specifically indicated on the drawings or specified, shall be provided. All such items unless otherwise indicated on the drawings or specified, shall be of the same kind of materials as the item to be applied, unless otherwise indicated or specified herein. Nails, screws and bolts shall be of the type best suited for the purpose intended and shall be of stainless steel or of a composition that is compatible with metal to which it will contact.
- C. Workmanship: Except as otherwise indicated on the drawings or specified, the workmanship of sheet metal work, method of forming joints, anchoring, cleating, provisions for expansion, etc., shall conform to the standards details and recommendations of the Sheet Metal and Air Conditioning Contractors National Association's "Architectural Sheet Metal Manual", and shall be subject to the approval of the Contracting Officer.
- D. Weather Resistance: All sheet metal work shall be fabricated to watertight and wind tight in compliance with the purpose intended.
- E. Protection from Contact of Dissimilar Materials: Surfaces in contact with dissimilar metal shall be painted with heavy bodied bituminous paint, or shall be separated by means of moistureproof building felts.

### 3.2 PROTECTION

- A. Protect all sheet metal work until final acceptance of the building.

### 3.3 CLEAN UP

- A. Remove all adhesive, sealants, grease, dirt, etc. from flashing and sheet metal and clean surfaces as recommended by the manufacturer and maintain in a clean condition during construction.
- B. At completion of the work, clean up and remove all rubbish and debris from the premises which resulted from this work.

END OF SECTION

## SECTION 07840

### FIRESTOPPING

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Closures of openings in walls, floors, and roof decks against penetration of flame, heat, and smoke or gases in fire resistant rated construction.
- B. Closure of openings in walls against penetration of gases or smoke in smoke partitions.

##### 1.2 RELATED WORK

- A. Sealants and application: SECTION 07920 – JOINT SEALANTS.

##### 1.3 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Manufacturers literature, data, and installation instructions for types of firestopping and smoke stopping used.
- C. List of FM, UL, or WH classification number of systems installed.
- D. Certified laboratory test reports for ASTM E 814 tests for systems not listed by FM, UL, or WH proposed for use.
- E. Warranty: Submit warranty as noted under item entitled “WARRANTY” herein below.

##### 1.4 DELIVERY AND STORAGE

- A. Deliver materials in their original unopened containers with manufacturer’s name and product identification.
- B. Store in a location providing protection from damage and exposure to the elements.

##### 1.5 WARRANTY

- A. The Contractor warrants that the firestopping work performed under this contract conforms to the contract requirements and is free of any defects in material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier as stated in the Article “Warranty of Construction”, FAR clause 52.246-21, except the manufacturer’s warranty period is to be extended to five years.
- B. The Surety shall not be liable beyond two (2) years from the project acceptance date.

##### 1.6 QUALITY ASSURANCE

- A. FM, UL, or WH or other approved laboratory tested products will be acceptable.

##### 1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM E 84 Surface Burning Characteristics of Building Materials.
  - 2. ASTM E 814 Fire Tests of Through-Penetration Fire Stops.
- C. Factory Mutual Engineering and Research Corporation (FM):  
Annual Issue Approval Guide Building Materials.
- D. Underwriters Laboratories, Inc. (UL):
  - 1. Annual Issue Building Materials Directory.
  - 2. Annual Issue Fire Resistance Directory 1479 Fire Tests of Through-Penetration Firestops.
- E. Warnock Hersey (WH):
  - 1. Annual Issue Certification Listings.

## PART 2 - PRODUCTS

### 2.1 FIRESTOP SYSTEMS

- A. Use either factory built (Firestop Devices) or field erected (through-Penetration Firestop Systems) to form a specific building system maintaining required integrity of the fire barrier and stop the passage of gases or smoke.
- B. Through-penetration firestop systems and firestop devices tested in accordance with ASTM E 814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed. "T" ratings are not required for penetrations smaller than or equal to 4-inch nominal pipe or 16 square inch in overall cross sectional area.
- C. Products requiring heat activation to seal an opening by its intumescence shall exhibit a demonstrated ability to function as designed to maintain the fire barrier.
- D. Firestop sealants used for firestopping or smoke sealing shall have following properties:
  - 1. Contain no flammable or toxic solvents.
  - 2. Have no dangerous or flammable out gassing during the drying or curing of products.
  - 3. Water-resistant after drying or curing and unaffected by high humidity, condensation or transient water exposure.
  - 4. When used in exposed areas, shall be capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.
- E. Firestopping system or devices used for penetrations by glass pipe, plastic pipe or conduits, unenclosed cables, or other non-metallic materials shall have following properties:
  - 1. Classified for use with the particular type of penetrating material used.

2. Penetrations containing loose electrical cables, computer data cables, and communications cables protected using firestopping systems that allow unrestricted cable changes without damage to the seal.
  3. Intumescent products which would expand to seal the opening and act as fire, smoke, toxic fumes, and, water sealant.
- F. Maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E 84.
  - G. FM, UL, or WH rated or tested by an approved laboratory in accordance with ASTM E 814.
  - H. Materials to be asbestos free.
- 2.2 SMOKE STOPPING IN SMOKE PARTITIONS
- A. Use silicone sealant in smoke partitions as specified in SECTION 07920 – JOINT SEALANTS.
  - B. Use mineral fiber filler and bond breaker behind sealant.
  - C. Sealants shall have a maximum flame spread of 25 and smoke developed of 50 when tested in accordance with ASTM E 84.
  - D. When used in exposed areas capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Submit product data and installation instructions, as required by article, submittals, after an onsite examination of areas to receive firestopping.

#### 3.2 PREPARATION

- A. Remove dirt, grease, oil, loose materials, or other substances that prevent adherence and bonding or application of the firestopping or smoke stopping materials.
- B. Remove insulation on insulated pipe for a distance of 6-inches on either side of the fire rated assembly prior to applying the firestopping materials unless the firestopping materials are tested and approved for use on insulated pipes.

#### 3.3 INSTALLATION

- A. Do not begin work until the specified material data and installation instructions of the proposed firestopping systems have been submitted and approved.
- B. Install firestopping systems with smoke stopping in accordance with FM, UL, WH, or other approved system details and installation instructions.
- C. Install smoke stopping seals in smoke partitions.

3.4 CLEAN-UP AND ACCEPTANCE OF WORK

- A. As work on each floor is completed, remove materials, litter, and debris.
- B. Do not move materials and equipment to the next-scheduled work area until completed work is inspected and accepted by the Contracting Officer.
- C. Clean up spills of liquid type materials.

END OF SECTION

## SECTION 07920

### JOINT SEALANTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide all sealants to completely close all joints indicated on the drawings or specified to be sealed to a watertight condition, including the following:
- B. Related Work Specified Elsewhere:
  - 1. SECTION 09901 –PAINTING: Coordinate work.

##### 1.2 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Product Data: Submit copies of manufacturer's product data and specifications for type of sealant required for approval.
- C. Material Safety Data Sheets (MSDS): Submit MSDS for each sealant product.
- D. Color Samples: Submit three (3) sets each of color finish samples of each sealant for approval.
- E. Guaranty: Submit guaranty as noted under item entitled "GUARANTY" herein below.

##### 1.3 GUARANTY

- A. The Contractor shall submit a written guaranty on the sealant for a two (2) year period after the project acceptance date. The guaranty shall provide for the repair of all leaks as well as repair and replacement of sealant and damage to the building and/or its finishes at no cost to the State.
- B. The Surety shall not be liable beyond two (2) years from the project acceptance date.

##### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Use manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

##### 1.5 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

## 1.6 PRODUCT HANDLING

- A. Delivery: Deliver sealants to the jobsite in sealed containers labeled to show the designated name, formula, or specification number, lot number, color, date of manufacture, shelf life, curing time, manufacturer's directions, and name of manufacturer.
- B. Storage: Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high temperatures, contaminants, or other causes.
- C. All sealant materials shall be installed prior to expiration of shelf life.

## 1.7 PROJECT CONDITIONS

- A. Inspection: Examine joint surfaces and backing, and their anchorage to the structure, and conditions, under which joint sealer work is to be performed, and notify Contractor in writing of conditions detrimental to proper completion of the work and performance of sealers. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer. On surfaces to be painted, install sealants prior to painting. Coordinate with SECTION 09901 - PAINTING.
- B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Sealant Backer Rod: Compressible rod stock of polyethylene foam, polyethylene-jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer to control the joint depth for sealant placement, to break bond of sealant at bottom of joint, to form optimum shape of sealant bead on back side, and to provide a highly compressible backer which will minimize the possibility of sealant extrusion when joint is compressed. Do not use oakum or other types of absorptive materials as backstops.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure.
- C. Primer for Sealants: Non-staining, as recommended by the sealant manufacturer.
- D. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.
- E. Sealants:
  - 1. Sealant No. 1, At Exterior Vertical and Overhead Joints: One-part polyurethane-based sealant, conforming to ASTM C 920, Type S, Grade NS, Use NT, Class 25 as applicable. Provide one of the following, or approved equal products of other manufacturers:
    - a. Cherm-Calk 900; Bostik Inc.

- b. Dymonic; Tremco.
  - c. Dynatrol I; Pecora Corp.
  - d. Sikaflex 1a; Sika Corp.
  - e. NP-1; Sonneborn
2. Sealant No. 2, At Interior Vertical and Overhead Joints: Non-Elastomeric Sealant; acrylic-emulsion type, conforming to ASTM C 834. Provide one of the following, or approved equal products of other manufacturers:
    - a. AC-20 Acrylic Latex; Pecora Corp.
    - b. Tremflex 834; Tremco, Inc.
    - c. Chem-Calk 600; Bostik Construction Products Div.
    - d. Sonolac; Sonneborn.
  3. Sealant No. 3, At All Horizontal Traffic-Bearing Joints: Two-part polyurethane-based sealant, conforming to ASTM C 920, Type M, Grade P, Use T, Class 25. Provide one of the following, or approved equal products of other manufacturers:
    - a. Chem-Calk 550; Bostik Inc.
    - b. Urexpam NR-200; Pecora Corp.
    - c. SL 2; Sonneborn
  4. Sealant No. 4, Silicone Sealant: Mildew-resistant, conforming to ASTM C 920; Type S; Grade NS; Class 25; Use NT, formulated with fungicide; intended for sealing interior joints between plumbing fixtures and wall surfaces. Provide one of the following or approved equal products of other manufacturers:
    - a. Dow Corning 786 Mildew Resistant; Dow Corning Corp.
    - b. SCS 1702 Sanitary; General Electric Co.
    - c. 898 Silicone Sanitary Sealant; Pecora Corp.
    - d. Trensil 600 White; Tremco.
- F. Bedding Compound: For installation of thresholds and similar items indicated to be bedded in sealant, use a preformed butyl-polyisobutylene sealant tape. Size of tape as required for the specific application. Provide one of the following, or approved equal:
1. Extru-Seal; Pecora Corp.
  2. 440 Tape; Tremco, Inc.
  3. Chem-Tape 40; Bostik Construction Products Div.

## PART 3 - EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

- A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

### 3.2 EXAMINATION

- A. Examine joints indicated to receive joint sealers, with Installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

### 3.3 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:
  - 1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; oil; grease; waterproofing; water repellants; water; and surface dirt.
  - 2. Clean concrete, masonry, and similar 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 sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
  - 3. Remove laitance and form release agents from concrete.
  - 4. Steel Surfaces in Contact with Sealant: Scrape and wirebrush to remove loose mill scale. Remove dirt, oil, or grease by solvent cleaning, and wipe surfaces with clean cloths.
  - 5. Clean metal, glass, glazed surfaces of hard tile; and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which 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.

### 3.4 INSTALLATION OF JOINT SEALERS

- A. General: Comply with joint sealant manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply. Do not apply sealants on wet surfaces or when the surface temperature exceeds 130 degrees F.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions.
- C. Latex Sealant Installation Standard: Comply with requirements of ASTM C 1193 for use of latex sealants.
- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
  - 1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
    - a. Do not leave gaps between ends of joint fillers.
    - b. Do not stretch, twist, puncture, or tear joint fillers.
    - c. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.
  - 2. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.
  - 3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.
- E. Primer: Immediately prior to application of the sealant, clean out all loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete, masonry units, wood, and other porous surfaces in accordance with compound manufacturer's instructions. Do not apply primer to exposed finish surfaces.
- F. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.
- G. Tooling of Non-sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
  - 1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
  - 2. Provide flush joint configuration per Figure 5B in ASTM C 1193, where indicated.

### 3.5 JOINT SEALANT SCHEDULE

- A. Sealant and Location: Install sealants indicated in joints fitting descriptions and locations as well as in locations where sealant is typically applied and as shown on the drawings, including but limited to, the following locations.
- B. Sealant No. 1:
  - 1. Exterior joints and recesses formed where frames of windows and doors adjoin masonry, concrete, or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.
  - 2. Metal-to-metal joints where sealant is required, indicated, or specified.
  - 3. Exterior locations, not otherwise indicated or specified.
- C. Sealant No. 2:
  - 1. Small voids between walls or partitions and adjacent casework, shelving, door frames, built-in or surface-mounted equipment and fixtures, and similar items.
  - 2. Perimeter of frames at doors and windows which adjoin exposed interior concrete and masonry surfaces.
  - 3. Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted.
- D. Sealant No. 3:
  - 1. Seats of metal thresholds for exterior doors.
  - 2. Control and expansion joints in floors, slabs, flooring, and walkways.
- E. Sealant No. 4:
  - 1. Joints between plumbing fixtures and adjoining surfaces.
  - 2. Joints occurring where substrates change.

### 3.6 CLEANING

- A. Immediately scrape off fresh sealant compound that has been smeared on masonry or porous surfaces and rub clean with a solvent as recommended by the compound manufacturer. Upon completion of sealant compound application, remove all remaining smears and stains resulting therefrom and leave the work in a clean, uniform, and neat condition.

### 3.7 PROTECTION

- A. Protect areas adjacent to joints from compound smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

- B. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of project acceptance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION

## DIVISION 8 – OPENINGS

### SECTION 08220

#### FIBERGLASS REINFORCED PLASTIC (FRP) DOORS AND FRAMES

##### PART 1 - GENERAL

###### 1.1 SUMMARY

- A. This Section Includes The Following:
  - 1. Fiberglass Reinforced Plastic (FRP) Doors
  - 2. Fiberglass Resin Transfer Molded Door Frames

###### 1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE)
  - ASCE/SEI 7-05 – Minimum Design Loads for Buildings and Other Structures
  
- B. ASTM International (ASTM)
  - ASTM C 177 – Thermal Properties of Materials
  - ASTM D 256 – Izod Pendulum Impact Resistance of Plastic
  - ASTM D 638 – Tensile Strength Properties of Plastic
  - ASTM D 696 – Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C With a Vitreous Silica Dilatometer
  - ASTM D 790 – Flexural Strength Properties of Plastic
  - ASTM D 792 – Density/Specific Gravity of Plastics
  - ASTM D 882 – Tensile Properties of Thin Plastic Sheeting
  - ASTM D 1622 – Density and Specific Gravity
  - ASTM D 1761 – Mechanical Properties of Fasteners
  - ASTM D 1929 – Self Ignition Temperature Properties
  - ASTM D 2583 – Indention Hardness of Plastics
  - ASTM D 2843 – Smoke Density
  - ASTM E 84 – Surface Burning Characteristics of Materials
  - ASTM E 90 – Sound Transmission Loss
  - ASTM E 283 – Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
  - ASTM E 331 – Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
  - ASTM E 413 – Classification for Rating Sound Insulation
  - ASTM E 1332 – Standard Classification for Determination of Outdoor-Indoor Transmission Class
  - ASTM E 1886 – Impact and Cycling, Large Missile Impact
  - ASTM E 1996 – Specifications for Performance of Exterior Doors
  - ASTM E 2235 – Standard Test for Determination of Decay Rates for Use in Sound Insulation Methods

###### 1.3 RELATED SECTIONS

- A. Related Sections Include The Following:
  - 1. SECTION 08710 – FINISH HARDWARE

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Structural - Design doors and frames to withstand the specified design wind load acting normal to the plane of the entrance wall either inward or outward. In accordance with ASCE/SEI 7-05 and ICC IBC.
- B. Air Infiltration - When tested in accordance with ASTM E 283, air infiltration is not to exceed 0.06 cubic feet per minute per square foot of fixed area at a test pressure of 6.24 pounds per square foot 50 mile per hour wind.
- C. Water Penetration - When tested in accordance with ASTM E 331, no water penetration is allowed, at a pressure of 8 pounds per square foot of fixed area.
- D. Provisions for Thermal Movement - Design doors and frames to provide for expansion and contraction of the component parts caused by an ambient temperature range of 0 to 100 degrees F causing buckling, opening of joints, overstressing of fasteners, or other harmful effects.

#### 1.5 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Product Data: Submit manufacturer's product data of all manufactured items. Manufacturer shall provide certificate of compliance with current local and federal regulations as it applies to the manufacturing process.
- C. Manufacturer's Installation Instructions: Submit schedule of doors and frames indicating the specific reference numbers used on the owner's project documents, noting door type, frame type, size, handing and applicable hardware. Details of core and edge construction, including factory construction specifications. Certification of manufacturer's qualifications.
- D. Shop Drawings: Submit shop drawings with door schedule indicating the specific reference numbers as used on owner's drawings, with columns noting door type, frame type, size, handing, and accessories. Drawings shall depict front and rear door elevations showing hardware with bill of material for each door, dimensional location of each hardware item and size of each door, and construction/mounting detail for each frame type.
- E. Samples: Provide one complete manufactured door sample which represents all aspects of the typical manufacturing process, including molded in gelcoat color and face plate construction. One edge should expose the interior of the door depicting the unique u-shaped continuous piece stile and rail, hardware reinforcement and core material.
- F. Operation and Maintenance Manual: Submittal shall include recommended methods and frequency for maintaining optimum condition of fiberglass doors and frames under anticipated traffic and use condition. Include one set of final as built drawings. Include certificate of warranty for door and frame listing specific door registration numbers. Include hardware data sheets and hardware manufacturer's warranties.
- G. Warranty Certification: Submit a signed certificate from the Manufacturer stating that the plans and specifications for the project have been reviewed and fully comply with the

Manufacturer's design standards and meet the requirements for warranty of the specified period.

- H. Warranty: Submit written warranty as specified in paragraph entitled "WARRANTY" hereinbelow.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver each door and frame individually crated for protection from damage, clearly marked with project information, door location, and specific reference number as shown on drawings. Store doors in original containers on platforms under cover in clean, dry ventilated and accessible locations, out of inclement weather. Do not stack containers horizontally. Remove damp or wet packaging immediately and wipe affected surfaces dry. Replace damaged materials with new.

#### 1.7 QUALITY ASSURANCE

- A. Manufacturer: A company specializing in the manufacture of fiberglass reinforced plastic (FRP) doors and frames with a minimum of twenty-five (25) years documented experience and with a record of successful in-house performance for applications required for this project.
- B. Installer: An experienced installer who has completed FRP door and frame installations similar in material, design, and extent to those indicated and with a record of successful in-service performance.
- C. Source Limitations:
  - 1. Obtain FRP doors and frames through one source fabricated from a single manufacturer, including fire-rated fiberglass frames.
  - 2. Hardware and accessories as specified under SECTION 08710 – FINISH HARDWARE, shall be furnished by hardware supplier for installation by FRP door manufacturer.

#### 1.8 WARRANTY

- A. Provide material and workmanship warranties meeting specified requirements. Provide revision or amendment to standard manufacturer warranty as required to comply with the specified requirements. Warrant FRP doors and frames for a period of twenty-five (25) years against failure due to corrosion. Additionally, warrant all FRP doors and frames on materials and workmanship for a period of ten (10) years, including warp, separation or delamination, and expansion of the core.
- B. The Surety shall not be held liable beyond two (2) years from the Project Acceptance Date.

## PART 2 – PRODUCTS

### 2.1 LAMINATE/CORE PROPERTIES

A. The door and frame system shall meet minimum properties as follows:		
Tensile Strength:	ASTM D 882	12,000
psi		
Flexural Strength:	ASTM D 790	30,000
psi		
Impact, Resistance:	ASTM D 256	
Thermal Expansion:	ASTM D 696	.000008
in/in/F		
Fire Resistance:	ASTM E 84	
Class I		
Barcol Hardness:	ASTM D 2583	53
Density/Specific Gravity of Laminate:	ASTM D 792	
Mechanical Fasteners:	ASTM D 1761	1530 lb
Thermal Properties:	ASTM C 177	
Density/Specific Gravity of Core:	ASTM D 1622	
Sound Transmission Loss:	ASTM E 90-04	

### 2.2 STANDARD FRP DOORS AND FRAMES

- A. General FRP Door and Frame - Provide complete swing-type FRP doors with frames of the size, design and location indicated, including but not limited to, framing members, subframes, trim, molding, and accessories. Provide complete door hardware schedule, design and location as specified in specification SECTION 08710 – FINISH HARDWARE. Provide complete door louver schedule, design and location as specified.
- FRP Doors - Provide fiberglass reinforced plastic doors using chemically proven resins resistant to contaminants found in this project's environment. Doors shall flush construction, with no seams or cracks. All doors shall have equal diagonal measurements with a maximum tolerance of +/- 1/32-inch.
    - Door Plates - Door plates shall be 1/8-inch thick, molded in one continuous piece, starting with a 25 mil resin of color specified, followed by a matrix consisting of at least three layers of 1.5 ounce per square foot of fiberglass mat and one layer of 16 ounce per square yard of unidirectional roving, yielding a plate weight 0.97 lb per square foot at a ratio of 30/70 glass to resin.
    - Stiles and Rails - Stiles and rails shall be constructed starting from the outside to the inside, of a 25 mil resin of color specified followed by a matrix of at least three layers of 1.5 ounce per square foot of fiberglass mat. The stile and rail shall be molded in one continuous piece to a u-shaped configuration and to exact dimensions of the door, resulting in no miter joints.
    - Core Material - Core material shall be 2 psf expanded polystyrene foam, completely filling all voids between the door plates.
    - Internal Reinforcement - Internal reinforcement shall be firestop of sufficient amount to adequately support required hardware.
    - Louver openings shall be completely sealed so that the interior of the door is not exposed to the environment. Louvers are to be solid fiberglass “V” Vanes and shall match the color and finish of the door plates.

- f. Finish - Finish of door and frame shall be identical in color and texture. At time of manufacturer, 25 mil of resin shall be integrally molded into both door and frame. Secondary painting to achieve color is not acceptable.
2. Door Frames - Door frames shall be fiberglass and manufactured using the resin transfer method in closed rigid molds to assure uniformity in color and size. The frame shall be of one-piece construction with molded stop, consisting of a minimum two layers of continuous strand fiberglass mat saturated with resin and a minimum 25 mil resin. All frame profiles up to 3/4-inch shall be solid fiberglass. All frame profiles greater than 3/4-inch shall have a core, material of 2 psf polyurethane foam. Metal frames or pultruded fiberglass are not acceptable.
- a. Finish - Finish of frame shall be identical in color and texture to the door. A 25 mil resin shall be integrally molded into the frame at time of manufacture. Secondary painting to achieve color is not acceptable.
  - b. Internal Reinforcement - Internal reinforcement shall be continuous within the door frame to allow for mounting of specified hardware. Material shall be completely non-organic with a minimum hinge screw holding value of 656 lbf.
  - c. Hardware Preparation - Hinge pockets shall be accurately machined to facilitate heavy duty hinges at all hinge location, using spacers when standard weight hinges are used. Due to special nature of the PVC material, all related hardware specified under Section 08710, "Finish Hardware", will be furnished by hardware supplier to the door manufacturer for installation.
  - d. Fasteners - All fasteners shall be of stainless steel or other materials warranted by manufacturer to be non-corrosive and suitable for required application.

### PART 3 – EXECUTION

#### 3.1 EXAMINATION

- A. Verification of Conditions – Inspect all surfaces to verify that they have been correctly prepared to receive doors and frames, and that door openings are of correct size and depth according to approved shop drawings. Notify the General Contractor in writing of conditions detrimental to the proper and timely completion of the work. Commencement of work shall signify acceptance of conditions and subsequent adjustments shall be the responsibility of the door installer.

#### 3.2 INSTALLATION

- A. Plumb, square, level, and align frames and framing members to receive doors. Anchor frames to adjacent construction in accordance with manufacturer's printed instructions. After erection, adjust doors and hardware to operate properly.

#### 3.3 ADJUSTING

- A. Adjust doors in accordance with the door manufacturer's maintenance instructions to swing open and shut without binding and to remain in place at any angle without being moved by gravitational influence.

- B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instruction.

3.4 CLEANING

- A. Upon completion of installation, clean door and frame surfaces in accordance with manufacturer's recommendations. Do not use abrasives, caustic, or acid cleaning agents.

3.5 PROTECTION

- A. Protect doors and frames from damage and from contamination by other materials such as cement mortar. Prior to completion and acceptance of work, restore damaged doors and frames to original condition, or replace with new doors and frames, as directed by the Contracting Officer.

END OF SECTION

## SECTION 08330

### OVERHEAD COILING DOORS

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION OF WORK

- A. Provide all materials, labor, equipment and tools necessary to complete overhead coiling doors as indicated and as specified herein. Provide complete operating overhead electric operated door assembly, including door curtain, guides, counterbalance mechanism, hood, hardware, operator, and installation accessories.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 08710 – DOOR HARDWARE: Padlocks. Master keyed cylinder.

##### 1.2 PERFORMANCE REQUIREMENTS

- A. Wind Loading: Supply doors to withstand uniform pressure (velocity pressure) of 37 lbf/sq. ft., acting inward and outward.
- B. Cycle Life: Design overhead coiling door components and operator to operate for not less than 20,000 cycles.
- C. Operation: Manual. Chain hoist.

##### 1.3 SUBMITTALS

- A. Product Data: Submit manufactures literature including but not limited to profiles, finishes, installation instructions, operating instructions, maintenance information, motor information, etc.
- B. Shop Drawings: Submit shop drawings, including all conditions not detailed in Product Data. Show interface with adjacent work.
- C. Manufacturer Certification: Submit certification that manufacturer is ISO 9001:2000 registered.
- D. Installer Certification: Submit certification that installer is approved by the manufacturer.
- E. Closeout Submittals: Submit Operation and Maintenance Manual, and certificate stating that installed materials comply with this specification.
- F. Samples: Submit samples of each type of exposed finish required for approval.
- G. Warranty: Submit warranty as noted under paragraph entitled "WARRANTY" herein below.

##### 1.4 WARRANTY

The Contractor shall submit written warranty on doors for two (2) years from the project acceptance date against defects in materials and workmanship.

## 1.5 MANUFACTURER'S REPRESENTATIVE

Provide services of overhead coiling door manufacturer's representative knowledgeable with installation and operation of all items furnished for installation.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Curtain:

1. Flat Profile Slats: No. 4, 16 gauge, .050 aluminum
2. Bottom Bar: Two (2) 2-inch x 2-inch x 3/16-inch aluminum angles.
3. Fabrication: Fabricate interlocking sections with high strength malleable steel end locks on alternate slats each secured with two 1/4- inch rivets. Provide windlocks as required to meet specified wind load.
4. Slat Finish: Aluminum Bronze anodized
5. Bottom Bar Finish: Same material and finish as slat finish above.

#### B. Guides: Fabricate with aluminum angles. Bolted together with 3/8" fasteners to form a channel for the curtain to travel. The wall angle portion shall be continuous and fastened to the surrounding structure with either minimum 1/2" fasteners or welds, both on 36" centers. Provide windlock bars of same material when wind locks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bell mouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar.

1. Finish: Same material and finish as slat finish above.

#### C. Counterbalance Shaft Assembly:

1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width.
2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.

#### D. Brackets: Fabricate from minimum 1/4-inch steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.

1. Finish: Same material and finish as slat finish above.

#### E. Hood: 0.040 inch aluminum with reinforced top and bottom edges. Provide minimum 1/4- inch steel intermediate support brackets as required to prevent excessive sag.

1. Finish: Same material and finish as slat finish above.

- F. Weatherstripping:
  - 1. Bottom Bar: Replaceable, bulb-style, compressible EDPM gasket extending full width of door bottom bar into guides.
  - 2. Guides: Vinyl strip sealing against fascia side of curtain.
  - 3. Neoprene/rayon baffle to impede air flow above coil.
  - 4. Lintel Seal: Nylon brush seal fitted at door header to impede air flow.

## 2.2 ACCESSORIES

- A. Padlockable slide bolt on interior side of bottom bar at each jamb extending into slots in guides. Provide interlock switches on motor operated units.

## 2.3 OPERATION

- A. Manual Chain Hoist: Provide chain hoist operator with endless steel chain, chain pocket wheel and guard, geared reduction unit, and chain keeper secured to guide.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Commencement of work by installer is acceptance of substrate.

## 3.2 INSTALLATION

- A. General: Install door with necessary hardware, anchors, inserts, hangers and supports.
- B. Follow manufacturer's installation instructions.

## 3.3 ADJUSTING

Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist. or distortion.

## 3.4 CLEANING

- A. Clean surfaces soiled by work as recommended by manufacturer.
- B. Remove surplus materials and debris from the site.

## 3.5 DEMONSTRATION

- A. Demonstrate proper operation to Owner's Representative.
- B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

## SECTION 08625

### TUBULAR DAYLIGHTING DEVICE

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.
- B. Accessories.

##### 1.2 RELATED SECTIONS

- A. Section 07411 – Preformed Metal Roofing.
- B. Section 07620 – Sheet Metal Flashing and Trim: Metal flashings.

##### 1.3 REFERENCES

- A. ASTM International (ASTM)
  - 1. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 2. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 3. ASTM A 463 Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process.
  - 4. ASTM A 653 Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process.
  - 5. ASTM A 792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
  - 6. ASTM E 283 Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 7. ASTM E 308 Standard Practice for Computing the Colors of Objects by Using the CIE System.
  - 8. ASTM E 330 Structural Performance of Exterior Windows, Curtain Walls and Doors.
  - 9. ASTM E 547 Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.
  - 10. ASTM E 1886 Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.

11. ASTM E 1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricane
12. ASTM D 635 Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.
13. ASTM D 1929 Test Method for Ignition Properties of Plastics.
14. UL 181 – Factory Made Air Ducts and Air Connectors
15. ICC AC-16 – Acceptance Criteria for Plastic Skylights.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
  1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
  2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
  3. Uniform Load Test:
    - a. No breakage, permanent damage to fasteners, hardware parts, or damage to make system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 60 psf (2.87 kPa) in accordance with ICC AC-16 Section A, or Negative Load of 70 psf (3.35 kPa) if tested per ICC AC-16 Section B.
    - b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
  4. Hurricane Resistance:
    - a. Meets ASTM E 1886 and ASTM E1996 for missile and cyclic pressure differential testing.
  5. Fire Testing:
    - a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
    - b. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
    - c. Smoke Density - Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
    - d. Rate of Burn and/or Extent - Maximum Burning Rate: 2.5-inches/min Classification CC-2 per ASTM D 635.

- e. Rate of Burn and/or Extent - Maximum Burn Extent: 1-inch Classification CC-1 per ASTM D 635.

#### 1.5 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.
- D. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum fifteen (15) years.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

#### 1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### 1.9 WARRANTY

- A. Daylighting Device: Manufacturer's standard warranty for ten (10) years.
- B. The Surety shall not be liable beyond two (2) years from the Project Acceptance Date.

### PART 2 – PRODUCTS

#### 2.1 TUBULAR DAYLIGHTING DEVICES

- A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
- B. 10-inch & 14-inch Daylighting System:
  - 1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.

- a. Outer Dome Glazing: Type DA, 0.125 inch minimum thickness impact resistant injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
  - b. Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
  - c. Shock Inner Dome Glazing: Type DI, 0.115 inch minimum thickness classified as CC1 material. High impact injection molded acrylic required for high velocity wind zones.
  - d. Light Tracker Reflector: Aluminum sheet, thickness 0.015 inch with Spectralight Infinity. Positioned in dome to capture low angle sunlight.
- C. Flashing Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
- 1. Base Material: Sheet steel, corrosion resistant, meeting ASTM A 653 or ASTM A 463 or ASTM A792, 0.028 inch plus or minus .006 inch thick.
  - 2. Base Flat: Flat Type F4, no pitch 4 inches high.
  - 3. Base Flat: Flat Type F6, no pitch 6 inches high.
  - 4. Base Pitched: Pitched Type FP, 22.5 degrees slope from horizontal, 4 inches high.
  - 5. Flashing Insulator: Type F1. Thermal isolation material for use under flashing.
  - 6. Metal Roof Flashing Kit: Type MR. Includes Butyl tape, flashing screws, speed nuts, corner washers and polyurethane sealant.
  - 7. Dome Edge Protection Band: Type PB, for fire-rated roofs. Aluminized steel. Nominal thickness of 0.028 inches.
- D. Roof Flashing Turret Extensions: Provide manufacturer's standard extensions for applications requiring:
- 1. Type T2: Additional lengths of 2 inches extension.
  - 2. Type T4: Additional lengths of 4 inches extension.
  - 3. Type T12: Additional lengths of 12 inches extension.
  - 4. Type T24: Additional lengths of 24 inches extension.
  - 5. Type T36: Additional lengths of 36 inches extension.
  - 6. Type T48: Additional lengths of 48 inches extension.
- E. Tube Ring: Attached to top of base section; 0.090 inch nominal thickness injection molded high impact acrylic; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.

- F. Reflective Extension Tube: Aluminum sheet, thickness 0.015 inch.
  - 1. Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface visible spectrum greater than 99 percent. Total solar spectrum less than 80.2 percent.
  - 2. Color: a\* and b\* (defined by CIE L\*a\*b\* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
  - 3. Tube Diameter: Approximately 10 inches or 14 inches.
- G. Reflective 30 degree Adjustable tube: Aluminum sheet, thickness .015 inch
  - 1. Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface visible spectrum greater than 99 percent. Total solar spectrum less than 80.2 percent.
- H. Reflective 90 degree Adjustable tube: Aluminum sheet, thickness .018 inch
  - 1. Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface visible spectrum greater than 99 percent. Total solar spectrum less than 80.2 percent.
  - 2. Extension Tube Angle Adapter: Provide manufacturer's standard adaptors for applications requiring:
    - a. Type A1 one 0 to 90 degree extension tube angle adapter.
    - b. Type A2 two 0 to 90 degree extension tube angle adapters.
- I. Ceiling Ring: Injection molded, impact resistant acrylic. Nominal thickness is 0.110 inches.
- J. Dual Glazed Diffuser Assembly:
  - 1. Lower glazing with integral injection molded acrylic Dress Ring classified as CC2 material. Nominal thickness is 0.110 inches:
    - a. Classic Vusion Diffuser: Molded acrylic plastic classified as CC2 material (nominal thickness 0.090 inches) with injection molded acrylic Diffuser Trim Ring. Type L4.
    - b. Classic OptiView (Fresnel Lens) Diffuser: Molded polycarbonate plastic classified as CC1 material, nominal thickness 0.022 inches with injection molded acrylic Diffuser Trim Ring. Type L1.
    - c. Just Frost Decorative Fixture: Full-tempered glass lens (nominal thickness is 0.16 inches), and decorative metal fasteners. Type L9.
    - d. Tier Drop Decorative Fixture: Three layers of full-tempered frosted glass lens (nominal thickness is 0.16 inches). Bottom layer is continuous with two stepped full-tempered glass rings on top and decorative metal fasteners. Type L10.

- e. OptiView Decorative Fixture: Molded polycarbonate plastic Fresnel Lens classified as CC1 material (nominal thickness is 0.022 inches) with full-tempered frosted glass bezel (nominal thickness is 0.16 inches), and decorative metal fasteners. Type L11.
  - 2. Upper glazing: PET GAG plastic with EPDM low density sponge seal to minimize condensation and bug, dirt, and air infiltration per ASTM E283. The nominal thickness is 0.039 inches (0.99 mm).
    - a. Natural Effect Lens: Type LN.
    - b. Softening Effect Lens: Type LS.
- 2.2 ACCESSORIES
- A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
  - B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
  - C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Contracting Officer of unsatisfactory preparation before proceeding.

### 3.2 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.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Contracting Officer and Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

## SECTION 08710

### FINISH HARDWARE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide all finishing hardware required for all doors, complete as specified.
- B. It is the intent of this Specification to cover in general the class and character of all finish hardware required.
- C. The hardware list specified has been made for the convenience of the Contractor and covers in general the necessary hardware for doors, etc., but all other doors, etc., shown on the Drawings and not covered by the general characterization shall be fitted with appropriate hardware of the same standards as the hardware described throughout these specifications. Contractor shall furnish hardware schedule as specified.
- D. Suppliers proposing substitutes of equivalent products of other than the manufacturers named shall submit schedules listing the product and manufacturer specified and the product and manufacturer of proposed substitute. This schedule shall be submitted in accordance with the GENERAL CONDITIONS.

##### 1.2 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Schedule: Furnish copies of the schedule of hardware in compliance with Specifications and Drawings. Schedule format shall be vertical type as listed in DHI document "Sequence and Format for the Hardware Schedule". List each opening hardware to be applied. State materials finish, and manufacturer's number for each item. Required types are listed. Include the following information:
  - 1. Identification number, location, hand, fire rating and material of each door and frame.
  - 2. Type, style, function, size, quantity and finish of each door hardware item.
  - 3. Complete designations of every item required for each door opening including name and manufacturer.
  - 4. Explanation of abbreviations, symbols, and codes contained in the schedule.
  - 5. Door and frame sizes and materials
- C. Manufacturer's Data: Submit manufacturer's descriptive literature along with schedule.
- D. Keying Schedule: New door shall be masterkeyed to building's existing key system.

Provide construction masterkey and permanent masterkey.

- E. Tools and Maintenance Instructions: Furnish a complete set of special wrenches, tools, maintenance instructions applicable to each different or special hardware component, but not less than the number supplied with the finish hardware materials.
- F. Certification: After completion and inspection by hardware supplier or manufacturer's representative of all construction work, certify on an approved form, that all items of finish hardware have been adjusted and are working properly and factory assembly of all locks and cylinders as well as master keying of all locks and cylinders.
- G. Warranty: Submit written warranty as specified in paragraph entitled "WARRANTY" herein below.

### 1.3 QUALITY ASSURANCE

- A. Perform work in accordance with current IBC, and NFPA 101 for exit doors as applicable.
- B. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience. Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.
- C. Hardware Supplier: Company specializing in architectural finish hardware. Lock system shall be accepted only if they have local stock warehouse by either the project hardware supplier or other local representation to ensure availability of replacement parts.
- D. Hardware Supplier Personnel: Employ an experienced Architectural Hardware Consultant (AHC), or Contracting Officer accepted equal, who is available at reasonable times during the course of the Work, to the Contracting Officer and Contractor for consultation about Project's hardware requirements, to verify specified hardware with door function and hardware finishes, and to establish keying system.
- E. Door Openings: Where new hardware components are scheduled for application to existing construction field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.
- F. Manufacturer's Warranty Response Time: Complete repair or replacement within 36 hours after being notified by the user. If repair at the site is not possible because the exact make and model replacement is not available within the specified response time, a temporary substitute of equal quality shall be provided within the specified response time. If a temporary replacement is provided, the permanent repair/replacement response time will be extended to seven (7) calendar days.

#### 1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for accessibility.
- B. Definition: "Door Hardware" includes items known commercially as finish hardware which are required for swing doors, except special types of unique and non-matching hardware specified in same Section as door and door frame.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Delivery, store, protect and handle products to prevent damage of any kind and to maintain security to site.
- B. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- C. Deliver individually packaged hardware items at proper times to proper locations (shop or project site) for installation.
- D. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.
- E. Deliver permanent keys as directed by Contracting Officer.
- F. Provide secure lock-up for hardware delivered to project but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the Work will not be delayed by hardware losses, both before and after installation.

#### 1.6 WARRANTY

- A. Provide one-year warranty for all Contractor furnished and installed materials. Locks shall have a minimum five (5) year manufacturer's warranty.
- B. Door closers shall have a minimum ten (10) year manufacturer's warranty. Exterior door closers shall have warranty against failure due to high wind conditions (50 mph or less).
- C. Panic exit devices shall have a minimum five (5) year manufacturer's warranty.
- D. The Surety shall not be liable for manufacturer's warranty beyond two (2) year of the project acceptance date.
- E. Procedure for providing manufacturer warranty is described in General Conditions, article 7.31. Contractor shall complete the manufacturer's forms in the name of the Department and submit such forms to the manufacturer within such time as required to validate the warranty/guaranty and submit the forms to the Contracting Officer.

## 1.7 PROJECT RECORD DOCUMENTS

- A. Record actual locations of installed cylinders and their master key code.

## 1.8 OPERATION AND MAINTENANCE DATA

- A. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- B. The manufacturer's representative shall provide instructions to the User's staff on the hardware's maintenance procedures (type of lubricant needed and frequency of maintenance).

## 1.9 MAINTENANCE MATERIALS

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in HARDWARE GROUPS at end of this Section. Products are identified by using proprietary catalog numbers, and are used to establish quality and function of products desired.
- B. Product numbers indicated in the HARDWARE GROUPS are those of the manufacturers listed and are used to establish the quality of products intended.
- C. Products listed hereinafter are pre-approved as equals to those products listed in the HARDWARE GROUPS.

### 2.2 MATERIALS AND FABRICATION

- A. Hand of Door: Drawings show direction of swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of indicated door.
- B. Base Metals: Produce hardware units of basic metal and forming method specified, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated.

- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated. Fasteners exposed to the weather shall be non-ferrous metal or stainless steel.
- D. Furnish appropriate screws for installation, with each hardware item. Provide Phillips flat head screws except as otherwise indicated. Finish exposed screws to match hardware finish. If exposed in surfaces of other work, to match finish of such other work as closely as possible, including prepared-for-paint finish in surfaces to receive painted finish.
- E. Provide concealed fasteners for hardware units which are exposed when door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the Work. In such cases, provide sleeves for each through bolt or use sex screw fasteners.
- F. Expansion shields in concrete or masonry shall fill the depth and diameter of drilled holes.
- G. Bring to the attention of the Contracting Officer any discrepancy between the Hardware Groups and door schedule prior to ordering.

### 2.3 HINGES

- A. General: Hinges shall conform to ANSI/BHMA A156.1, Grade 1 as a certified product by BHMA and the requirements of this specification.
  - 1. The following hinges will be considered equal subject to project conditions:
    - a. Hager:
      - Type 1: BB1279
      - Type 2: BB1191
      - Type 3: BB1168
      - Type 4: BB1199
    - b. McKinney:
      - Type 1: TA2714
      - Type 2: TA2314
      - Type 3: T4A3786
      - Type 4: T4A3386
    - c. Stanley:
      - Type 1: FBB179
      - Type 2: FBB191
      - Type 3: FBB168
      - Type 4: FBB199
  - 2. Hinge Application Requirements:
    - a. Exterior Outswing Doors: Type 4 x NRP.

- b. Exterior Inswing Doors and Vestibule Doors: Type 3 or 4.
  - c. Interior Doors With Closers: Type 1 or 3.
  - d. Interior Doors Over 36 Inches Wide. Type 4.
  - e. Interior Doors 36 Inches or Less Without Closer: Type 1.
- B. Templates: Except for hinges to be installed entirely (both leaves) into wood doors and frames, provide only template producing units.
- C. Screws: Furnish Phillips flat head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges.
- D. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
- 1. Nonferrous Hinges: Stainless steel pins.
  - 2. Exterior, Out-swing Doors: Non-removable pins (NRP).
  - 3. Interior Doors: Nonrising pins.
  - 4. Tips: Flat button and matching plug, finished to match leaves.
  - 5. Oil impregnated or ball bearing hinges are acceptable products.
- E. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90-inches or less in height and one additional hinge for each 30-inches of additional height.
- F. Size of hinges shall be as follows:

<u>Door Thickness/Width</u>	<u>Hinge Height</u>	<u>Hinge Width</u>
1-3/4 inches to 36-inches	4-1/2-inches	4-1/2 inches extra heavy ball bearing
1-3/4 inches over 36-inches	5-inches	4-1/2 inches extra heavy ball bearing
1-3/4 inches over 48-inches	5-inches	4-1/2 inches extra heavy ball bearing

Note: Hinge width shall be of sufficient size to clear frame and trim when door swings 180 degrees.

## 2.4 LOCK CYLINDERS AND KEYING

- A. Existing Park Facilities' key system is Schlage. All locks shall be an extension of

existing key system. All work, whether new or modification to existing to remain, shall be in compliance with requirements of this Section. Cylinders and cores shall have 6 pin tumblers unless scheduled otherwise. The contractor has the option of replacing the existing lock cylinders, at not additional cost to the State, if needed to create a new master keying system.

- B. Provide the number of individual keys equal to not less than 4 times the number of cylinders provided. The number of keys cut to each key cut shall be as directed by the Contracting Officer. All remaining keys shall be blanks. All locks shall be master keyed and Grandmaster keyed to a single lock system. During period of construction, all locks shall be operated by a special construction master key. Regular day and master keys are to be retained by the Contractor so they cannot be obtained or duplicated by unauthorized persons. All keys shall be stamped "DO NOT DUPLICATE" at the point of manufacture. The special construction master key shall become inoperative when regular keys are turned over to the Contracting Officer. Proper certification of factory assembly of all locks and cylinders and master keying of all locks and cylinders shall be furnished by the Contractor prior to final acceptance of this portion of the work. Certificate shall then be given to the Contracting Officer. Provide 20 construction master keys, 6 grand master keys, and 6 master keys per set.
- C. Removable Core Locks: This project shall require that all locks be provided with removable core locks and construction removable cores. Provide 4 control keys for removable cores.
- D. Upon acceptance of the project, the Contractor shall arrange for temporary keys, obtained from custodian if further access is required.

## 2.5 LOCKS, LATCHES AND BOLTS

- A. General: Mortise locks and latches shall conform to ANSI/BHMA A156.13, Series 1000, Grade 1 unless Grade 2 is listed; bored locks and latches shall conform to ANSI/BHMA A156.2, Series 4000, Grade 1 unless Grade 2 is listed; auxiliary locks shall conform to ANSI/BHMA A156.5; Grade 1; bolts shall conform to ANSI/BHMA A156.16, Grade 1; ADAAG and the requirements of this specification.
  - 1. The following mortise locksets and deadbolts will be considered equal:
    - a. Best 38H series, 40H Series.
    - b. Sargent 4800 series, 8200 series.
    - c. Schlage L400 series, L9000 series.
  - 2. The following cylindrical locksets and deadbolts will be considered equal:
    - a. Best 93K series, 83T Series.
    - b. Sargent 10 series, 480 series.
    - c. Sargent 11 series, 480 series.
    - d. Schlage "ND" series, B600 series.
- B. Mortise locksets shall be manufactured in a single sized case formed from 12 gauge minimum steel. The case shall be closed on all sides and back. The lockset shall have a field-adjustable, beveled armored front, with a 0.1 25-inch minimum thickness.

- C. Mortise locksets shall have freewheeling or breakaway vandal resistant design outside levers on all exterior doors. The freewheeling lever design shall allow the lever to swing freely up to 70 degrees, when the door is locked.
- D. Strikes: Provide manufacturer's standard wrought box strike for each latch of lock bolt, with lip extended to protect frame, finish matching hardware set. Provide dustproof recessed floor strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolts.
- E. Lock Throw:
  - 1. Provide 3/4-inch minimum throw of latch and one-inch minimum for deadbolt.
  - 2. Flush Bolt Heads: Minimum of 1/2-inch diameter rods of brass, bronze or stainless steel, with minimum 12-inches long rod for doors up to 7-feet in height; minimum 42-inches long rod for doors up to 9-feet 6inches in height.
- F. Provide locksets, latches, and cylinders equal in all respects to those specified in the Hardware Groups.

## 2.6 PANIC EXIT DEVICES

- A. General: Panic exit devices shall conform to ANSI/BHMA A156.3, Grade 1 and the requirements of this section. Exit device vertical rods shall be one piece construction. No splicing will be allowed. Provide recessed floor strikes.
  - 1. The following panic hardware will be considered equal:
    - a. Corbin Russwin ED5000, ED4000 series.
    - b. Monarch 18,17 series.
    - c. Sargent 80 series.
    - d. Von Duprin 98, 35 Series.
    - e. Yale 7000 series.
- B. All exit devices shall be heavy duty push rail and cast chassis construction.
- C. Exit devices shall have freewheeling or breakaway vandal resistant design outside levers on all exterior doors. The freewheeling lever design shall allow the lever to swing freely up to 70 degrees when the door is locked.

## 2.7 CLOSERS AND DOOR CONTROL DEVICES

- A. General: Closers shall conform to ANSI/BHMA A156.4, Series C02000, Grade 1, with features necessary for the particular application, UL10C listed for fire rated doors, ADAAG, and the requirements of this specification.
  - 1. The following closers will be considered equal for heavy use on exterior doors:
    - a. Corbin Russwin DC6000 series.
    - b. Doromatic SC71 series.
    - c. LCN 4041 Series, 4011/4111 Series.
    - d. Norton 7500 series.
    - e. Sargent 351 Series, 281 Series.

- B. Size of Units: Provide non-sized closers, adjustable to meet maximum opening force requirements of ADA. Comply with manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather, and anticipated frequency of use. Where parallel arm closers are installed, provide closer unit one size larger than recommended for use with standard arms.
- C. Closers shall have adjustment operating valves for closing speed, latching speed, and backcheck control as a standard feature.
- D. Provide parallel arm or regular arm closer as required to mount closer on door face least exposed to public traffic.
- E. Provide drop plates, brackets, or adapters for arms as required to suit details or conditions.
- F. Closer covers shall be rectangular, full cover type, high impact non-corrosive, and flame retardant.
- G. Closer shall not require removal for adjustments to be made.
- H. Provide hold-open arms where indicated.

## 2.8 FLAT GOODS

- A. General: Flat goods shall conform to ANSI/BHMA A156.6 and the types listed in the HARDWARE GROUPS.
  - 1. The products of the following manufacturers will be considered equal subject to project conditions:
    - a. Baldwin Hardware Corporation
    - b. Burns Manufacturing Incorporated
    - c. Hager Companies
    - d. Ives Hardware
    - e. Rockwood Manufacturing Company
    - f. Trimco
- B. Door plates for single doors shall be 2-inches less than door width. Door plates for double doors shall be 1-inch less than door width. Height of plate shall be as listed but 1-inch less than bottom rail for panel doors.

## 2.9 STOPS AND HOLDERS

- A. General: Stops and holders shall conform to ANSI/BHMA A156.16 and the types listed in the HARDWARE GROUPS.

1. The products of the following manufacturers will be considered equal subject to project conditions:
  - a. Architectural Builders Hardware MFG., Inc.
  - b. Baldwin Hardware Corporation
  - c. Burns Manufacturing Incorporated
  - d. Hager Companies
  - e. Ives Hardware
  - f. Trimco

#### 2.10 THRESHOLDS

- A. General: Thresholds shall conform to ANSI/BHMA A156.21 and ADAAG. Provide size, thickness, and profile as listed in the HARDWARE GROUPS.

1. The products of the following manufacturers will be considered equal subject to project conditions:
  - a. Hager Companies
  - b. National Guard Products
  - c. Pemko Manufacturing Co.
  - d. Reese Enterprises
  - e. Zero International

#### 2.11 WEATHERSTRIPPING AND GASKETING

- A. General: Weatherstripping shall conform to ANSI A156.22 and the types listed in the HARDWARE GROUPS.

1. The products of the following weatherstripping and gasketing manufacturers will be considered equal subject to project conditions:
  - a. Hager Companies
  - b. National Guard Products
  - c. Pemko Manufacturing Co.
  - d. Reese Enterprises
  - e. Zero International

#### 2.11 FINISHES

- A. Finishes: Identified in schedule at end of Section.

1. Designations used are those listed in ANSI/BHMA A156.18 "Materials and Finishes", including coordination with traditional U.S. finishes shown by certain manufacturers for their products.

2. If no BHMA finish is established, match specified product.

- B. Provide matching finishes for hardware units at each door or opening to greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where base metal or metal forming process is different for individual units of hardware exposed at same door or opening.

- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for applicable units of hardware by referenced standards.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Pre-Installation Meeting: Before start of work under this contract, the Contractor, hardware installer, hardware manufacturer's representative or supplier, the Contracting Officer, and a user representative shall meet to review the keying system, hardware installation instructions, and installation conditions.
- B. Verify that doors and frames are ready to receive Work and dimensions are as indicated.

### 3.2 INSTALLATION

- A. Install each hardware item in compliance with manufacturer's instructions and recommendations.
- B. Mount hardware units at height indicated in the Door and Hardware Institute's Recommended Locations for Builders Hardware for Standard Steel Doors and Frames, except:
  - 1. As otherwise indicated or as required to comply with governing regulations.
  - 2. Mount deadbolt (if any) centerline not more than 5-inches above latchset handle centerline.
- C. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work. Do not install surface mounted items until finishes have been completed on the substrate.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set metal thresholds for exterior doors in full bed of butyl rubber, polyisobutylene mastic sealant, or preformed butyl-polyisobutylene sealant tape as specified under SECTION 07920 - JOINT SEALANTS.
- G. Fit face of all mortise parts snug and flush.
- H. Operating parts shall move freely and smoothly without binding, sticking or excessive clearance.

- I. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- J. Install with manufacturer's fasteners conforming to requirements of this section or those required for substrate. Expansion shields securing hardware such as door stops/holders to concrete or solid grouted masonry substrates shall completely fill the depth and diameter of the drilled holes. Shimming of the shields or using of plastic shields is not acceptable.
- K. Protect hardware from damage or marring of finish during construction. Use strippable coatings, removable tapes or other approved means.
- L. Ensure that hardware displays no evidence of finish paint after building cleanup with exception of prime coated hardware installed for finish painting. The Contractor may achieve this by sequencing installation, removing after fittings and reinstalling after painting is completed, providing protection, cleaning original hardware finish, or other approved means.
- M. Latch and Bolt: Install latch and bolt to automatically engage in keeper, whether activated by closer or manual push. In no case shall additional manual pressure be required to engage latch or bolt in keeper.
- N. Closers:
  - 1. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
  - 2. Carefully adjust closers to operate noiselessly and evenly.
  - 3. Have manufacturer's representative regulate closers prior to Contracting Officer's acceptance of building.

### 3.3 FIELD QUALITY CONTROL

- A. If requested by the Contracting Officer, the Certified Architectural Hardware Consultant from door hardware supplier or manufacturer's representative shall inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified at no additional cost to the State.

### 3.4 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace items which cannot be adjusted to operate freely and smoothly as intended for application made.
- B. Clean adjacent surface soiled by hardware installation.

C. Final Adjustment:

1. Clean operating items as necessary to restore proper function and finish of hardware and doors.
2. Adjust door control devices to compensate for final operation of ventilating equipment.
3. Lubricate bearings surface of moving parts and adjust latching and holding devices for proper function.
4. Test keys in every lock for proper operation and conformance with keying system.

3.5 HARDWARE GROUPS

MANUFACTURER LIST

CATEGORY	VENDOR NAME	MFG
Door Holder	By Island Pacific Dist., Inc.	ISL
Hinge	By McKinney Products Company	Mck
Astragal	By Pemko	PEM
Door Bottom	By Pemko	PEM
Threshold	By Pemko	PEM
Door Closer	By Sargent Manufacturing Company	SAR
Mortise Lock	By Sargent Manufacturing Company	SAR
D.P. Strike	By Trimco	TRI
Flush Bolt	By Trimco	TRI
Kickplate	By Trimco	TRI
Wall Stop	By Trimco	TRI

HW GROUP - 001

6.0 EA	Hinge	TA2314 4.5 X 4.5 US26D	MCK
1.0 EA	Mortise Lock	21-8224 ETL US32D (F21)	SAR
2.0 EA	Flush Bolt	3917 12 626	TRI
2.0 EA	D.P. Strike	3910N 626	TRI
2.0 EA	Door Closer	351 CPSH EN	SAR
2.0 EA	Door Holder	HBN-SS516-6PE US32D HOOK&EYE	ISL
2.0 EA	Kickplate	K0050 10" X 34" 630	TRI
2.0 EA	Wall Stop (Convex)	1270WX 626	TRI
1.0 EA	Astragal	29310 CV	PEM
2.0 EA	Door Bottom	18041CNB	PEM
1.0 EA	Threshold	154A	PEM

		HW GROUP - 002	
1.0 EA	Padlock	11-63-858C-2 HS	SAR
		(Remaining Hardware By Door Manufacturer)	

		HW GROUP - 003	
3.0 EA	Hinge	TA2314 4.5 X 4.5 US26D	MCK
1.0 EA	Mortise Lock	21-28-8224 ETL US32D (F21)	SAR
1.0 EA	Closer	351 O EN	SAR
1.0 EA	Kickplate	K0050 10" X 34" 630	TRI
1.0 EA	Door Bottom	216AV 36"	PEM

END OF SECTION

## SECTION 08910

### LOUVERS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide all louvers as indicated on the drawings and as specified herein.
- B. Related Work Specified Elsewhere: SECTION 07920 - JOINT SEALANTS: Field applied sealants.

##### 1.2 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Product Data: Submit data for each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- C. Shop Drawings: Submit drawings for louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
- D. Samples: Submit sample for each type of metal finish required.

##### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum".
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

##### 1.4 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.

##### 1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components. Noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
  - 1. Wind Loads: Tested in accordance with ASTM E 330 to withstand wind velocity of 120 mph, Exposure C, in accordance with current building code.

- B. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, over stressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Air-Performance and Water-Penetration: Provide louvers complying with manufacturer's performance requirements, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

#### 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. 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. Arrow United Industries
  - 2. Construction Specialties, Inc.
  - 3. Industrial Louvers, Inc.

#### 2.2 MATERIALS

- A. Wall Louvers:
  - 1. Product is based on Construction Specialties, Model 4157 to establish the basis of design. Equal products of other manufacturers are acceptable.
  - 2. Material: Horizontal fixed blade louvers of extruded aluminum, ASTM B 221, alloy 6063-T5.
  - 3. Frame and Blade: Frame and blade thickness – minimum 0.081-inch; frame depth – 5-inches.
  - 4. Blade Profile: Louver of storm resistant design.
  - 5. Free Area: Minimum 49.5% free area
  - 6. Fabrication: Louvers shall be mechanically assembled using stainless steel fasteners.
  - 7. Finish: Finish shall be high performance (Kynar 500) two-coat coating system complying with AAMA 2605.2.
  - 8. Color: Color as selected by the Contracting Officer.

9. Insect Screen: Furnish louvers with 18x18 mesh, 0.009-inch diameter stainless steel screen secured within extruded aluminum frame of color to match louver finish.
10. Fasteners: Stainless steel fasteners with exposed surfaces matching louver finish and of size and type as recommended by the louver manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 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.

#### 3.3 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.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. 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.

#### 3.4 ADJUSTING AND CLEANING

- A. Clean exposed surfaces of louvers that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- 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. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating. If results of restoration are unsuccessful, remove damaged units and replace with new units.

END OF SECTION

## DIVISION 9 - FINISHES

### SECTION 09250

#### GYP SUM BOARD

##### PART 1 - GENERAL

###### 1.1 SUMMARY

A. Provide all gypsum board where indicated on the drawings and as specified herein.

B. Related Work Specified Elsewhere:

1. SECTION 09901 – PAINTING: Painting of gypsum board.

###### 1.2 SUBMITTALS

A. Submit in accordance with SECTION 01300 – SUBMITTALS.

B. Product Data: Submit for each type of product specified. Include manufacturer's recommended installation instructions.

C. Shop Drawings: Submit drawings showing locations, fabrication, and installation of control and expansion joints, including plans, elevations, details of components, and attachments to other units of work.

E. Samples:

1. Submit trim accessories full-size samples in 12-inch lengths.

2. Submit gypsum board finish sample for approval.

###### 1.3 QUALITY ASSURANCE

A. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated, including the recommendations of the manufacturer, and GA-214, "Recommended Specification: Levels of Gypsum Board Finish" by the Gypsum Association.

B. Fire Resistance: For walls where indicated or requiring fire resistance-rated gypsum board assemblies, comply with following requirements:

1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

C. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

#### 1.4 PRODUCT HANDLING

- A. Deliver gypsum board materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry well ventilated space, protected from the weather, under cover and off the ground. Stack gypsum panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, 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, those that are moisture damaged, and those that are 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

#### 2.1 MATERIALS

- A. Exterior Gypsum Soffit board: ASTM C 1396 /C 1396M, 5/8-inch thick, manufacturer's standard edges, 48-inches wide, Type "X", unless indicated otherwise indicated or as required.
- B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, 5/8-inch thick, manufacturer's standard edges, 48-inches wide, Type "X", unless indicated otherwise indicated or as required.
- E. Wallboard Fasteners: ASTM C 1002 "Steel Drill Screws for the Application of Gypsum or Metal Plaster Bases", standard bugle head self-drilling, self-tapping corrosive-resistant drywall screws. Screws used in fire-resistive rated construction shall be of type approved for use by governing building code.
- F. Non-Load Bearing Studs: ASTM C 645 "Non-Load (Axial) Bearing Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board". Studs shall be rolled formed channel of minimum 20 gauge galvanized steel, ASTM A 653, G60 coating. Provide holes and notches for conduit or electrical wiring. Adjust stud to a heavier gauge where required by the manufacturer's recommendations for stud wall heights and ceiling supports.
- G. PVC Trim Accessories: Provide cornerbeads, edge trim, etc. as indicated on the drawings or as required complying with ASTM C 1047, and formed of polyvinyl chloride (PVC) unless otherwise indicated or required.

- H. Joint Treatment Materials: ASTM C 475; type recommended by wallboard manufacturer for the application indicated, except as otherwise noted.
  - 1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable joint and topping compound.
  - 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- I. Membrane: ASTM D 226, Type II, No. 30, asphalt-saturated roofing felt or 10 mil polyethylene sheet.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine area and substrates to which drywall construction attaches or abuts, preset hollow metal frames, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 requirements that apply to framing installation.
- B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer, or if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.

### 3.3 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS

- A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum drywall stud system abuts other construction. Where studs are installed directly against exterior walls, install asphalt felt strips between studs and wall.
- B. Install each steel framing and furring member so that fastening surface do not vary more than 1/8-inch from plane of faces of adjacent framing. Align plumb and square.
- C. Extend partition framing full height to structural supports, unless otherwise indicated. Continue framing over frames for doors and openings to provide support for gypsum board.
- D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by referenced steel framing installation standard. For single layer construction: 16-inches on center, except as otherwise indicated.
- E. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.
- F. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at

jamb with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

- G. Frame openings other than door openings to comply with details indicated, or if none indicated, in same manner as required for door openings.

### 3.4 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum board to comply with ASTM C 840, GA-216, and GA-214.
- B. Locate exposed end-butt joints as far from center of walls and ceilings as possible and stagger not less than 24-inches in alternate courses of board.
- C. Install ceiling boards in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24-inches.
- D. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible.
- E. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.
- F. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
- G. Attach gypsum board to studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
- H. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- I. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturers recommendations.

### 3.5 METHODS OF GYPSUM BOARD APPLICATION

- A. Single-Layer Application:
  - 1. On partitions/walls, apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints. Fasten with screws at 6-inch centers.
  - 2. On ceilings, apply gypsum board before partition/wall board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
- B. Single-Layer Fastening Method: Apply gypsum boards to supports by fastening with screws.

### 3.6 TILE BACKING BOARD APPLICATION

- A. Install in accordance with ANSI A108.11. Install on partitions/walls, in single layer application, with screws at 6-inch centers, and in accordance with manufacturer's recommendations. Panel surfaces shall be finished/prepared to receive ceramic tile as per manufacturer's recommendations.

### 3.7 INSTALLATION OF DRYWALL TRIM ACCESSORIES

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install comer beads at external comers.
- C. Install edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound.
  - 1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
  - 2. Install "L" bead where edge trim can only be installed after gypsum board is installed.

### 3.8 FINISHING OF DRYWALL

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of comer bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Pre-fill open joints and rounded or beveled edges, if any, using setting-type joint compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Finish interior gypsum wallboard by applying the following levels of gypsum board finish in accordance with GA-214:
  - 1. Level 1: For ceiling plenum areas and concealed areas.
  - 2. Level 2: For wall panels to form substrates for ceramic tile.
  - 3. Level 3: Not used.
  - 4. Level 4: Not used.
  - 5. Level 5: For .exposed walls and ceiling surfaces receiving paints.
  - 6. Where Level 1 gypsum board finish is specified, embed tape in joint compound.
  - 7. Where Level 2 gypsum board finish is specified, embed tape in joint compound and apply first coat of joint compound.

8. Where Level 5 gypsum board finish is specified, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories; and apply a thin, uniform skim coat of joint compound over entire surface. For skim coat, use joint compound specified for third coat, or a product specially formulated for this purpose and acceptable to gypsum board manufacturer. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects, tool marks, and ridges and ready for decoration.
- 3.9 PROTECTION
- A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of project acceptance.

END OF SECTION

## SECTION 09901

### PAINTING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.
  - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Contracting Officer will select from standard colors and finishes available. Paint surfaces including but not limited to the following:
  - 1. Surfaces exposed during this work.
  - 2. Surfaces damaged during this work.
  - 3. Surfaces requiring touch-up painting.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

##### 1.2 REFERENCES

- A. ASTM D 16 - Definition of terms relating to Paint, Varnish, Lacquer and Related Products.
- B. ASTM D 2016 - Test Method for Moisture Content of Wood.
- C. MPI (Master Painter's Institute) - Approved Product List.
- D. PCDA (Painting and Decorating Contractors of America - Painting - Architectural Specification Manual.
- E. PCA (Portland Cement Association) - Painting Concrete.
- F. SSPC (Steel Structures Painting Council - Steel Structures Painting Manual).

##### 1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

##### 1.4 SUBMITTALS

- A. Submit in accordance with SECTION 01300 – SUBMITTALS.

- B. Product Data:
  - 1. Materials List: Provide an inclusive list of required patching and coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
    - a. For products with premixed colors, provide manufacturer's standard color chips for selection by Contracting Officer.
  - 2. Manufacturer's Information: Provide data on all listed materials, including:
    - a. Thinning and mixing instructions.
    - b. Application instructions and required mil film thicknesses.
    - c. Manufacturer's Material Safety Data Sheets.
- C. Certifications: Provide a letter certifying paints and coatings are free of asbestos, lead, zinc-chromate, strontium chromate, cadmium, mercury, crystalline silica, and other EPA regulated and hazardous materials. Provide a letter certifying the amounts of mildewcide added by both the paint manufacturer and paint supplier.
- D. Schedule of Finishes: Provide finish schedule including paint spread rates required to achieve final dry film thickness indicated in the schedule.
- E. Schedule of Operations: Provide a work schedule showing sequence of operation and installation dates.
- F. Samples:
  - 1. Submit color and finish samples, at manufacturers normal paint chip size illustrating range of colors and textures available for each surface finishing product scheduled.
  - 2. After color and finish sample are returned, submit paint finish samples, 8.5" x 11" in size illustrating selected colors and textures for each selection. Divide sample in horizontal strips showing prime and overlapping second and finish coats. Show coat tinting. Prepare transparent finish samples on same material as that on which coating will be applied. Identify each sample.
- G. Manufacturer's Instructions: Indicate special surface preparation procedures, and substrate conditions requiring special attention. Refer to Article 3.2 PREPARATION.
- H. Qualification Data: For Applicator.
- I. Delivery Receipts: Provide three (3) copies of the delivery receipt, signed by the user's representative, attesting to delivery of extra paint as required under Article 3.7 EXTRA PAINT.
- J. Warranty: Submit warranty as noted under item entitled "WARRANTY" herein below.

#### 1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
  - 1. Exception: Alkali resistant primers if compatible with the intermediate coat paint products.

#### 1.6 REGULATORY REQUIREMENTS

- A. Comply with State OSHL (Occupational Safety and Health Law) and pollution control regulations of the State Department of Health and EPA.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's brand name and lot number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions and coverage.
  - 7. Color name and number.
  - 8. VOC content.
- B. Storage
  - 1. Non-flammable Materials: Store materials not in use in tightly covered containers in a well-ventilated area. Maintain storage containers in a clean condition, free of foreign materials and residue.
  - 2. Flammable Materials:
    - a. Store in such a manner as to prevent damage. No paint material, empty cans, paint brushes and rollers may be stored in the building(s). Store these items in separate storage facilities away from the building(s). Contractor may furnish a separate job site storage structure, if the structure complies with the requirements of the local Fire Department. Keep the storage area shall clean. Lock any storage structures when not in use or when no visual supervision is possible.
    - b. All rejected materials shall be removed from the job site immediately.

#### 1.8 PROJECT CONDITIONS

- A. Do not apply materials when surfaces and ambient temperatures are outside the ranges required by the paint product manufacturer. Do not apply exterior coatings during rain or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- B. Protect public, pedestrians and tenants from injury. Provided, erect and maintain safety barricades around scaffolds, hoists and where constriction operations create hazardous conditions.

- C. Completed Work: Provide necessary protection for wet paint surfaces.
- D. Protective Covering and Enclosures: Provide and install clean sanitary drop cloth or plastic sheets to protect furniture, equipment, floor and other areas that are not scheduled for treatment. Remove any paint applied to surfaces not scheduled for treatment.
- E. Fire Safety: Contractor and its employees shall not smoke in the vicinity of the paint storage area. Exercise precautions against fire at all times and remove waste rags, plastic (polyester sheets), empty cans, etc. from the site at the end of each day.
- F. Safeguarding Property: Safeguard the work and also the property of the State and other individuals in the vicinity of Contractor's work. Make good on any damages and for losses to work or property caused by Contractor or its employee's negligence. Where damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) replace it with a new product of equal quality. No prorating or use of "used" products will be permitted.

#### 1.9 WARRANTY

- A. Provide a two (2) year guarantee that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship.
- B. The Surety shall not be liable beyond two (2) years from the project acceptance date.

### PART 2 - PRODUCTS

#### 2.1 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Mildewcide: Except for metal primers, provide primer and finish coats with suitable chemical mildewcide to the maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint, but not less than one ounce per gallon.
- C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
  - 1. Proprietary Names: Use of manufacturer's proprietary product names in the Paint Systems Schedule in Part 3 below to designate colors or materials, is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed products to be used.
  - 2. Equivalent products to the specified products are listed in the Master Painter's Institute's "Architectural Painting Specification Manual."

3. Substitution: Requests for substitution of a product or product if a manufacturer is not on the "Approved Product List" will be evaluated for equivalency based on product test results per the test criteria of the Master Painter's Institute.
- D. Colors: Paint colors as indicated in the contract documents are for bid purposes only. Contractor shall coordinate with the Users and the Contracting Officer for final approval on color selection from the manufacturer's full range.
- E. EPA Regulated and Hazard Materials: Do not use paint or paint products containing asbestos, lead, mercury, zinc chromates, strontium-chromate, cadmium, crystalline silica, or the EPA regulated or hazardous materials. Select paint from the Master Painter's Institute's Approved Product List.

## 2.2 MISCELLANEOUS MATERIALS

- A. Provide patching and repair materials. Compatible with paint finishes and substrates. Use weather resistant materials for exterior surfaces and surfaces exposed to moisture.
- B. Accessories
  1. General: Provide other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
  2. Thinners: Thinning of paint shall be done using material recommended by the manufacturer. Mix proprietary products according to manufacturer's requirements. Do not use compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline for thinning.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
  1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  2. Ensure that concrete and masonry surfaces are cured and dried to meet paint manufacturer's recommendations.
  3. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  1. Notify Contracting Officer about anticipated problems when using the materials specified over substrates primed by others.

### 3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove dust, oil and grease before cleaning.
  - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified. Provide barrier coats over incompatible primers or remove and re-prime.
- D. Surface Preparation Cementitious Materials: Prepare concrete, concrete unit masonry, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
  - 1. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
  - 2. Determine alkalinity and moisture content of surfaces by performing appropriate tests. Submit test results to Contracting Officer.
    - a. Prior to painting, concrete and masonry surfaces shall be allowed to cure and dry in accordance with the paint manufacturer's instructions and recommendations.
    - b. Prior to paint application, interior and exterior concrete and masonry (including grout joints) scheduled to receive paint shall be tested to determine the alkalinity level of the surface. Testing shall be performed in strict accordance with the test kit manufacturer's instructions. Submit test results to the Contracting Officer.
    - c. Where the alkalinity level exceeds the pH level limit of the primer take one of the following three remedies at no additional cost to the State:
      - 1) Substitute a primer that is able to resist the measured alkalinity and that is compatible with the paint finish. Alkyd based primers and top-coats or epoxy ester primers shall not be used. Submit the substitute primer to the Contracting Officer for review.
      - 2) Neutralize the surface in accordance with the primer manufacturer's instructions to reduce the alkaline level. However, acid washing is not permitted where the surface has been finished with a cementitious coating.
- E. Surface Preparation Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off. Scrape and clean small, dry, seasoned knots, and apply a thin coat

of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

- F. Surface Preparation Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
  - 1. If mill scale or mild surface rust cannot be removed with solvent, then blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3 and SSPC-SP 10/NACE No. 2.
  - 2. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
  - 3. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat. Spot priming specified here shall be in addition to full prime painting scheduled in Part 3 below.
- G. Surface Preparation Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- H. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
  - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  - 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- I. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### 3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
  - 1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  - 2. Provide finish coats that are compatible with primers used.
  - 3. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
  5. Sand lightly between each succeeding enamel or varnish coat.
  6. Ensure primers are top coated within the times required by the paint manufacturers. Top coats not applied within the recoating window may be rejected.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  3. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
  2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- F. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- G. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

- H. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

### 3.4 FIELD QUALITY CONTROL TESTING

- A. Inspection and Approvals: Obtain written approval upon completion of each phase of work (phases of work are: surface preparation and spot prime, prime, first finish coat, second finish coat) before proceeding into the next phase or work. For any particular area of work that deviates from the submitted work schedule, notify the Contracting Officer one day (24 hours minimum) in advance when completing any phase of work. Provide access to areas to be inspected.
  - 1. Failure to obtain approval of any phase of work for a work area may result in redoing the operation at no cost to the State.
  - 2. Right of Rejection: Non conforming work will be rejected by the Contracting Officer. Remove rejected material from the job site immediately. Redo rejected work at no cost to the State.
- B. Manufacturer's Field Services: The Painting Contractor shall be responsible to assure the presence of a qualified Technical Representative (approved by a responsible officer of the Material Manufacturer) at the job site prior to starting of the work and as require while the work is in progress. The Technical Representative shall provide assistance to the Painting Contractor in physical demonstrations on the use of the materials and methods or techniques required to accomplish all of the work as specified herein.
  - 1. A minimum two (2) visits will be required. The Technical Representative shall submit a detailed report simultaneously to the Contracting Officer and a Responsible Officer of the Painting Contractor and not to the on-site project manager or foremen. This report shall contain in detail the findings, conclusions and recommendations and shall be submitted during each visit. It is the intent of this provision to ensure that the on-site project manager or foreman does not have supervisory rights over the Technical Representative.

### 3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

### 3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Contracting Officer.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

### 3.7 EXTRA PAINT

- A. The Contractor shall provide extra paint in each of the different colors of exterior and interior paint used for walls, eaves and trim to the facility upon completion of the project. The paint shall be in unopened one gallon cans and shall be in the quantities listed below:

1. Paint used over large areas, such as the exterior of the building - 5 gallons of each color and each type used (alkyd, latex, gloss, semi-gloss, flat, etc.).
2. Paint used in single room areas and in small areas, such as bathrooms and doors - 1 gallon of each color and each type used (alkyd, latex, gloss, semi-gloss, flat, etc.)

### 3.8 EXTERIOR PAINT SCHEDULE

- A. Concrete: Provide the following finish systems over exterior concrete:
  1. Acrylic Finish: Two finish coats over a primer.
    - a. Primer: Exterior Concrete primer. MPI 3.
    - b. Finish Coats: Exterior acrylic paint. MPI 11.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 4.5 mils.
- B. Concrete Unit Masonry: Provide the following finish systems over exterior concrete unit masonry:
  1. Acrylic Finish: Two finish coats over block filler.
    - a. Block Filler: Concrete unit masonry block filler. MPI 4.
    - b. Finish Coats: Exterior acrylic paint. MPI 11.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 11 mils.
- C. Cementitious Board: Provide the following finish systems over exterior cementitious surfaces:
  1. Acrylic Finish: Two finish coats over an epoxy primer.
    - a. Primer: Exterior epoxy primer. MPI 77.
    - b. 1<sup>st</sup> Finish Coat: Exterior epoxy paint. MPI 77.
    - c. 2<sup>nd</sup> Finish Coat: Exterior polyurethane paint. MPI 72
    - d. Finish Coat Gloss Level: Semi-gloss.
    - e. System DFT: 4.5 mils.
- D. Gypsum Board: Provide the following finish systems over exterior gypsum board surfaces:
  1. Acrylic Finish: Two finish coats over a primer.
    - a. Primer: Exterior gypsum board primer. MPI 6.
    - b. Finish Coats: Exterior acrylic paint. MPI 11.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 4 mils.

- E. Wood: Provide the following paint finish systems over new interior wood surfaces:
  - 1. Acrylic-Enamel Finish: Two finish coats over a primer.
    - a. Primer: Exterior wood primer for acrylic-enamel and semi-gloss alkyd-enamel finishes. MPI 7.
    - b. Finish Coats: Exterior acrylic enamel. MPI 11.
    - c. Finish Coat Gloss Level: Semi-gloss. '
    - d. System DFT: 4.5 mils.
- F. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
  - 1. Alkyd Finish: Two finish coats over a primer.
    - a. Primer: Exterior ferrous-metal primer. MPI 23.
    - b. Finish Coats: Exterior acrylic paint. MPI 94.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 5.25 mils.
- G. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated metal surfaces:
  - 1. Acrylic Finish: Two finish coats over a galvanized metal primer.
    - a. Primer: Exterior galvanized metal primer. MPI 101.
    - b. Finish Coats: Exterior acrylic paint. MPI 72.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 4.5 mils.

### 3.9 INTERIOR PAINT SCHEDULE

- A. Concrete: Provide the following finish systems over interior concrete:
  - 1. Acrylic Finish: Two finish coats over a primer.
    - a. Primer: Exterior concrete primer. MPI 50.
    - b. Finish Coats: Interior acrylic paint. MPI 141.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 5 mils.

- B. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry:
  - 1. Acrylic Finish: Two finish coats over a block filler.
    - a. Block Filler: Concrete unit masonry block filler. MPI 4.
    - b. Finish Coats: Interior acrylic paint. MPI 141.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 11 mils.
- C. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
  - 1. Acrylic Finish: Two finish coats over a primer.
    - a. Primer: Interior gypsum board primer. MPI 50.
    - b. Finish Coats: Interior acrylic paint. MPI 141.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 4 mils.
- D. Wood: Provide the following paint finish systems over new interior wood surfaces:
  - 1. Acrylic-Enamel Finish: Two finish coats over a primer.
    - a. Primer: Interior wood primer for acrylic-enamel and semigloss alkyd-enamel finishes. MPI 39.
    - b. Finish Coats: Interior acrylic enamel. MPI 141.
    - c. Finish Coat Gloss Level: Semi-gloss. '
    - d. System DFT: 4.5 mils.
- E. Ferrous Metal: Provide the following finish systems over ferrous metal:
  - 1. Acrylic Finish: Two finish coats over a primer.
    - a. Primer: Interior ferrous-metal primer. MPI 79.
    - b. Finish Coats: Interior acrylic paint. MPI 141.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 5 mils.

- F. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:
1. Acrylic Finish: Two finish coats over a primer.
    - a. Primer: Interior zinc-coated metal primer. MPI 79.
    - b. Finish Coats: Interior acrylic paint. ,MPI 141.
    - c. Finish Coat Gloss Level: Semi-gloss.
    - d. System DFT: 5 mils.

END OF SECTION

## SECTION 09960

### HIGH PERFORMANCE COATING

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of an epoxy floor coating system with aggregate. The system shall have the color and texture as specified on the drawings or herein. It shall be applied to the prepared area(s) as defined in the plans, but not limited to the Storage Room Floor and Wall Base (approx. 6-inches high), strictly in accordance with the manufacturer's recommendations.

##### 1.02 RELATED SECTIONS

- A. SECTION 09901 – PAINTING.
- B. SECTION 03300 – CAST-IN-PLACE CONCRETE.
- C. SECTION 07920 – JOINT SEALANTS.

##### 1.03 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Product Data: Submit manufacturer's descriptive literature, performance data and installation procedures.
- C. Manufacturer's Material Safety Data Sheet (MSDS) for each product being used.
- D. Samples: A 6-inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system.
- E. Maintenance Data: Submit manufacturer's cleaning and maintenance instructions.

##### 1.04 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of ten (10) years experience in the production, sales, and technical support of epoxy coating, and related materials.
- B. The Applicator shall have been approved and certified by the system manufacturer in all phases of surface preparation and application of the product specified.
- C. No requests for substitutions shall be considered that would change the generic type of the specified System.
- D. A pre-installation meeting shall be held between the applicator, General Contractor and the Contracting Officer to review and clarify, application procedure, quality control, inspection and acceptance criteria and production schedule.

##### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping
  - 1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.

B. Storage and Protection

1. The Applicator shall be provided with a storage area for all components. The area shall be between 60-degree F and 90-degree F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
2. Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site at all times.
3. The applicator shall be provided with adequate waste disposal facilities for non-hazardous waste generated during the installation of the system.

1.06 PROJECT CONDITIONS

A. Site Requirements

1. Application may proceed while air, material and substrate temperatures are between 60-degree F and 90-degree F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. The relative humidity in the specific location of the application shall be less than 85 percent and the surface temperature shall be at least 5-degree F above the dew point.
3. The Applicator shall ensure that adequate ventilation is available for the work area.
4. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
5. The concrete shall be moisture cured for a minimum of seven (7) days and have fully cured for a minimum of twenty-eight (28) days in accordance with the contract documents, prior to the application of the coating system pending moisture tests.
6. New concrete shall have a flat rubbed finish or at most a light steel trowel finish, (a hard steel trowel finish is not desirable).
7. Cure and Seal agents for concrete should not be used.
8. Concrete must be free of hydrostatic, capillary or moisture vapor pressure. Substrates in contact with ground must have a properly installed, effective vapor barrier to help prevent potential problems resulting from hydrostatic, capillary or moisture vapor pressure.
9. Do not apply materials unless surface to receive coating is clean and dry

B. Safety Requirements

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. "No Smoking" signs shall be posted at the entrances to the work area.
3. Non-related personnel in the work area shall be kept to a minimum.

1.07 WARRANTY

- A. Manufacturer shall warrant the materials are substantially free from material defects and will perform substantially to the published literature.

## PART 2 – PRODUCTS

### 2.01 FLOORING AND WALLS (Including Wall Base)

A. Product is based on Neogard, CG 32 to establish the basis of design. Equal products of other manufacturers are acceptable.

1. System Materials

a. Primer

b. Base Coat

c. Top Coat

d. Top Coat with Aggregate/Textured Finish

2. Product Requirements

a. Epoxy Coating:

i. Material Properties:

Compression Strength	ASTM D 695	25,000 – 25,300 psi
Tensile Strength	ASTM D 638	3,000 – 3,700 psi
Elongation	ASTM D 638	15 to 25%
Flexural Strength	ASTM D 790	2,800 – 3180 psi
Hardness, Shore D	ASTM D 2240	78 to 85
Adhesion	ASTM D 4541	250 – 350 psi
Impact Resistance	Mil-D-3134, Sec. 4.7.3	Passes
Water Resistance	ASTM D 570	0.21%
Fungus & Bacteria Resist.	Mil-F-52505	No Growth

b. Aggregate:

i. Particle Size Distribution

Range (microns)

US Mesh Size

Results

150 - 250

60 - 100

## PART 3 – EXECUTION

### 3.01 EXAMINATION

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting coating performance.

1. Verify that substrates and conditions are satisfactory for installation and comply with requirements specified.

### 3.02 PREPARATION

A. General

1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, and dirt.

2. There shall be no visible moisture present on the surface at the time of application of the system.

3. Remove loose mortar spatter, joint compounds etc.
4. Create a surface profile on concrete with sandblasting apparatus and/or dust-free diamond grinders.
5. Masonry block shall be clean, dry and coated with high solid block filler.
6. Drywall shall be completely clean and free of any oils, soap residue, gypsum dust etc.

### 3.03 APPLICATION

#### A. General

1. The system shall be applied in five distinct steps as listed below:
  - a. Substrate preparation
  - b. Priming
  - c. Base coat
  - d. Topcoat application
2. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
3. The system shall follow the contour of the substrate.
4. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

#### B. Primer

1. The primer shall be mixed at the ratio of 2 parts resin to 1 part hardener per the manufacturer's instructions.
2. The primer shall be applied by roller at the rate of 200 sf/gal to yield a dry film thickness of 8 mils.

#### C. Base Coat

1. The base coat shall be comprised of the specified two components, a resin, and hardener.
2. The resin shall be added to the hardener and thoroughly mixed by suitably approved mechanical means.
3. The base coat shall be applied by a roller at the rate of 130 sf/gal to yield a dry film thickness of 12 mils.
4. Hang semi-rigid fiberglass mat directly into wet epoxy resin so that seams are uniform and even per Manufacturers instructions.

#### D. Topcoat

1. The topcoat shall be roller applied at the rate of 130 sf/gal to yield a dry film thickness of 12 mils.

2. The topcoat shall be comprised of a liquid resin and hardener that is mixed at the ratio of 2 parts resin to 1 part hardener per the manufacturer's instructions.
- E. Second Topcoat with Texture Finish (For Floor Condition Only)
1. The topcoat shall be roller applied at the rate of 350-400 sf/gal to yield a wet film thickness of 4 mils.
  2. The topcoat shall be comprised of a liquid resin and aggregate that is mixed at the ratio of 4 to 6 ounces of aggregate to one (1) gallon of resin per the manufacturer's instructions.

#### 3.04 FIELD QUALITY CONTROL

##### A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
  - a. Temperature
    - i. Air, substrate temperatures and, if applicable, dew point.
  - b. Coverage Rates
    - i. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

#### 3.05 CLEANING AND PROTECTION

- A. Cure material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove masking. Perform detail cleaning to leave cleanable surface for subsequent work of other sections.

END OF SECTION

## DIVISION 10 - SPECIALTIES

### SECTION 10440

#### SIGNAGE

##### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Provide all signage as shown and as specified herein, including the following:
  - 1. Fiberglass Signs.
  - 2. Exterior Identification Signs.
  - 3. International Symbol of Accessibility.
- B. Sign Locations: As indicated and scheduled.

##### 1.02 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. Manufacturer's Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.
- C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
  - 1. Provide message list for each sign required, including large-scale details of wording and layout of lettering.
  - 2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other sections.
- D. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
  - 1. Samples for initial selection of color, pattern, and texture:
    - a. Fiberglass: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.
    - b. Aluminum: Samples of each finish type and color, on 6-inch long sections of extrusions and not less than 4-inch squares of sheet or plate, showing the full range of colors available.
  - 2. Samples for Verification of Color, Pattern, and Texture Selected, and compliance with requirements indicated:
    - a. Provide a full size sample panel for each material indicated. Include a panel for each color, texture, and pattern required. On each panel include a

representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

b. Acceptable samples will be returned and may be used in the work.

#### 1.03 QUALITY ASSURANCE

- A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.
- B. Design Criteria: The drawings, if available, indicate size, profiles, and dimensional requirements of signs. If drawings are not available, submit manufacturer's standard products incorporated with item entitled "SUBMITTALS" herein above.
- C. Braille: The Contractor shall be responsible to have all signs with Braille proofread prior to installation. Any sign that has incorrect Braille information shall be redone at the Contractor's expense.

#### 1.04 SIGN MESSAGE

- A. Provide sign messages as required or as indicated on the drawings. Submit sign message schedule as per item entitled "SUBMITTALS" herein above.

#### 1.05 ACCESSIBILITY COMPLIANCE

- A. The 2010 ADA Standards for Accessible Design (2010 ADA).

#### 1.06 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. General Requirements: Character proportion, color contrast, dimension, depth, and heights of symbols, Grade II braille, and letters, location, and mounting heights of designated signs shall be in accordance with the requirements noted in the 2010 ADA Standards Section 216, and Section 703.
- B. Anchors: Use nonferrous metal or hot-dipped galvanized anchors for installations as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors.

#### 2.02 FIBERGLASS SIGNS

- A. Fiberglass, non-corrosive, 3-ply laminate, approximately 3/16-inch to 1/4-inch thick with contrasting core color.
- B. Letters, symbols, and borders shall be raised. Individual cutout letters and symbols which are applied to the sign plaque shall not be used.

- C. Where a white or light colored background (core color) is provided, the background surface shall be coated with white or clear graffiti resistant coating as approved by the signage manufacturer. The coating shall provide a finish which is resistant to pencils, pens, felt tip markers, and spray paint.
  - D. Signs shall be mounted with one-way, tamper-proof fasteners. Shields shall be provided as required to suit the mounting conditions. Double-stick tape or adhesives shall not be used.
  - E. Manufacturers:
    - 1. Architectural Graphics, Inc.
    - 2. Best Manufacturing Company.
    - 3. Mohawk Sign Company.
    - 4. Signs, Letters & Nameplates, Inc. (SL & N).
    - 5. Approved equal.
- 2.05 EXTERIOR IDENTIFICATION SIGNS (ALUMINUM SIGNS)
- A. Manufacturers: Products of the following manufacturers or approved equal are acceptable provided they meet the materials, construction and the standard of quality specified.
    - 1. A.R.K. Ramos Signage System.
    - 2. Mills Manufacturing Company.
    - 3. Metal Arts.
  - B. Sign shall be of anodized die-stamped aluminum approximately 3/32-inch thick or cast aluminum approximately 1/4-inch thick plaque. Sign shall be provided with a baked-on enamel background color finish.
  - C. Letters and numbers shall be raised 1/32-inch; upper case, sans serif or simple serif type and shall be accompanied with Grade 2 Braille. Signs of individual cast letters shall not be used. Signs designating permanent rooms and spaces shall comply with 2010 ADA Standards Section 703.
  - D. Signs shall be mounted with one-way, tamperproof fasteners. Fastener heads shall be finished to match the background finish of the sign.
- 2.06 INTERNATIONAL SYMBOL OF ACCESSIBILITY (ISA)
- A. Provide "International Symbol of Accessibility" in conformance with ADA Section 703.7 requirements and in locations shown on drawings. See DCAB Interpretive Opinions for further clarification.
  - B. Provide International Symbol of Accessibility at accessible entrances in conformance with ADA Fig. 703.7.2.1.

## 2.07 FINISHES

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Contracting Officer from the manufacturer's standards.
- B. Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. General:
  - 1. Installation of all signage shall be in strict accordance with manufacturer's printed instructions and approved shop drawings. Installation shall be accomplished by experienced mechanics and in a workmanlike manner.
  - 2. Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
  - 3. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance and designated signs with braille in accordance to ADA Section 216 and Section 703.
- B. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using one-way, tamper-proof fasteners. Shields shall be provided as required to suit the mounting conditions. Double-stick tape or adhesives shall not be used.
- C. Fire Alarm Pull Station and Fire Extinguisher Signage: Fasten to wall with fasteners as specified. Sign shall be located so that the bottom edge of the mounting frame is a minimum of 80-inches above the floor finish.

### 3.02 CLEANING AND PROTECTION

- A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Contracting Officer. Remove all tools, equipment, debris, and surplus materials.

END OF SECTION

## SECTION 10991

### RESTROOM RESTORATION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide cleaning, disinfections, and removal of grime, dirt, paint, graffiti, calcium build-up, rust, and stains from toilets, urinals, lavatories/sinks, plumbing fixtures, dispensers, mirrors, toilet partitions and urinal screens, light fixtures, windows, walls, and floors.
- B. Remove existing deleterious contaminants from surface of tile and grout. Restore wall grout to overall consistent condition/color. Clean floor tile and grout to clean condition while allowing for existing color distinction from traffic patterns to remain where not corrected by extra-ordinary procedures.
- C. Coat ceramic unglazed wall tiles, floor tiles, and all grout with appropriate protective sealant.
- D. Related Work Described Elsewhere:
  - 1. Replacement of deteriorated sealant is provided under SECTION 07920 - SEALANTS.
  - 2. Painting of non-tile walls and ceilings is provided under SECTION 09901 - PAINTING.

##### 1.2 QUALITY ASSURANCE

- A. Restroom Cleaning Company: Restroom cleaning company shall be a professional cleaning company with not less than two (2) years experience in cleaning public restrooms.
- B. Equipment and Materials: Equipment and materials used for the work shall be a combination of professional and general products that are specifically recommended for the surfaces and conditions found in public school restrooms and this project in specific. Contractor shall have available on site various pieces of equipment and materials in varying degrees of complexity and effect on substrate so that procedures and materials that least effect the substrates can be tried first. It is expected that increasing degrees of equipment and material impact on substrates will be required for some cleaning situations and they shall be included as part of the expected work unless specifically noted otherwise or accepted in writing by the Contracting Officer. Acid will not be used on porcelain.

- C. Abrasive materials shall not be applied to glazed surfaces of tile, porcelain, plastic laminate, fiberglass reinforced plastic (FRP), solid phenolic, stainless steel, glass, etc. where use will damage surface.
- D. Safety Precautions: Provide Contractor personnel with and require them to use protective clothing, gloves, face shields and other appropriate clothing necessary to prevent personal injury due to steam, hot water, high pressure water, chemicals, and other equipment and materials to be used.
- E. Ventilation: Provide adequate ventilation during cleaning processes as recommended by the manufacturer of each product used.
- F. Sewer System: Do not allow any chemical not allowed by the County Sewer system to enter the sewer system.

### 1.3 SUBMITTALS

- A. Submit in accordance with SECTION 01300- SUBMITTALS.
- B. Manufacturer's Data: Submit list of materials to be used for each anticipated condition with manufacturer's technical product data. Update the submittal where project conditions dictate the use of alternate cleaners and sealants.
- C. Restroom Cleaning Experience: Submit documentation of restroom cleaning company's professional experience in accomplishing the work specified herein for acceptance by the Contracting Officer. Include contact names, company name, and telephone numbers of individuals who can verify quality of previous work.
- D. Material Safety Data Sheets (MSDS): Submit MSDS for all materials.

### 1.4 PRODUCT HANDLING

- A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather. Materials that are hazardous shall be stored in appropriate locked storage containers as directed by the Contracting Officer.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Vapor Steam Cleaner: High temperature steam equipment with controls to adjust temperature and volume.
- B. Hot Water Pressure Washer: Hot water pressure washer with controls to adjust water pressure.
- C. Cleaners: Cleaning compounds, detergents, and other products appropriate for the conditions and recommended for the application intended.
- D. Grout Stain: Permanent stain used topically to provide a uniform grout color where existing grout is discolored. Provide in color to match existing or as required for uniform appearance of grout on the entire surface.

- E. Protective Sealers: Water based inorganic film forming catalyzed siloxanes or reactive silonal type coating system for ceramic tile and grout, which penetrates into porous surfaces leaving a film of protection, MicroGuard or approved equal.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Before starting the restroom cleaning, examine all surfaces to be cleaned and record the following:
  - 1. Ceramic tile that is loose or that may be damaged by cleaning operations.
  - 2. Existing toilet fixtures with damaged or missing glazing or cracks.
  - 3. Stains, marks, or traffic patterns that cannot be removed.
  - 4. Hardwater build-up that cannot be removed.

#### 3.2 PREPARATION

- A. Protect adjacent surfaces not required to receive the applicable cleaning operation or material from damage by each operation.
- B. Cover drains where materials are not allowed to be introduced into the sewer system.

#### 3.3 INSTALLATION

- A. General: All materials shall be applied in accordance with the manufacturer's written instructions.
- B. Pretreat substrates and use combination of materials and methods to accomplish cleaning work.
- C. Thoroughly clean and disinfect all substrates. Apply grout restoration mix where required for uniform grout coloration. Floor grout discoloration due to previous traffic patterns shall be cleaned, as specified, but total restoration for uniform color throughout, will not be required.
- D. Contracting Officer will conduct an inspection of the substrates prior to application of protective sealer.
- E. After acceptance of substrate cleaning by the Contracting Officer, apply protective sealer as recommended by the manufacturer to all unglazed tile surfaces and all grout joints.

#### 3.4 CLEAN UP

- A. Leave finished restrooms in neat condition with no adverse chemicals remaining and all Contractors' equipment and material removed from the premises.

END OF SECTION

## DIVISION 15 – MECHANICAL

### SECTION 15011

#### GENERAL MECHANICAL PROVISIONS

##### PART 1 – GENERAL

###### 1.01 SUMMARY

- A. Work Included: Applies to all work of DIVISION 15 – MECHANICAL.

###### 1.02 PLANS

- A. The plans and specifications direct attention to certain required features of the equipment but do not purport to cover all details entering into its design and construction. Nevertheless, the Contractor shall furnish and install the mechanical systems complete in all details and ready for operation. The mechanical systems shall be installed substantially as shown on the plans and as specified herein and shall be designed for installation in the area designated with proper space allowed for clearance and maintenance access.
- B. Attention is directed to the fact that the plans are based upon certain equipment configurations and that equipment components of other approved equal manufacturers may differ from the arrangement indicated on the plans. If other approved equipment is accepted which require an arrangement different from that indicated on the plans or specified, the Contractor shall prepare and submit for approval, detailed architectural, structural, and mechanical drawings, layouts, calculations, and equipment lists showing all necessary changes and embodying all special features of the equipment which the Contractor proposes to furnish. The cost of such changes shall be borne by the Contractor at no increase in contract price or extension of contract time for the project.

###### 1.03 SUBMITTALS

- A. Submit in accordance with SECTION 01300 - SUBMITTALS.
- B. General Requirements

- 1. Data Required with the Submittal: The Contractor shall submit all data sufficient to demonstrate conformance to the requirements of the DIVISION 15 - MECHANICAL Technical Specifications. The submittal shall include, but not be limited to, manufacturer's name, catalog number or designation, and the electrical and physical characteristics of the equipment. The submittal shall be in the form of printed data sheets, catalog cuts and shop drawings. Reference to manufacturer's literature without enclosing a copy of the referenced document will be considered insufficient.

Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal. Incomplete packages will be returned without a review.

2. Approval Requirements: Approval of material and equipment will be based on manufacturer's published data. Where materials or equipment are specified to be constructed and/or tested in accordance with the Standards of the American Society of Mechanical Engineers, National Electrical Manufacturers Association, or Underwriters' Laboratories, Inc.; the Contractor shall submit proof that the items furnished under this specification conform to such requirements. The ASME stamp will be acceptable as sufficient evidence that the items conform to the requirements of the American Society of Mechanical Engineers. A certificate or published statement that the item is in accordance with the referenced Standard by the manufacturer will be sufficient evidence that the item conforms to the requirements of the Standard. In lieu of such stamp, certificate, or statement, the Contractor may submit a written certificate from any nationally recognized testing agency that the items have been tested and that the units conform to the requirements listed hereinbefore, including methods of testing of the specified agencies.
  3. Identification: All submittals covering equipment shall be identified with the equipment numbers shown on the contract drawings and the system served.
  4. Substitutions
    - a. Substitutions shall be subject to the requirements of the GENERAL CONDITIONS and SPECIAL CONDITIONS. Supporting data shall be furnished for all substitutions. Redesign of architectural, structural, environmental, mechanical, electrical, or any other feature made necessary by the use of substitutions shall be the responsibility of and at the expense of the Contractor, and subject to approval by the Contracting Officer.
    - b. Where such approved deviation requires a different quantity and arrangement of piping or equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such piping, structural supports, and any other additional equipment required by the system at no additional cost to the State.
  5. Samples: When called for in the DIVISION 15 - MECHANICAL Technical Specifications, furnish samples of materials that truly represent the materials to be used. Where samples are specified to demonstrate method of installation, furnish all materials and tools. Samples shall also be furnished when materials are proposed as substitutions for those specified. Materials used in the work shall be identical to samples that have been approved by the Contracting Officer.
- C. List of Material and Equipment: The Contractor shall submit to the Contracting Officer for approval six (6) sets of a complete list of proposed material or equipment. This list shall include manufacturer's name and material or equipment identification such as styles, types, or catalog numbers, to permit ready and complete identification. Catalog numbers specified herein are given for reference only. The Contractor shall furnish the latest model manufactured.
- D. Shop Drawings: The Contractor shall submit to the Contracting Officer for approval six (6) sets of prints of shop drawings in accordance with the requirements of the GENERAL CONDITIONS. Shop drawings shall be submitted

for equipment not completely identifiable by information contained in the list of materials and equipment.

1. The Contractor shall submit detailed shop drawings of all equipment and all material required to complete the project. No material or equipment may be delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein.
  2. Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.
  3. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.
  4. Shop drawings shall be submitted for, but not limited to, the following:
    - a. Ventilation System.
    - b. All items described in specifications.
    - c. Other items as the Contracting Officer may direct.
  5. Shop drawings shall include as applicable:
    - a. Identification of each piece of equipment and component.
    - b. Dimensioned layouts and arrangement of equipment.
    - c. Operating performance, and electrical characteristics.
- E. MSDS: The Contractor shall submit to the Contracting Officer for approval six (6) sets of MSDS sheets for materials used in this project. Contractor shall perform all work in accordance with the recommendations of the MSDS, including all tests.
- G. As-Built Drawings: The Contractor shall submit to the Contracting Officer one (1) reproducible set of all Contract Drawings corrected to reflect the "AS-BUILT" conditions of the installation. The drawings shall be kept up to date as the job progresses and shall be available for inspection at all times.
- H. One Year Guarantee And Maintenance Service Contract
1. Contractor shall submit six (6) copies of a written Guarantee that all work is as specified, and shall be bound to replace material or equipment defective due to workmanship or materials. Contractor shall not be responsible, however, for defects proven to the Contracting Officer's satisfaction to be due to misuse,

accident, lack of maintenance, improper operation, or negligence by other parties.

2. Further, Contractor shall be held responsible for all damages to any part of the premises, building or contents caused by leaks or other defect in pipe, equipment or materials provided under this specification.
3. Terms of this Guarantee are in addition to other guarantee provisions of the specifications, and do not substitute for other more stringent terms, if any.
4. In addition to the Guarantee on material and workmanship, the Installer shall submit six (6) copies of the Maintenance Service Contract, countersigned by the Contractor that will validate the Guarantee. The Maintenance Service Contract shall exclude existing equipment not installed by the Contractor.
5. The Guarantee and Maintenance Service Contract shall commence immediately after the Project Acceptance, and extend for a period of one year commencing after thirty (30) consecutive days of trouble-free operation after the Project Acceptance Date. The Guarantee and Maintenance Service Contract shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the attached Schedule of Maintenance Service (see Attachment No. 1), so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the Contractor. This maintenance period and the guarantee period shall run concurrently (same start and end dates). However, should the Contractor default on the maintenance service contract and must restart or complete the service, then the guarantee period shall also be extended to match the revised maintenance service period. Similarly, should equipment fail and require repair, the guarantee and maintenance period shall be extended by the period of time it takes to repair the equipment.
6. Trouble-free operation is defined as a non-disabling condition or a non-recurring failure or disruption and the following:
  - a. The system shall be free of all discrepancies, contamination and debris, which requires correction in excess to those described for the monthly service which is included in the Schedule of Maintenance.
7. The Installer shall include a list of the following items along with the Maintenance Service Contract:
  - a. Name of the servicing Contractor and documentation that field service personnel are trained, qualified, and certified to service the equipment.
  - b. Completion of thirty (30) consecutive calendar days of trouble free operation date.
  - c. Service contract expiration date.
  - d. Service schedule for the maintenance period.

- e. Itemized list of equipment covered under the service contract, including a description of the equipment identified, its model and serial number(s) and manufacturer's name(s).
- 8. Field service personnel shall be fully capable of providing technical assistance instruction, routine maintenance and emergency maintenance service on all system equipment components.
- 9. The Maintenance Service Contract shall be submitted along with the Operation and Maintenance Manual on/or before the Project Acceptance Date.

#### 1.04 MANUFACTURER'S INSTRUCTIONS

- A. General: Furnish manufacturer's instructions and data covering installation, operation and maintenance of all materials and equipment. Submittals shall be in eight (8) bound copies each.
- B. Installation instructions for materials shall include precautions for handling, storage and preparation for field application. Description of other materials and tools required to complete the installation shall be included. Installation instructions for equipment shall include assembly, recommended supports, aligning and connecting for service. The instructions shall include illustrations, diagrams and step-by-step procedures.
- C. Operation and maintenance instructions shall include instructions for operation, maintenance, repair, recommended inspection points and periods for inspection in a practical, complete and comprehensive manner. The information shall be arranged in a logical, orderly sequence, including a general description of the equipment and significant technical characteristics.
- D. Identification: The data shall have complete identification throughout using equipment numbers shown on the drawings and indicating the system to which the data pertains.

### PART 2 – PRODUCTS

#### 2.01 ASBESTOS PROHIBITION

- A. No asbestos containing materials shall be used. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved.

#### 2.02 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall conform to the requirements of applicable Technical Specifications and publications specified therein and shall be as shown. Materials and equipment shall be new and shall be the products of manufacturers regularly engaged in the manufacture of such products. All items shall essentially duplicate materials and equipment that have been in satisfactory use at least two (2) years prior to bid opening and shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site of installation.

### 2.03 NAMEPLATES

- A. Each item of equipment shall have manufacturer's nameplate of corrosion resistant metal attached in a conspicuous location. Nameplate data shall include manufacturer's name, address, model number, capacity, rating and such other performance data as required to completely identify the item. In addition, the Contractor shall provide a separate corrosion resistant metal tag, unless specified otherwise, to carry the equipment designation as shown on drawings and the installation date. Except as otherwise specified nameplate lettering shall be stamped upper case. Nameplate shall be fastened by means of corrosion resistant metal screws or wire, 14-gage.

### 2.04 TOOLS AND SUPPLIES

- A. Where specified in the DIVISION 15 - MECHANICAL Technical Specifications, special tools and supplies shall be provided. The items shall be packaged or boxed to provide protection in storage, and shall be identified as to use. Tools and supplies shall be accompanied by information as to source of supply.

### 2.05 FACTORY-APPLIED PAINT

- A. All interior ferrous piping and associated support materials shall have factory-applied protective coating as specified under SECTION 09901 - PAINTING.

## PART 3 – EXECUTION

### 3.01 QUALITY CONTROL

- A. The work shall be performed by workmen skilled in the type of work involved, under experienced supervision. Where methods of application or installation are specified by commercial standards in the DIVISION 15 - MECHANICAL Technical Specifications, no departures will be permitted except as specified or as directed by the Contracting Officer.

### 3.02 INSPECTION

- A. The Contractor shall give the Contracting Officer written notice a minimum of seven (7) consecutive calendar days prior to inspection. All work rejected by the Contracting Officer shall be repaired or replaced by the Contractor at no additional cost to the State.

### 3.03 VERIFICATION OF DIMENSIONS

- A. The Contractor shall check all dimensions at the site and shall establish all lines and levels. The Contractor shall be responsible for correctness of all dimensions and fitting of piping and equipment into the available space. Should field measurements show conditions that require relocation of any work, such conditions shall be reported to the Contracting Officer in advance of installation, and the work shall proceed in accordance with his decisions.

### 3.04 PROTECTION DURING STORAGE

- A. All materials and equipment shall be stored in a safe manner, secured from weather. All materials shall be stored above the ground or floor level to avoid damage by moisture.

3.05 PROTECTION OF WORK IN PROGRESS

- A. Pipe openings shall be closed with caps or plugs until connections are made. Equipment shall be securely covered for protection against physical or chemical damage. In areas exposed to weather, materials unused at the end of each day's work shall be stored in weather-protected locations. Damage to materials or equipment due to the Contractor's neglect shall be repaired or replaced to the satisfaction of the Contracting Officer by, and at the expense of, the Contractor.

3.06 PROGRESS OF WORK AND COORDINATION

- A. The work shall be coordinated with the work of other contractors and other trades to avoid interferences, preserve headroom and operating clearances, and to expedite completion of the project.

3.07 INSTALLATION OF EQUIPMENT

- A. Installation and adjustments shall be in accordance with the equipment supplier's written instructions. All accessories required shall be properly installed and connected. Supports shall be adequately anchored .

3.08 PERMITS, LICENSES AND INSPECTIONS

- A. The Contractor shall obtain all permits and licenses required to perform the work, and pay all required fees, and shall cooperate with all inspections required by authorities having jurisdiction. Inspections specified in the DIVISION 15 - MECHANICAL Technical Specifications shall be permitted without interference. Corrections to work as a result of inspections shall be made promptly.

3.09 PAINTING

- A. The Contractor shall patch and touch-up paint all surfaces damaged and/or disturbed due to Contractor's operations. All patching and touch-up painting shall match existing surrounding surfaces.

3.10 OPERATING TEST

- A. After installation work has been completed and approved, test equipment and fixtures under normal operating conditions to check capacities and other details as required demonstrating that they fulfill requirements of the plans and specifications, and that they operate satisfactorily.
- B. Where evidence of stoppage appears in piping or equipment, disconnect, clean, repair, and reconnect obstructed parts. Contractor shall bear costs of cutting, patching adjoining work necessitated by such cleaning and repairing.

END OF SECTION

## ATTACHMENT NO. 1

### SCHEDULE OF MAINTENANCE SERVICE

#### PART 1 - EQUIPMENT MAINTENANCE

##### 1.01 SUMMARY

- A. All services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks. Contractor shall also be responsible for performing all maintenance tasks recommended by the equipment manufacturer(s) whether listed below or not.

##### 1.02 SOLAR POWERED VENTILATION EXHAUST FANS

###### A. Quarterly Service

1. Check and clean the surface of the solar panel of debris, dust and sand
2. Check and clean fan wheel of dust and dirt.
3. Check and clean exhaust grille of dust and debris.
4. Certify performance of quarterly fan maintenance service. Correct and report all discrepancies.

###### B. Semi-Annual Service

1. Check and clean the surface of the solar panel of debris, dust and sand
2. Check and clean fan wheel of dust and dirt.
3. Check and clean exhaust grille of dust and debris.
4. Check plastic dome and base for damages. Remove and replace entire unit with new unit.
5. Certify performance of semi-annual fan maintenance service. Correct and report all discrepancies.

###### C. Annual Service

1. Submit maintenance report in writing to the Contract Administrator.

#### PART 2 - MAINTENANCE SCHEDULE AND REPORTING

##### 2.01 WORK SCHEDULE

- A. All maintenance work shall be performed between the hours of 7:30 a.m. and 4:00 p.m. on normal working days, Monday through Friday, excluding State Holidays.

## 2.02 TROUBLE CALLS

- A. Emergency service and repairs required between regular service calls shall be rendered within 24 hours after the Contractor is notified, State non-work days excluded. The Contractor shall call the facility representative the next working day after being notified of the problem and report the status of repairs.

## 2.03 MAINTENANCE REPORT/CHECKLIST

- A. The Contractor shall prepare and maintain a maintenance service report/checklist, which shall include the following:
  - 1. Date maintenance service was performed.
  - 2. Type of maintenance (i.e., quarterly, semi-annual, annual).
  - 3. The name of the mechanic who performed said maintenance.
  - 4. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.
  - 5. Documents and other data pertaining to the maintenance performed.
    - a. It shall be the responsibility of the Contractor to maintain the report/checklist by recording the above noted data after each scheduled maintenance and emergency repair, and have the checklist available for inspection at the building site. The report shall be sufficiently detailed to properly reflect the past maintenance history of the equipment.
    - b. Reports shall be certified by a representative of the facility being served and shall be submitted to the representative of the facility quarterly or at the completion of the service trouble call, whichever occurs first.

## 2.04 CLEANUP AND WORK PRACTICES

- A. The Contractor shall keep the job site free of debris, litter, discarded parts, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts and equipment from the service areas upon completion of the work.
- B. 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 components. The Contractor shall restore all damages, caused by his negligence, to its original condition at his own expense.

END OF ATTACHMENT

## SECTION 15400

### PLUMBING

#### PART 1 – GENERAL

##### 1.01 SUMMARY

A. This Section covers the following items:

1. Water piping and non-potable water equipment within the Storage Building to a point 5 feet from the building.

##### 1.02 GENERAL REQUIREMENTS

- A. Provide all necessary labor, materials, operations, tools and techniques required to furnish and install complete the plumbing systems as and within the limits indicated.
- B. Existing conditions, materials, sizes and dimensions shown on these drawings represent the best available information obtained from existing drawings and field investigations. Prospective bidders shall visit the premises and familiarize themselves with all work details and conditions before submitting a bid. Reasonable modifications to indicated arrangements to suit actual conditions shall not constitute a basis for requesting additional funds from the State.
- C. Prior to ordering materials and equipment, the Contractor shall verify all existing conditions, materials, sizes and dimensions that affect their work, and shall coordinate their work with all trades involved.
- D. Obtain all permits and pay the costs thereof. Arrange for inspections when required, in sufficient time to avoid delay to the project. Provide copies of inspection reports and disinfection certificates.

##### 1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. SECTION 05500 - METAL FABRICATIONS
- B. SECTION 15011 - GENERAL MECHANICAL PROVISIONS
- C. SECTION 15653 - VENTILATION

##### 1.04 LAWS, RULES, REGULATIONS AND REFERENCES

- A. The entire installation shall comply with the latest applicable rules and regulations of the County of Hawaii, the State of Hawaii, and any other applicable laws, codes, rules and regulations whether or not specifically mentioned hereinafter.
- B. Codes
1. Plumbing Code, County of Hawaii.
  2. Building Code, County of Hawaii.

3. Hawaii County Code, Chapter 5 – Building.
4. Americans With Disabilities Act Accessibility Guidelines (ADAAG), 36 CFR Part 1191

C. References

1. American Society for Testing and Materials (ASTM) Publications
  - a. D2846-09be1 Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems
  - b. D1998-15 Standard Specification for Polyethylene Upright Storage Tanks
2. Manufacturers Standardization Society (MSS) Publications
  - a. SP 110-10 Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
3. NSF International (NSF) Publications
  - a. 61-13 Drinking Water System Components - Health Effects

1.05 SUBMITTALS

- A. General: The Contractor shall submit submittals in accordance with the SECTION 15011 - GENERAL MECHANICAL PROVISIONS.
- B. Shop Drawings: The Contractor shall submit shop drawings showing the entire work with dimensions. Contractor shall check project drawings to avoid interferences with structural features and with work of other trades. No plumbing or piping work shall commence until such plans have been approved and accepted by the Contracting Officer. Any deviations from the shop drawings shall require approval by the Contracting Officer.
- C. Submit the following:
  1. Manufacturer's product data
  2. Shop drawings
  3. MSDS sheets
  4. As-built drawings
  5. One-Year Guarantee

PART 2 - PRODUCTS

2.01 WATER PIPING, ABOVE GRADE

- A. CPVC Pipe (2-inches and smaller): ASTM D2846, NSF 61 with CPVC fittings and solvent weld joints.

2.02 BALL VALVES

- A. Up to 2-Inches: Two piece bronze body, 150 psi steam working pressure, 600 psi nonshock cold working pressure, full port, chrome plated brass ball, Teflon seats and stuffing box ring, blowout-proof stems, Stainless steel lever handle, threaded ends. Valves shall comply with MSS SP-110.

2.03 POLYETHYLENE WATER STORAGE TANK

- A. Water Storage Tank shall be of one-piece seamless construction by rotational molding. Storage tank shall be constructed in accordance with ASTM D 1998. Tank shall be constructed of high density cross-linkable polyethylene, and designed for above ground installation, and for the containment of potable water at atmospheric pressure. Storage tank shall be a horizontal elliptical leg tank style, with liquid storage capacity as indicated on the drawings. Tank shall be provided with one fill opening, 16-inch diameter minimum opening, and a matching high density polyethylene hinged lid assembly. Storage tank shall be provided with a factory installed 2-inch double threaded bolted outlet fitting, equipped with type 316 stainless steel bolts and EPDM gasket. Storage tank shall include tank manufacturer provided elliptical leg tank support bands, number and quantity as recommended by the tank manufacturer. Support bands shall be galvanized or powder coated for corrosion protection. "Norwesco" or approved equal.

2.04 PLUMBING FIXTURES

- A. Furnish all items as required for installation and connection of fixtures and equipment furnished under this or other sections. Coordinate with other trades and disciplines as required.
- B. Fixtures List:
  - 1. Hose Bib shall be brass, wall mounted, 3/4 inch hose thread outlet, 3/4 inch threaded inlet, equipped with non-removal type vacuum breaker, removable tee handle and square head stop cock.

<u>Item</u>	<u>Manufacturer</u>	<u>Model</u>
Hose Bib	Arrowhead	351-BFP
Stop Cock	A.Y. McDonald	9802W

2.05 MISCELLANEOUS METALS

- A. Preformed slotted channel system components used in supports and brackets shall be Type 316 stainless steel, Unistrut Corporation or approved equal.

- B. Other metal components not specified elsewhere shall be in accordance with SECTION 05500 - METAL FABRICATIONS.

### PART 3 - EXECUTION

#### 3.01 WORKMANSHIP

- A. Comply with applicable codes of the County of Hawaii and with regulations of the State of Hawaii.
- B. Defective work or materials shall be removed by the Contractor and corrected without extra compensation.

#### 3.02 INSTALLATION

- A. Install all plumbing work as indicated and as specified herein.
- B. The tank manufacture shall specify the requirements for support of the tank bottom in installation specifications and recommended installation practices as provided by the tank manufacturer.

#### 3.03 PLUMBING FIXTURES

- A. Furnish, install and properly connect all plumbing fixtures and fittings and/or trims herein specified.
- B. Setting of all fixtures shall be done in an approved workmanlike manner. Special attention shall be exercised to the fixture heights as indicated on the drawings.
- C. No wood grounds shall be used for supports of plumbing fixtures.

#### 3.04 PIPE SUPPORTS, HANGERS AND INSERTS

- A. Install hangers and supports for all piping to provide for expansion and contraction, prevent vibration and maintain required grading by proper adjustment.
- B. Refer to structural drawings and as-built drawings for type of construction from which piping and/or equipment is to be suspended.
- C. Grind and smooth all sharp metal edges including struts and fabricated metal supports.
- D. Horizontal Piping Support Schedule:
  - 1. Support horizontal lines of CPVC pipe 1-inch pipe size and smaller with solvent cemented joints no more than 3-feet center-to-center and 1-1/4 inch pipe size and larger no more than 4-feet center-to-center.

#### 3.05 PROTECTION

- A. Provide plastic sheeting, or other protective covering as required to prevent damage during construction to building elements and equipment. Damage to materials, equipment or building due to the Contractor's neglect shall be repaired or replaced to the satisfaction of the Contracting Officer by, and at the expense of, the

Contractor. Be prepared to immediately repair any damage that does occur during any operations, so as to avoid damage to building or contents or interruption of State's operations.

3.06 INSPECTION

- A. Acceptance of the work will not take place until after discrepancies noted by the Contracting Officer have been corrected to the satisfaction of the Contracting Officer.

3.07 CLEANUP

- A. Upon completion of this work, remove all debris and excess materials, tools, etc., resulting from this work from the job site and leave the location of this work broom-clean in an acceptable manner as per the Contracting Officer. All work under this Section shall be thoroughly cleaned and ready for use.

END OF SECTION

## SECTION 15653

### VENTILATION

#### PART 1 - GENERAL

##### 1.01 SUMMARY

A. This Section covers the following items:

1. Install new solar powered ventilation exhaust fans and appurtenances.

##### 1.02 GENERAL REQUIREMENTS

A. Provide all necessary labor, materials, operations, equipment, tools and techniques and perform all operations required to furnish and install complete the ventilation work as and within the limits indicated.

B. Existing conditions, materials, sizes and dimensions shown on these drawings represent the best available information obtained from existing drawings and field investigations. Prospective bidders shall visit the premises and familiarize themselves with all work details and conditions before submitting a bid. Reasonable modifications to indicated arrangements to suit actual conditions shall not constitute a basis for requesting additional funds from the State.

C. Prior to ordering materials and equipment, the Contractor shall verify all existing conditions, materials, sizes and dimensions that affect their work, and shall coordinate their work with all trades involved.

D. Obtain all permits and pay the costs thereof. Arrange for inspections when required, in sufficient time to avoid delay to the project. Provide copies of inspection reports.

##### 1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. SECTION 05500 - METAL FABRICATIONS

B. SECTION 07920 – SEALANTS

C. SECTION 09901 – PAINTING

D. SECTION 15011 - GENERAL MECHANICAL PROVISIONS

E. SECTION 15400 – PLUMBING

##### 1.04 LAWS, RULES, REGULATIONS AND REFERENCES

A. The entire installation shall comply with the latest applicable rules and regulations of the County of Hawaii, the State of Hawaii, and any other applicable laws, codes, rules and regulations whether or not specifically mentioned hereinafter.

B. Codes

1. Hawaii County Code, Chapter 5 – Building.

2. Hawaii Administrative Rules, Title 11, Chapter 39, Air Conditioning and Ventilation.
3. Americans With Disabilities Act Accessibility Guidelines (ADAAG), 36 CFR Part 1191

#### 1.05 SUBMITTALS

- A. General: The Contractor shall submit submittals in accordance with the SECTION 15011 - GENERAL MECHANICAL PROVISIONS.
- B. Submit eight (8) sets of color schedule and sample chart for all exposed air distribution devices.
- C. Submit the following:
  1. Manufacturer's product data
  2. Shop drawings
  3. MSDS sheets
  4. Test reports
  5. As-built drawings
  6. Certificates
  7. One-Year Guarantee and Maintenance Service Contract
  8. Operation and Maintenance Manual
  9. Corrosion Protection Coating Warranty

### PART 2 - PRODUCTS

#### 2.01 MATERIALS AND EQUIPMENT

- A. Ventilation equipment to be considered for bid purposes shall be from a manufacturer that has locally stocked spare parts, representation, and support of a factory authorized service organization within 500 miles of the site of installation and has serviced manufacturer's units of comparable type, size and capacity as those specified herein. The manufacturer must have other units of comparable type, size and capacity installed and operating satisfactorily in the State of Hawaii for a minimum of two (2) years prior to bid opening.

#### 2.02 SOLAR POWERED VENTILATOR

- A. Ventilator shall be a factory assembled, roof curb-mounted, solar powered ventilator package unit. Solar panel shall be factory mounted to the ventilator unit's dome, and provided with a high transmission, tempered glass surface, with a

minimum rated DC power output of 28 watts. Perimeter of solar panel and wire opening shall be factory sealed. Fan motor shall be direct current (DC), variable voltage motor with permanently lubricated sealed ball bearings, hardened stainless steel shaft, sealed motor housing, dynamically balanced, and corrosion resistant. Fan blade shall be one-piece blade fan, factory balanced, and corrosion resistant. Ventilator unit dome and base shall be constructed of ultraviolet resistant plastic. Ventilator unit shall have a factory provided, corrosion resistant, insect screen. All manufacturer provided brackets and hardware shall be corrosion resistant. Solar powered ventilator shall be rated to exhaust air at the minimum rates as specified in the drawings.

### 2.03 EXHAUST GRILLE

- A. Material and Finishes: Construct grilles of aluminum. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded. Grilles shall be finished to match surrounding ceiling. Submit color schedule and sample chart with grilles identified and colors indicated.
- B. Surface mounted grilles shall have surface mount border type and fixed blades. Blades shall be spaced 1/2-inch on center and have a deflection angle of zero (0) degrees. Titus Model 355 ZFS or approved equal.

## PART 3 – EXECUTION

### 3.01 WORKMANSHIP

- A. Comply with applicable codes of the County of Hawaii and with regulations of the State of Hawaii.
- B. Defective work or materials shall be removed by the Contractor and corrected without extra compensation.

### 3.02 INSTALLATION

- A. Install ventilation work in accordance with the manufacturer's instructions and as indicated and as specified herein. Arrange for access to the site by written request submitted not less than seven (7) consecutive calendar days prior to the time at which access is requested. Install grilles after installation of ceiling surfaces in which they are installed. Coordinate installation with other trades so as to eliminate or avoid conflicts and delays to the progress of the work.

### 3.03 PROTECTION

- A. Provide planking, plastic sheeting, or other protective covering as required to prevent damage during construction to roof, roofing, or other existing building elements and equipment. Be prepared to immediately repair any damage that does occur during any operations, so as to avoid damage to building or contents or interruption of State's operations.

### 3.04 INITIAL OPERATION AND COMPLETION

- A. Test fan for proper operation in accordance with manufacturer's recommendations.

3.05 INSPECTION

- A. Acceptance of the work will not take place until after discrepancies noted by the Contracting Officer have been corrected to the satisfaction of the Contracting Officer.

3.06 LOCAL TECHNICAL SUPPORT

- A. The mechanical equipment supplier shall have a local Oahu, Hawaii office, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.

3.07 CLEANUP

- A. All equipment shall be thoroughly cleaned in an approved manner, and maintained until the final inspection.
- B. At completion of work, remove all debris and excess materials resulting from this work and leave location broom-clean acceptable to the Contracting Officer.

END OF SECTION